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How Important are Credit Constraints for Small Firm Growth?

Evidence from the Indian Informal Manufacturing Sector

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FINAL REPORT

1. Introduction

Globalisation has heightened the process of informalisation in developing countries. In India, there has been a significant expansion of the informal sector since the radical economic reforms of 1991, and at present, out of the 485 million workers in India, 86 per cent of them are in the unorganised and informal sector. The informal sector is the largest employment provider in the manufacturing sector in India. One major concern is its low productivity and efficiency despite its growing share in employment and output. The lack of upward progression of firms within the sector is believed to be a major hindrance affecting productivity in the manufacturing sector. Own-account manufacturing enterprises (OAMEs) employing family labour still dominate over Non-directory manufacturing establishments (NDMEs) and the Directory manufacturing establishments (DMEs) employing at least one hired labour (Table 1), and there has been hardly any transformation in the distribution of enterprises in the 10 years between 1994-95 and 2005-06, signifying less upward progression of firms in the sector. What explains this lack of transition of firms within the informal sector? The presence of such a large number of micro sized household enterprises along with their lack of growth is often attributed to credit constraints that do not allow these firms to increase in size (Hurst and Lusardi 2004).

In this study, we specifically focus on the role of finance constraints in determining the lack of transition of firms from the very small family firms (OAMEs) which are the predominant type of firm in the informal sector to the larger firms that employ non-family labour (DMEs and NDMEs). There is an extensive literature on the importance of the finance constraint on firm growth, but this literature is mostly confined to developed countries, and where the evidence

exists for developing countries, it is for the formal sector alone. We know surprisingly little about the role of finance constraints on firm growth in the informal sector. This is a surprising omission, given the dominance of informal firms in the manufacturing sectors of India and many other developing countries. In this paper, we use a very rich data-set based on unit level data drawn from the nationally representative surveys of the informal manufacturing sector undertaken by the NSSO. We test for finance constraints on informal firm growth using a variety of estimation methods including ordered logit and multinomial logit models. We use the unit level data for the econometric analysis, paying particular attention to endogeneity concerns with our measure of the finance constraint. We supplement the unit level analysis with panel data analysis of 364 districts over the period 1995-2010, where we estimate the effects of financial development on firm transition at the district level.

We find strong and robust evidence that finance constraints play an important role in firm transition from OAMEs, to NDMEs, then to DMEs. However, finance constraints seem to matter for the NDME-DME transition than the OAME-NDME transition. Firm capabilities seem to matter significantly too – e.g firms which maintain accounts are twice as likely to make the transition versus firms which do not. Moreover, firms which work as sub-contractors are 30 per cent more likely to make the transition. We also find that access to electricity, the firm's location in urban areas and whether the firm has experienced an expansion in its operations previously matter greatly in firm growth. District characteristics also matter – firms in districts with low levels of human capital (share of pop primary and less educated) and social disadvantage (SC/ST share in pop) less likely to make transition. Interestingly, State assistance (loans, training, marketing, etc.) does not seem to matter so much.

Table 1: Composition of informal sector by enterprise type

Year	Number of enterprises			Number of Workers			Gross Value Added		
	OAME	NDME	DME	OAME	NDME	DME	OAME	NDME	DME
1994-95	84.8	10.1	5.1	68.5	13.2	18.3	40.3	22.8	37.0
2000-01	86.1	10.1	3.8	67.6	15.0	17.4	42.3	25.0	32.7
2005-06	85.6	10.4	4.0	65.0	15.9	19.1	32.0	24.1	43.8

Source: NSSO surveys on the informal manufacturing sector.

The rest of the report is organised as follows. Section 2 provides a review of the literature. Section 3 discusses the empirical strategy and econometric methodology. Section 4 discusses the data and variables. Section 5 presents the descriptive statistics and results. Section 6 concludes.

2. Credit Constraints and Small Firm Growth

The access to and cost of finance is one of the factors that determine the ability of a firm to grow (Binks and Ennew, 1996; Oliveira and Fortunato, 2006). There is empirical evidence in support of this assertion which establishes a positive relationship between increased access to finance and firm growth (Rajan and Zingales, 1998; Demirgüç-Kunt and Maksimovic, 1998). Ayyagari, Demirgüç-Kunt and Vojislav (2006) show that finance, crime, and political instability directly affect the rate of growth of firms, with finance being the most robust variable affecting firms' growth rate. In a recent study, Beck et al (2005) finds that firms that report lower growth rates face greater finance constraints. Evidence also suggests that firms that face finance constraints are less likely to invest in fixed capital (Ojha et al., 2010; Winker 1999) and also lack the capabilities to innovate (Winker 1999).

The effect of financial constraint on firm growth varies across firms of different sizes. There is evidence that the effect is stronger for smaller firms (Angelini and Generale, 2008; Beck et al., 2005a) as small firms are financially more constrained than large firms (Beck et al., 2005; Beck and Demirgüç-Kunt, 2006; Beck, 2007; Kuntchev et al., 2012). Small firms face greater financial constraints, which exert a negative influence on their growth (Oliveira and Fortunato (2006).[1] Large firms, on the other hand, are more likely to have a loan and less likely to have credit constraints (Audretsch and Elston, 2002; Kumar and Francisco, 2005). Winker (1999) also finds that the larger a firm became, the lower is the risk of facing financial constraints. Beck et al. (2005) show that financing constraints reduce firm growth by 6 percentage points, on average, for large firms but by 10 percentage points in the case of small firms. Similarly, Schiffer and

[1] In the enterprise survey by the World Bank, 35 per cent of the small firms' rate cost of finance as major growth constraint and 30 per cent rate access to finance as major growth constraint (Beck 2007).

Weder (2001) find that small firms consistently report higher financing obstacles than medium and large enterprises. The probability that a small firm reports financing as a major obstacle (as opposed to moderate, minor or no obstacle) is 39 per cent as compared to 36 per cent of medium-sized firms and 32 per cent for large firms (Beck 2007). Evidence shows that lack of access to credit tends to hurt small firms the most in developing countries where financial markets are considerably underdeveloped, however, small firms in these countries benefit disproportionately as financial systems develop (Beck et al., 2005). In a recent study, Laeven (2003) finds that financial liberalisation reduces credit constraints for small firms and increases for large firms.

Small firms use less external finance, especially bank finance, and much of their financing come from internally generated funds, supplemented by borrowings from family and friends as well as informal sources or moneylenders. The excessive reliance on internal finance severely constrains their growth (Carpenter and Peterson, 2002). Studies have observed that access to external finance can significantly enhance the performance of firms (Keasey and Watson, 1992; Beck 2003; Becker and Greenberg 2005) and boost entry among small firms (Aghion et al., 2007). It also permits small firms to take advantage of growth opportunities especially in growing sectors where large firms would be predominant otherwise.

Recent research around the developing and developed world provides evidence that greater access to finance leads to small firm growth. In their analysis for Portuguese firms, Oliveira and Fortunato (2006) notice that, with the easing of finance constraints, small firms, which face more finance constraint and are more sensitive to the availability of internal finance, are likely to grow faster than large firms. Using a firm level database for a sample of 16 countries from industrialised, developing and emerging economies, Aghion et al. (2007) finds that finance matters most for the entry of small firms, especially in sectors that are reliant more on external finance. The study argues that greater access to external financing helps improve the selection process by allowing small firms to compete on a more equal footing with large firms.

The studies on the effects of financial constraints on firm performance have focused on different aspects: firm productivity, firm growth, firm investment, firm innovation and firm size distribution. Analysing the influence of credit constraint on firm productivity, Kuntchev et al. (2012) finds that medium and large firms with higher labour productivity are more likely to be less credit constrained when compared to small firms. Another study by Chaffai et al (2011) for the Moroccan garment sector firms also show a positive relationship between credit access and technical efficiency. Carpenter and Peterson (2002) find that excessive reliance on internal

finance hamper the growth of small firms. Beck et al. (2005) also provides evidence that financial obstacles have a much greater impact on the operation and growth of small firms than on that of large firms. Quasi-natural experimental evidence also confirms the importance of credit constraints for firm growth. Banerjee and Duflo (2004) analyze detailed loan information on 253 Indian SMEs' before and after they became eligible for a directed subsidized lending program and find that the additional credit resulted in a proportional increase in sales reflecting its impact on growth. Similarly, Zia (2007) finds that small non-listed and non-group firms in Pakistan reduce their sales after they become ineligible for subsidized export credit, indicating the existence of credit constraints; in contrast, large, listed and group firms do not reduce their sales after losing access to subsidized credit.

In addition to growth, studies have also noted that finance constraints also affect a firm's decision to invest in fixed capital and R&D. For instance, Hyytinen and Toivanen (2005) show that growth and innovativeness of small firms is constrained by access to external finance and that firms that are relying more on external finance are likely to invest more in R&D and are relatively more growth oriented. Ojah et al. (2010) also provides robust evidence that external and internal finance drives firm's decision to invest in fixed capital. Studies by Hottenrott and Peters (2011), Canepa and Stoneman (2008) and Ughetto (2008) also show how constraints to external financing are more binding for R&D and innovation of small firms. Ayyagari et al. (2007) observe that enterprises innovate at a faster rate if they have access to external borrowing.

Some studies also point out that lack of access to credit leads to distorted size distribution. Cabral and Mata (2003) argue that in the presence of finance constraints the long-run size distribution of firms is skewed significantly towards small firms. They further argue that when financing constraints cease to be binding, the small firms will grow to their optimal size, thus giving rise to a more symmetric distribution of firm size. Angelini and Generale (2005), however, argue that the relationship between financial constraint and firm size tends to be stronger in developing countries.

Recent research also shows the importance of the business environment for firms' financing constraints and patterns. Beck et al. (2006) place institutional development as the most significant factor explaining inter-regional variation in credit constraints encountered by firms. Firms report lesser capital constraint in countries with higher levels of institutional development as compared to countries with less developed institutions (Beck 2007). Beck et al. (2004) observe that better protection of property rights increases external financing of small firms significantly more than it does for large firms, particularly due to the differential impact it has on bank and

supplier finance. Financial and institutional underdevelopment also influences average size distribution of firms. Kumar et al. (1999) find that the average size of firms in human capital-intensive and R&D intensive industries is larger in countries with better property rights and patent protection.

3. Empirical Strategy and Econometric Methodology

The focus of the study is to analyse the role of financial constraints in explaining the transition of firms across the entire continuum of firm size in the informal manufacturing sector. We examine whether credit constraints matter in the transition of own account manufacturing enterprises (OAMES), which only the use of only family labour and which are very small in size, to somewhat larger enterprises which use both family and non-family labour but employ 5 or less workers (NDMEs), and then to the largest size class of firms in the informal manufacturing sector - firms that use both family and non-family labour and employ 6 or more workers (DMEs).

To test for the presence of finance constraints, we estimate the following equation:

$$e^*_{j,i,d,t} = \alpha_0 + \alpha_1 FIN_{j,i,d,t} + \sum_{k>1} \alpha_k X_{j,i,d,t} + \sum_{m>1} \lambda_m Z_{,d,t} + \gamma_i + \delta_t + \varepsilon_{j,i,d,t} (1)$$

Where e* is a latent variable denoting the size-class of the firm. The subscript j stands for firm, i for industry, d for district, and t for time. The latent variable e* is not observed, but the outcome e is – these observations are determined by the condition:

e = 1 if e*= OAME, e=2 if e* = NDME and e=3 if e*=DME (2)

FIN is our measure of finance constraint that a particular firm faces. We use a direct measure of the firm's finance constraint. The NSSO asks the firms in its surveys if they have faced any constraint on its borrowing in the last year. We denote this variable CAPSHOR and code this variable equal to 1 if the firm states that it faces a constraint and 0 if it answers that it does not face a constraint. Our hypothesis is that $\alpha_1$would be less than zero if access to finance is a constraint on firm transition.

X is a vector of firm-specific controls, while Z is a vector of district-specific controls. The variables γ_i are industry specific fixed effects and δ_t are the year specific dummies. We use

industry specific effects to capture the possibilities that firm transition to larger size enterprises would be more likely in industries with economies of scale such as metal, chemicals and automobiles. The year dummies capture the possibility that economy wide demand shocks may have an impact on firm transition.

We estimate equation (1) using ordered logistic regressions. We also estimate equation (1) using ordered probit and multinomial logit regression methods to check for our robustness of our results.

In equation (1), we use firms as units of analysis. As a further robustness test, we test for finance constraints using districts as units of analysis, and where our dependent variable is the share of NDMEs and DMEs in total enterprises in the district. We capture level of financial development at the district levelby the number of bank offices per capita (BANKOFPOP) and number of bank accounts per capita (BANKACTPOP).

The equation we estimate at the district level is given by:

$$s_{d,t} = \alpha_0 + \alpha_1 FIN_{d,t} + \sum_{m>1} \lambda_m Z_{,d,t} + \varepsilon_{d,t} (3)$$

Where s is the share of NDMEs and DMEs in total enterprises, FIN is measured by bank offices per capita and by bank accounts per capita alternately. Z is the vector of district level controls already specified in equation (1). We estimate equation (3) by ordinary least squares (OLS). We expect that the coefficient $\alpha_1$that we estimate in equation (3) would be positive and significant if the level of financial development has a positive effect on firm transition to larger size categories.

A possible concern with ordered logit estimates of equation (1) and OLS estimates of equation (3) is the coefficient on FIN in these estimates would be biased due to possible endogeneity of the variables that we use to measure firm-specific and district-specific finance constraints. For example, commercial banks may place their branches in districts where there are more NDMEs and DMEs as the demand for external funds would be higher in these larger sized enterprises. In this case, the presence of finance constraints would be endogenous to the distribution of firms in various size classes in the district. To address endogeneity concerns, we also estimate equations (1) and (3) using Instrumental Variable (IV) methods. As instruments for CAPSHOR in equation (1) and (3) we use the distance of the district from the state capital (DISTANCE), whether there is a national highway or a broad gauge line passes through the district (TRANSPORT) and the

proportion of villages in the district that has colleges. We use instrumental variables that we believe capture the supply side of financial intermediation. An important supply side consideration for financial intermediaries to place their branches in district is the preferences of senior level staff of these intermediaries as to where they would like to be based. Important factors that will determine the preferences of senior level staff of financial intermediaries to take up residences in districts would be the access of the district in terms of a major transportation link, the remoteness of the district as captured by the distance of the district from the state capital and the presence of higher education facilities in the district. This set of instrumental variables will meet the exclusion criteria as they would not have a direct effect on firm transition over and above their indirect effect working through the presence of finance constraints.

4. Data and Variables

For the unit level analysis, we use unit level data for the informal manufacturing sector for three years, 2000-01, 2005-06, and 2010-11 .The choice of years for the unit level analysis is governed by the fact that the data on the finance constraints that an informal sector firm faces are only available for these years. While unit level data on informal manufacturing firms is available for 1994-95, the surveys for this year did not ask any question on whether the firm faced any borrowing constraint. However, for the district level analysis, where we do not use firm specific information on finance constraint, we use the unit level data for the year 1995-96 as well.

The National Sample Survey Organization (NSSO) is the agency that collects unit level data on various aspects of the enterprises/units in the informal manufacturing sector quinquennially using a stratified random sampling procedure. These are nationwide enterprise level surveys covering all the Indian states and Union Territories (UTs) and are stratified by district.[1]Since most informal enterprises are not registered with any government authority, the NSSO uses a block enumeration approach to ensure a representative sample of the informal sector in every district.

For the unit level analysis, our data is in the form of repeated cross-sections, and not in panel form, as the NSSO does not reveal the identity of the firm/plant in the unit level data, and for the informal sector, the same firms may not be surveyed in each round. For our unit level data, we had 294736 firms in the pooled data-set, across 22 industries, 364 districts, three years and 15 major Indian states.[2]However, where we use districts as units of analysis as in equation (3), we have a panel data of 364 districts over four years, giving a total of 1440 observations.

[2] The states induded are Andhra Pradesh (AP), Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh (MP), Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu (TN), Uttar Pradesh (UP), and West Bengal (WB).

It is to be noted that during the sixteen years of our analysis period, industrial classification has undergone some changes. NSSO data for 1989-90 and 1994-95 are based on NIC 1987codes, whereas 2000-01 data is based on NIC 1998 and 2005-06 data is based on NIC 2004. The 2010-2011 round uses NIC 2008 codes. We harmonized the whole data at NIC 2008 codes, and constructed twenty-two industry dummies for all rounds in our unit level data.

The district level finance variables that we used as proxies for firm-specific finance constraints are drawn from the Reserve Bank of India (RBI) publication, *Basic Statistical Returns of Scheduled Commercial Banks in India*, for the period, 1993, 1999, 2004 and 2009. These reports provide comprehensive data on state-wise/ district-wise distribution of branch offices, bank employees, number of deposits and amount deposited and outstanding credit of scheduled commercial banks in India. The data are collected through the annual statistical surveys from the offices of scheduled commercial banks in India including Regional Rural Banks. The NSSO surveys provide the names of the districts in which firms are located, and we merged the NSSO and the RBI datasets using a one-to-one mapping of 364 districts for the two datasets. New districts have been created in many states during the period 2001-2010. In order to facilitate comparison over time at the district level for the period under study, these new districts have been merged with their parent districts. Data on district level control variables, as discussed below, were obtained from the 2001 Census of India.

Our firm specific controls are whether the firm is located in urban area or not (SECTOR = 1 if the firm is located in urban area), whether the firm is registered under any act/authority (REGIS = 1 if the firm is registered), whether the firm is undertaking any work on contract basis (if yes, CONTRACT = 1), whether the firm receives any assistance from the government such as financial loans, subsidies, machinery and equipment, training, marketing and procurement of raw materials (if yes, ASSISTANCE = 1), whether the firm has been expanding in the past three years (STATUS = 1 if the firm has been expanding and STATUS = 0 if the firm is stagnant or contracting), whether the firm has access to electricity (if yes, ELEC = 1) and whether the firm maintains regular accounts (if yes, ACMAINT = 1). We would expect that all the control variables will be having a positive effect on firm transition.

Our district level controls are the level of urbanisation in the district as measured by the share of urban population in total population (URBAN), the proportion of SC/ST in total population (SHSCSTPOP), the proportion of individuals who are educated at primary level or below

(PRIMEDU) and the proportion of individuals educated at secondary level and above (MIDGRADEDU). We expect that higher the level of urbanisation in a district and higher the level of human capital as measured by high MIDGRADEDU and low PRIMEDU would have a positive effect on firm transition. On the other hand, social and economic backwardness as captured by SHSCSTPOP will have a negative effect on firm transition.

5. Descriptive Statistics and Results

We begin the empirical analysis by presenting the summary statistics for the main dependent and independent variables used in our analysis in table 1. We find that, on average, 36.2 per cent of all firms are finance-constrained; 54.2 per cent are in urban areas; and 20 per cent of informal firms undertake work on a contract basis. Data also shows that more than a fifth (23.3 per cent) of firms do not have an electricity connection and only 7.4 per cent maintain accounts. At the district level, SC/STs constitute 23 per cent of the total population. We find that 23 per cent of the population is educated only up to the primary level while 26 per cent is educated beyond the secondary level. At the same time, just 2 percent of the villages have a college located within. An interesting finding is that 80 per cent of all districts are connected to a national highway or a broad-gauge railway line. In figures 1 to 7, we also present some firm-specific characteristics by enterprise type. We find that more number of OAMEs faced capital shortages as compared to NDMEs and DMEs (figure 1).[2] We also find that very few OAMEs, NDMEs and DMEs received any type of assistance from external sources (figure 2). In our dataset, 26 per cent of DMEs received work through sub-contracting, but only 19 per cent of OAMEs and DMEs worked as sub-contractors (figure 3). While more than 1/3rd of the DMEs reported that they maintain accounts, only 10 per cent of NDMEs and 2 per cent of OAMEs claimed that they did so (figure 4). Our estimates suggest that 37 per cent of DMEs and 30 per cent of NDMEs had access to electricity as opposed to 19 per cent of OAMEs (figure 5). While 2/3rd of the DMEs have registered under any act, only 9 per cent of OAMEs reported they have registered with any agencies or act (figure 6). As is evident from figure 7, 32 per cent of DMEs, 28 per cent of NDMEs and 19 per cent of OAMEs have reported their current status as expanding.

Table 2 presents the estimates of equation (1). In model1, we present an estimate of equation (1) with only the CAPSHOR variable. In model2, we include industry dummies and in model3, we further include year dummies. In model4, we introduce firm specific controls as discussed in the previous section. Finally, in model5 we also include district specific controls.

Strikingly we find across all five models the CAPSHOR variable is negative and significant suggesting that with easing of finance constraint the firm is likely to move from OAME status to NDME status and then on to DME status. This suggests clear negative relationship between finance constraints and firm transition across the continuum of size classes in the informal manufacturing sector in India. We also find that transition of firms is more evident in urban areas. Firms which are registered under any act, firms that are under contract, firms that maintain accounts and firms that have access to power are more likely to make the transition from OAME to NDME and then from NDME to DME. There is less clear evidence that assistance provided to firms have a positive effect on firm transition. We also find that firms that are expanding for the last three years are more likely to move out of OAME status. With respect to district level controls, we find that firms are more likely to make transition across size classes in more urbanised districts. This indicates that the demand side factors are important for firm transition as in more urbanised districts there will be greater demand for manufacturing products. We also find that the share of SC/ST population in total population and the share of level of education up to primary level have a negative influence on firm transition. This perhaps could be due to lower level of entrepreneurship among the socially disadvantaged groups and constraints emanating from lower levels of human capital. Our finding on the positive effect of education beyond secondary level supports the crucial role of human capital on firm transition.

Table 3 and Figure 8 present the odds ratios of the ordered logit estimates of equation (1). We follow the same order of specifications as in table 2. We find that the odds ratio is less than one for CAPSHOR across five models estimated. This suggests that the switch in firm status being finance constrained to not being finance constrained increase the likelihood that the firm will be DME or NDME instead of OAME. Among the other variables that matter for firm transition, the most important of these are whether the firm is registered, whether the firm maintain an account and the level of education of the district beyond secondary level.

We do robustness checks by estimating equation (1) using alternate econometric models – viz. ordered probit and multinomial logit models. We present the results of ordered probit models in table 4 and multinomial logit model in table 5. We follow the same order of specification in both these estimations as in table 2. We get similar results with respect to our key explanatory variables except assistance which turns out to be positive and significant in all our runs. Moving on to the instrumental variable estimate of equation (1) using ordered probit model, we find that as hypothesised in our first set of regressions distance from state capital, the lack of access to a

transportation link and lack of presence of collages in the district have a negative effect on CAPSHOR (Table 6). In our second stage results, the predicted CAPSHOR variable (CAPSHORHAT) is negative and significant suggesting that our results are robust to possible endogeneity concerns with CAPSHOR.

As a final robustness test, we also present panel data estimates at the district level, both using OLS and IV models. Table 7 presents the summary statistics for the variables used in the analysis. We find that, on average, 81 per cent of villages are electrified and 61 per cent have better road connectivity. On average, only 14 per cent of the enterprises in the informal sector employ hire labour. The SC/ST constitutes 25 per cent of the total population. Only 14 per cent of the people are educated up to primary level while 23 per cent are educated beyond the secondary level.

We also attempt to capture the relationship between district specific characteristics and presence of enterprises with hired labour (NDMEs and DMEs) using scatter plots in figures 9 to 12. We start off by examining whether the NDMEs and DMEs have a higher presence in districts that are more financially developed. The scatter plot of proportion of NDMEs and DMEs in total enterprises against bank offices per capita in figure 9 confirms positive relationship between the two suggesting that districts that are financially more developed have a larger share of DMEs and NDMEs in total enterprises. We next look at the relationship between the presence of NDMEs and DMEs and the average educational level of people at the district level. Our scatter plot in figure 10 confirms a positive relationship between the two, indicating that districts with higher human capital have a larger share of NDMEs and DMEs in total enterprises. On the other hand, districts with a larger presence of socially disadvantaged sections -- captured through the percentage of the SC/ST population in the total population -- tend to have less number of NDMEs and DMEs (figure 11). We find that the share of NDMEs and DMEs to total enterprises is higher in district that are more urbanised and are better connected by road (Figure 12 and 13). Evidence also points to the existence of a one-to-one relationship between the financial development of a region and its distance from the state capital (figure 14).

We present the OLS and IV results in table 8. We find that our financial development measures – BANKOFPOP and BANKACTPOP – are positive and significant for both OLS and IV estimates. Reassuringly, our district level controls have the same sign as in the unit level analysis

and are mostly significant in these estimations too. Two additional variables we considered as proxy for infrastructure are positive and significant in our OLS estimations.

To conclude, there is robust evidence that finance constraints are clear impediment for firm transition across different size classes in the informal sector. We find this to be valid irrespective of whether we use firms or districts as units of analysis. Further alternate econometric models produce identical results. Our results are also robust to possible endogeneity concerns with regard to our measures of finance constraint. We also find clear evidence that firm location, past history of the firm and firm capabilities explain why some firm make transition across different size classes and others do not.

5. Conclusions

In this study, we specifically focus on the role of finance constraints in determining the lack of transition of firms from the very small family firms (OAMEs) which are the predominant type of firm in the informal sector to the larger firms that employ non-family labour (DMES and NDMEs). We use a very rich data-set based on unit level data drawn from the nationally representative surveys of the informal manufacturing sector undertaken by the NSSO. We test for finance constraints on informal firm growth using a variety of estimation methods including ordered logit and multinomial logit models. We use the unit level data for the econometric analysis, paying particular attention to endogeneity concerns with our measure of the finance constraint. We supplement the unit level analysis with panel data analysis of 364 districts over the period 1995-2010, where we estimate the effects of financial development on firm transition at the district level.

We find strong and robust evidence that finance constraints play an important role in firm transition from OAMEs, to NDMEs, then to DMEs. However, finance constraints seem to matter for the NDME-DME transition than the OAME-NDME transition. Firm capabilities seem to matter significantly too – e.g firms which maintain accounts are twice as likely to make the transition versus firms which do not. Moreover, firms which work as sub-contractors are 30 per cent more likely to make the transition. We also find that access to electricity, the firm's location in urban areas and whether the firm has experienced an expansion in its operations previously matter greatly in firm growth. District characteristics also matter – firms in districts with low levels of human capital (share of pop primary and less educated) and social disadvantage (SC/ST share in pop) less likely to make transition. Interestingly, State assistance (loans, training, marketing, etc.) does not seem to matter so much.

The finding that finance constraints matter for firm transition and growth in the informal sector and that financial development exerts a strong positive effect on the ability of OAMEs to grow into NDMEs and DMEs has important implications for policy. While the Indian government actively promoted an equitable spread of financial institutions till 1991 under a system of branch licensing policy for nationalised commercial banks which made it mandatory for these banks to open branches in rural and semi-urban areas and remote regions of the country, this policy has been considerably weakened since the financial liberalisation enacted as part of the 1991 economic reforms. Our results suggest that such a weakening of branch licensing policy could have a negative effect on firm transition in the informal sector, especially if commercial banks are withdrawing their offices from the more remote regions and districts. In this case, there would need for a counter-vailing set of policy measures that provide incentives for financial intermediaries to lend to informal sector enterprises as well as a greater emphasis on micro-finance initiatives.

Table 1:Summary Statistics - Firm Level Analysis

Variables	N	Mean	SD	Min	Max
ENTYP	294736	1.448988	0.682141	1	3
CAPSHOR	294736	0.362307	0.480668	0	1
SECTOR	294736	0.542343	0.498205	0	1
REGIS	294736	0.232588	0.422482	0	1
CONTRACT	294736	0.200227	0.400171	0	1
ASSISTANCE	294736	0.004794	0.069074	0	1
STATUS	294736	0.226029	0.418259	0	1
ELEC	294736	0.233097	0.422804	0	1
ACMAINT	294736	0.073832	0.261498	0	1
URBAN	294736	0.34537	0.396945	0	1
SHSCSTPOP	294736	0.231766	0.117352	0.026295	0.942542
PRIMEDU	294736	0.292051	0.060837	0.14919	1
MIDGRADEDU	294736	0.261882	0.105644	0.068002	0.964556
DISTANCE	294736	255.5111	184.2678	0	1010
TRANSPORT	294736	0.800832	0.399375	0	1
COLLGVILLG	281606	0.016217	0.028592	0	0.166667

Table 2: Results: Ordered Logistic Regression Estimates

Dep Variable: entyp

Variables	Model1	Model2	Model3	Model4	Model5
CAPSHOR	-0.037* (0.008)	-0.175* (0.008)	-0.150* (0.009)	-0.138* (0.010)	-0.100* (0.010)
SECTOR				0.383* (0.009)	0.287* (0.009)
REGIS				1.847* (0.010)	1.786* (0.010)
CONTRACT				0.330* (0.011)	0.289* (0.012)
ASSISTANCE				0.079 (0.063)	0.115* (0.063)
STATUS				0.439* (0.010)	0.465* (0.010)
ELEC				0.542* (0.010)	0.614* (0.010)
ACMAINT				1.445* (0.016)	1.420* (0.016)
URBAN					0.232* (0.011)
SHSCSTPOP					-0.645* (0.043)
PRIMEDU					-0.444* (0.078)
MIDGRADEDU					1.596* (0.048)
Industry Dummy	N	Y	Y	Y	Y
Year Dummy	N	N	Y	Y	Y
N	294736	294736	294736	294736	294736
Pseudo R2	0.00	0.04	0.04	0.19	0.20
Log Likelihood	-251788.55	-241365.77	-241343.33	-204146.63	-202404.57

Table 3: Odds Ratios: Ordered Logistic Regression Estimates

Dep Variable: entyp

Variables	Model1	Model2	Model3	Model4	Model5
CAPSHOR	0.964* (0.008)	0.839* (0.007)	0.860* (0.008)	0.871* (0.009)	0.905* (0.009)
SECTOR				1.466* (0.013)	1.333* (0.012)
REGIS				6.343* (0.063)	5.967* (0.061)
CONTRACT				1.391* (0.016)	1.335* (0.015)
ASSISTANCE				1.083* (0.068)	1.122* (0.071)
STATUS				1.551* (0.015)	1.592* (0.016)
ELEC				1.720* (0.017)	1.847* (0.019)
ACMAINT				4.242* (0.066)	4.135* (0.064)
URBAN					1.262* (0.013)
SHSCSTPOP					0.525* (0.022)
PRIMEDU					0.642* (0.050)
MIDGRADEDU					4.934* (0.238)
Industry Dummy	N	Y	Y	Y	Y
Year Dummy	N	N	Y	Y	Y
N	294736	294736	294736	294736	294736
Pseudo R2	0.00	0.04	0.04	0.19	0.20
Log Likelihood	-251788.55	-241365.77	-241343.33	-204146.63	-202404.57

Table 4: Results: Ordered Probit Regression Estimates

Dep Variable: entyp

Variables	Model1	Model2	Model3	Model4	Model5
CAPSHOR	-0.021* (0.005)	-0.095* (0.005)	-0.090* (0.005)	-0.076* (0.006)	-0.053* (0.006)
SECTOR				0.212* (0.005)	0.158* (0.005)
REGIS				1.062* (0.006)	1.026* (0.006)
CONTRACT				0.200* (0.007)	0.172* (0.007)
ASSISTANCE				0.106* (0.035)	0.125* (0.035)
STATUS				0.250* (0.006)	0.265* (0.006)
ELEC				0.314* (0.006)	0.354* (0.006)
ACMAINT				0.847* (0.009)	0.830* (0.009)
URBAN					0.140* (0.006)
SHSCSTPOP					-0.392* (0.024)
PRIMEDU					-0.189* (0.044)
MIDGRADEDU					0.922* (0.027)
Industry Dummy	N	Y	Y	Y	Y
Year Dummy	N	N	Y	Y	Y
N	294736	294736	294736	294736	294736
Pseudo R2	0.00	0.04	0.04	0.19	0.20
Log Likelihood	-251789.12	-240982.68	-240978.81	-204541.98	-202698.97

Table 5: Results: Multinomial Logistic Regression Estimates

Dep Variable: entyp

Variables	Model1		Model2		Model3		Model4		Model5	
	NDME	DME	NDME	DME	NDME	DME	NDME	DME	NDME	DME
CAPSHOR	-0.037* (0.009)	-0.040* (0.013)	-0.146* (0.010)	-0.222* (0.013)	-0.016 (0.011)	-0.311* (0.014)	-0.046* (0.012)	-0.270* (0.016)	-0.012* (0.012)	-0.207* (0.017)
SECTOR							0.586* (0.010)	0.220* (0.016)	0.509* (0.011)	0.075* (0.016)
REGIS							1.713* (0.012)	2.464* (0.016)	1.676* (0.012)	2.365* (0.017)
CONTRACT							0.200* (0.014)	0.606* (0.018)	0.167* (0.014)	0.545* (0.019)
ASSISTANCE							-0.186* (0.079)	0.311* (0.090)	-0.157* (0.079)	0.370* (0.091)
STATUS							0.401* (0.012)	0.625* (0.017)	0.424* (0.012)	0.664* (0.017)
ELEC							0.545* (0.012)	0.691* (0.016)	0.591* (0.012)	0.819* (0.017)
ACMAINT							0.857* (0.023)	2.224* (0.024)	0.847* (0.023)	2.202* (0.025)
URBAN									0.149* (0.013)	0.385* (0.016)
SHSCSTPOP									-0.521* (0.049)	-1.073* (0.077)
PRIMEDU									-0.660* (0.089)	0.144* (0.138)
MIDGRADEDU									1.437* (0.055)	2.491* (0.078)
Industry Dummy	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Year Dummy	N	N	N	N	Y	Y	Y	Y	Y	Y
N	294736	294736	294736	294736	294736	294736	294736	294736	294736	294736
Pseudo R2	0.00	0.00	0.06	0.06	0.06	0.06	0.21	0.21	0.22	0.22
Log Likelihood	-251788.3	-251788.3	-236893.9	-236893.9	-236157.6	-236157.6	-198334.2	-198334.2	-196398.1	-196398.1

Table 6: Robustness Check: First Stage OLS and Second Stage Ordered Probit Results

Dep Variable: entyp

Variables	First Stage Dep - Capshor	Second Stage Dep - entyp
CAPSHORHAT		-0.243* (0.058)
SECTOR	-0.0003 (0.002)	0.158* (0.005)
REGIS	-0.031* (0.002)	1.033* (0.006)
CONTRACT	-0.011* (0.002)	0.157* (0.007)
ASSISTANCE	0.052* (0.013)	0.153* (0.041)
STATUS	-0.010* (0.002)	0.268* (0.006)
ELEC	0.170* (0.002)	0.394* (0.012)
ACMAINT	-0.057* (0.003)	0.814* (0.010)
URBAN	-0.047* (0.002)	0.126* (0.007)
SHSCSTPOP	0.114* (0.008)	-0.332* (0.025)
PRIMEDU	-0.041* (0.014)	-0.285* (0.047)
MIDGRADEDU	-0.246* (0.010)	0.863* (0.033)
DISTANCE	-0.0002* (4.66e-06)	
TRANSPORT	-0.013* (0.002)	
COLLGVILLG	-0.285* (0.033)	
Industry Dummy	Y	Y
Year Dummy	Y	Y
N	281606	281606
Log pseudolikelihood		-190660.43
R2/Pseudo R2	0.23	0.19

Table 7: Summary Statistics - District Level Variables

Variables	N	Mean	SD	Min	Max
ELECVILLAGE	1440	0.815605	0.244493	0.056998	1
ROADVILLAGE	1440	0.619109	0.252702	0.129032	1
SHNDMEDME	1446	0.143876	0.115159	0.000159	0.806688
BANKOFPOP	1446	6.46E-05	2.99E-05	7.86E-06	0.00028
BANKACTPOP	1446	0.397815	0.275047	0.033333	1
SHSCSTPOP	1446	0.252114	0.133335	0.026295	0.942542
SHURBAN	1446	0.302986	0.22283	0.001091	1
PRIMEDU	1446	0.144479	0.051109	0.059946	0.875199
MIDGRADEDU	1446	0.232398	0.094602	0.068002	0.964556

Table 8: District level Analysis

Dep Variable: shndmedme

Variable	OLS Results				IV Results	
	Model1	Model2	Model3	Model4	Model5	Model6
BANKOFPOP	358.05* (151.99)	324.37* (146.50)			1168.72# (732.19)	
BANKACTPOP			0.076* (0.020)	0.063* (0.019)		0.471* (0.190)
SHSCSTPOP	-0.066* (0.017)	-0.024 (0.018)	-0.057* (0.017)	-0.020 (0.017)	-0.070* (0.018)	-0.024 (0.026)
SHURBAN	0.155* (0.016)	0.142* (0.015)	0.142* (0.017)	0.134* (0.016)	0.153* (0.016)	0.075* (0.037)
PRIMED	-0.022 (0.051)	-0.057 (0.057)	-0.013 (0.048)	-0.044 (0.053)	-0.062 (0.068)	-0.061 (0.064)
MIDGRADEDU	0.269* (0.053)	0.195* (0.049)	0.229* (0.051)	0.171* (0.047)	0.154 (0.115)	-0.241 (0.244)
ELECVILLAGE	0.028* (0.010)		0.029* (0.010)		0.019 (0.013)	
ROADVILLAGE		0.100* (0.013)		0.094* (0.013)		0.008 (0.016)
Constant	0.007 (0.011)	-0.015 (0.011)	0.009 (0.010)	-0.010 (0.011)	-0.003 (0.014)	0.002 (0.013)
N	1440	1440	1440	1440	1440	1440
R2	0.09	0.09	0.30	0.32	0.26	0.39

Note: * significant at 5 per cent level; # significant at 11 per cent level

Figure 1: Proportion of enterprises facing finance constraint by enterprise type

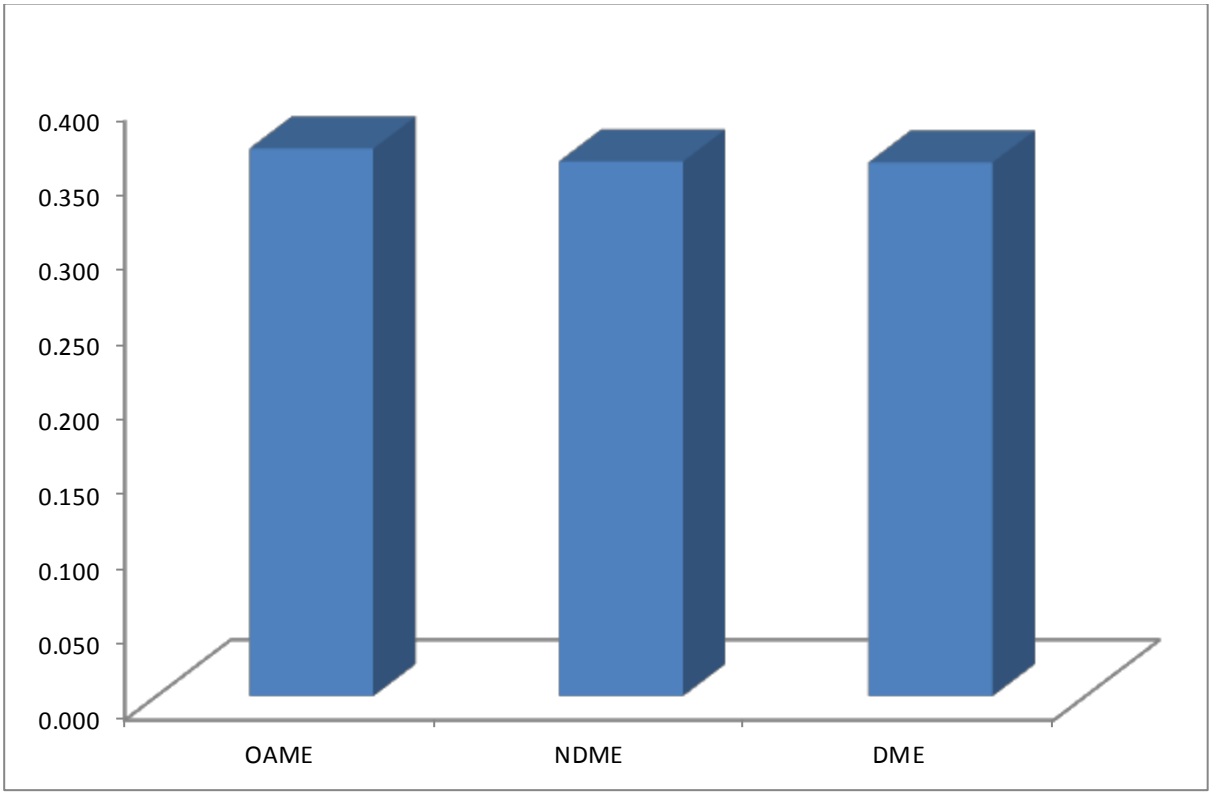


Figure 2: Proportion of enterprises with some assistance received by enterprise type

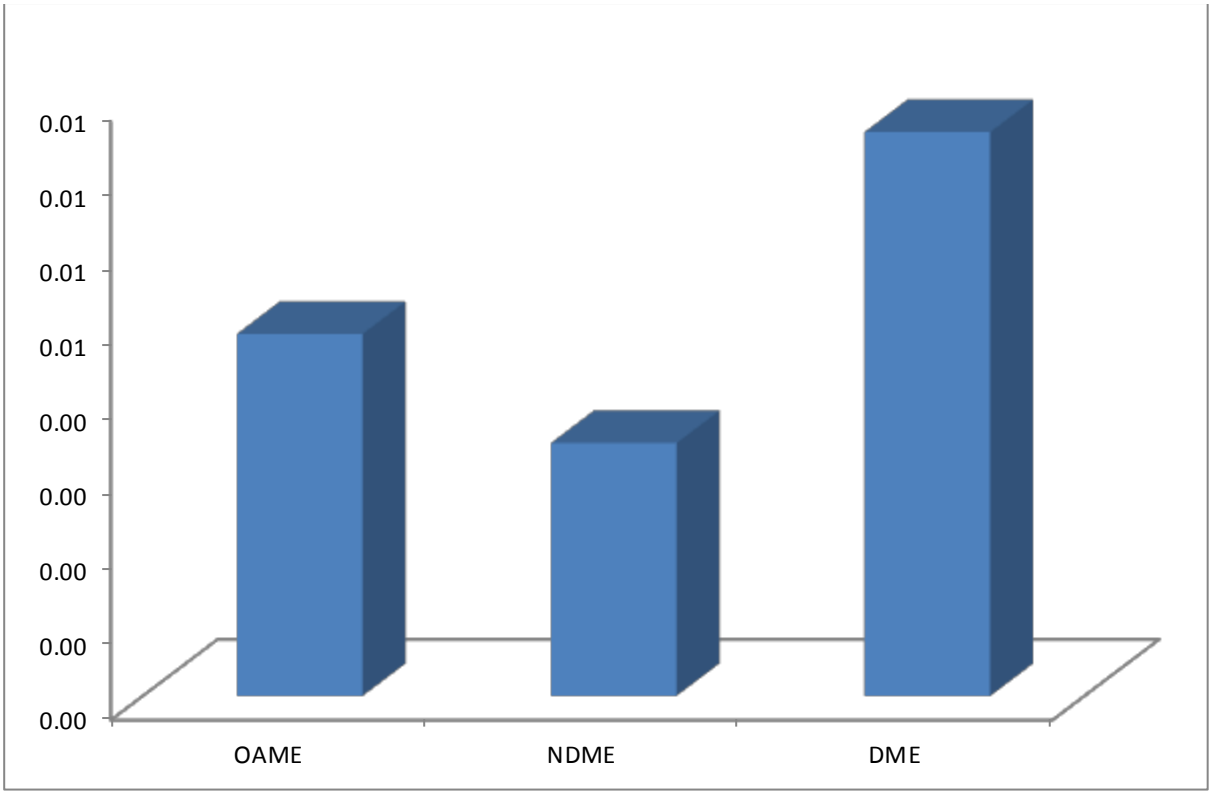


Figure 3: Proportion of enterprises on contract by enterprise type

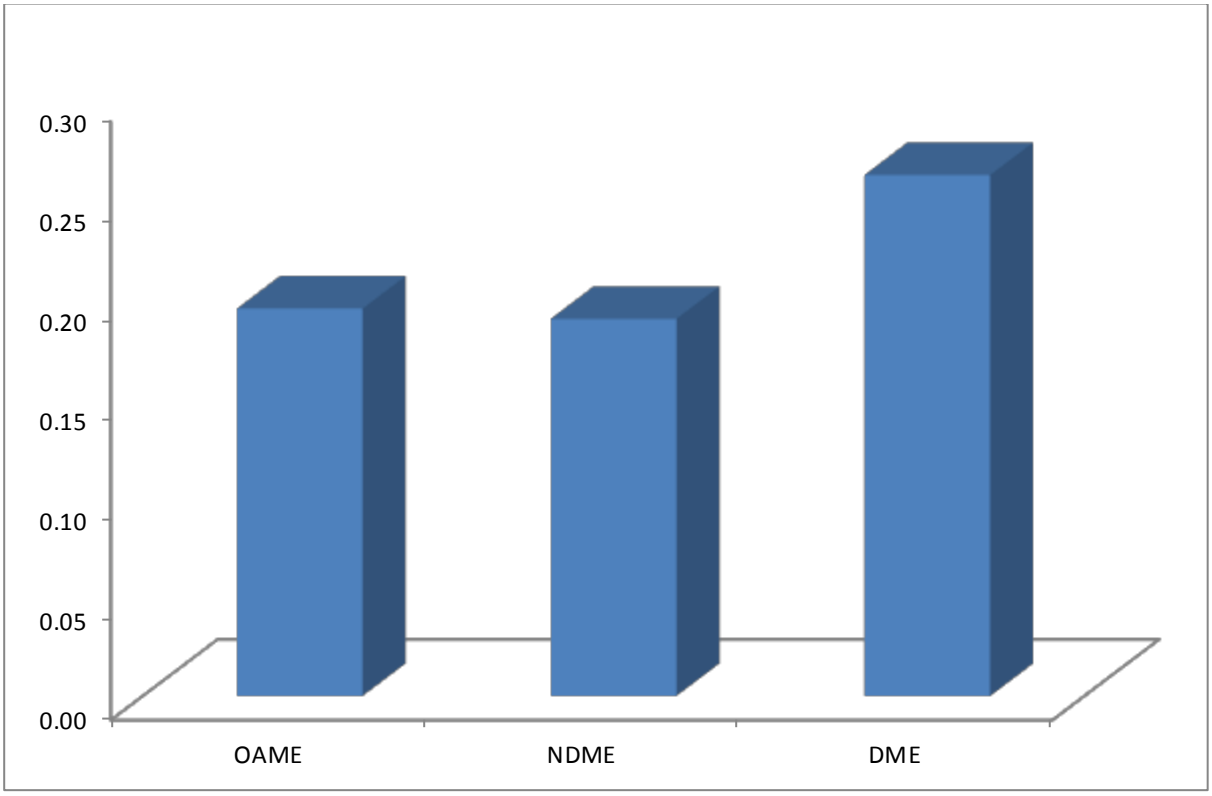


Figure 4: Proportion of enterprises that maintain accounts by enterprise type

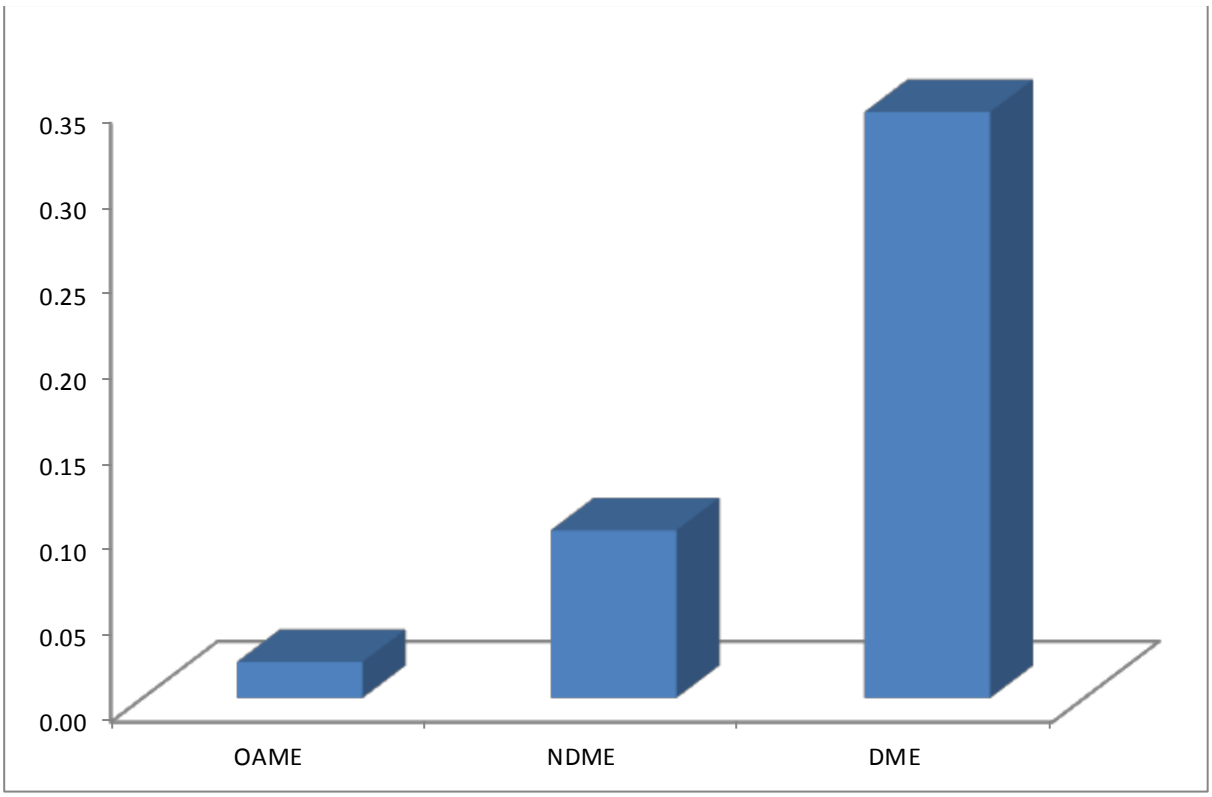


Figure 5: Proportion of enterprises with access to electricity by enterprise type

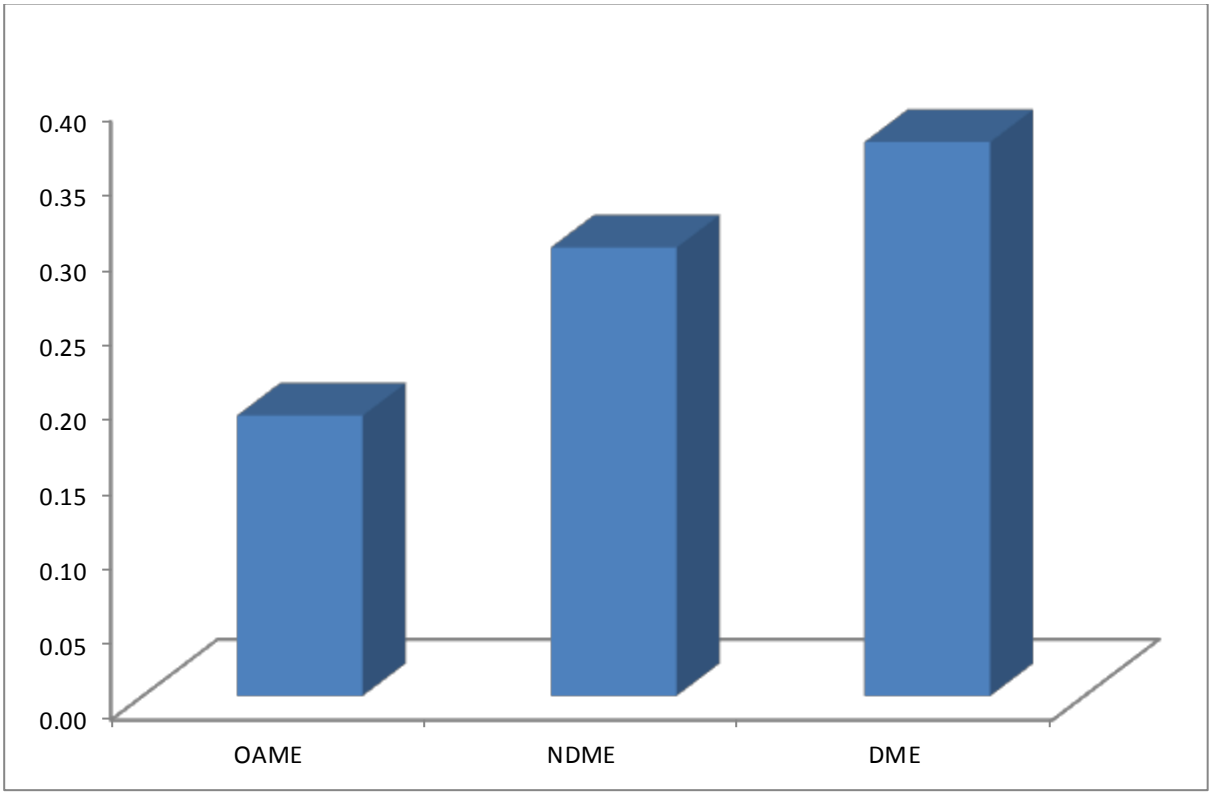


Figure 6: Proportion of enterprises that are registered under any act by enterprise type

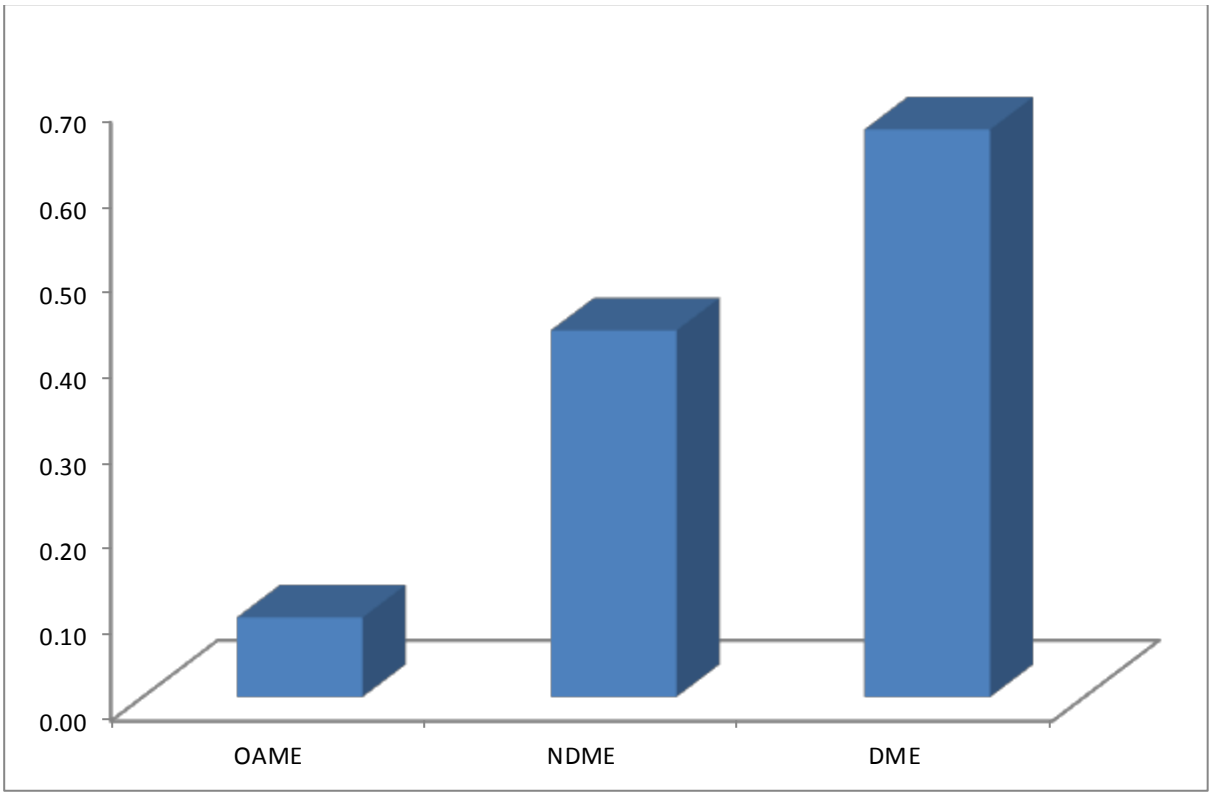


Figure 7: Proportion of enterprises with status as expanding by enterprise type

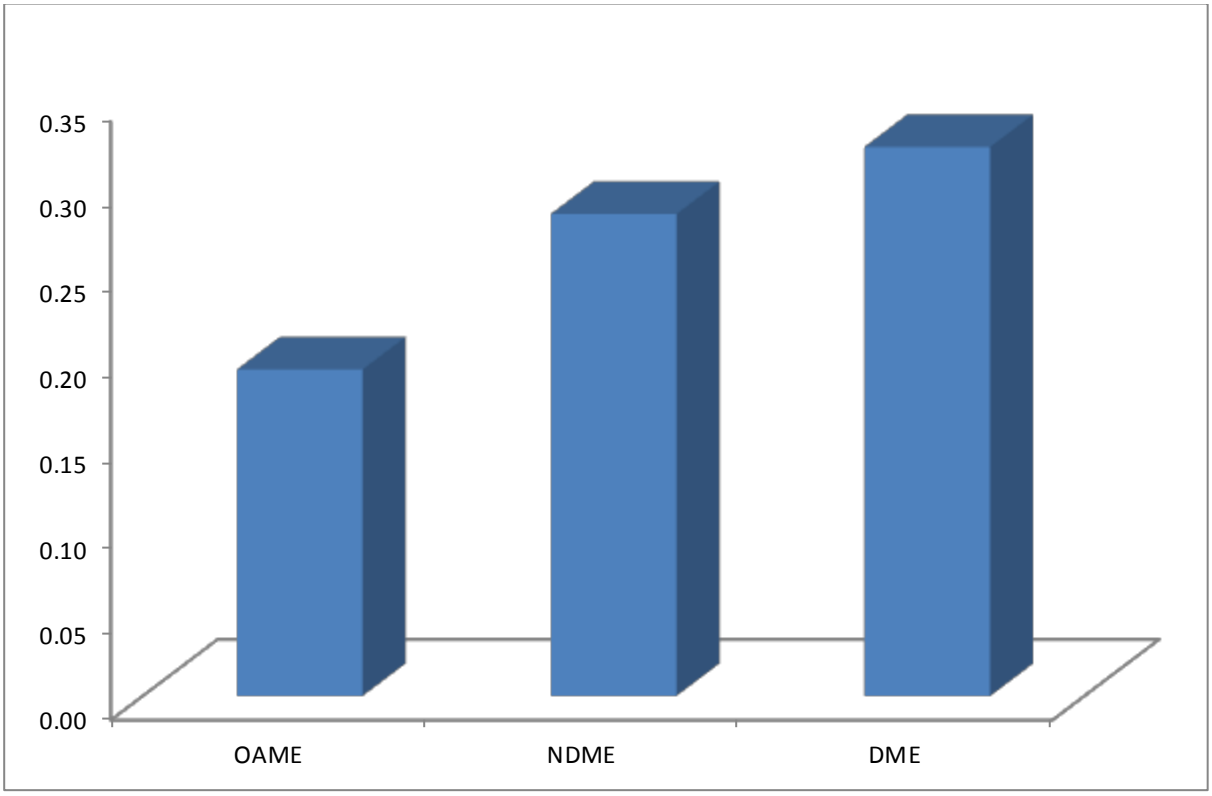


Figure 8: Odds Ratios: Ordered Logistic Regression Estimates

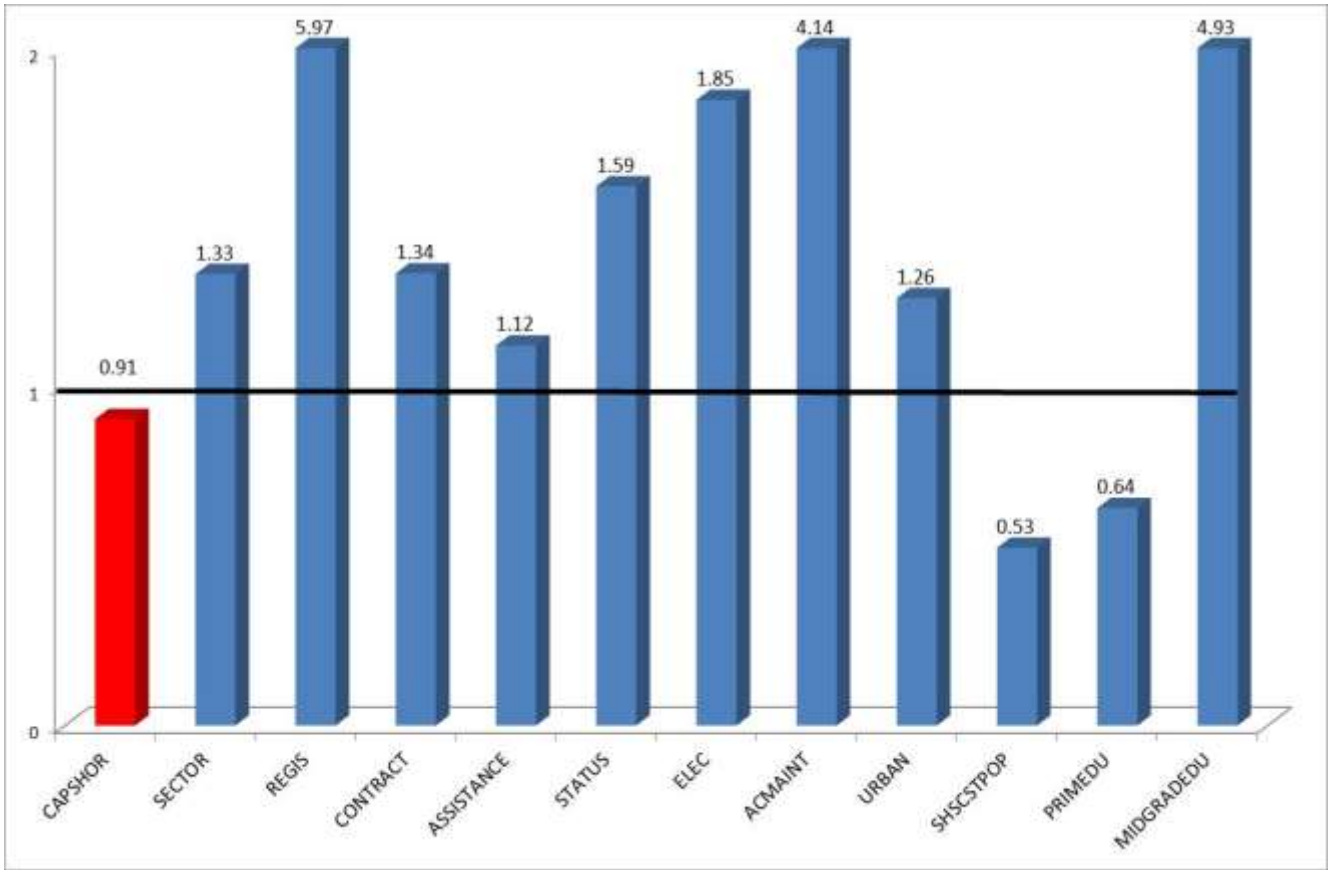


Figure 9: Scatter Plot of Proportion of establishments and Number of Bank Offices per capita, at the district level

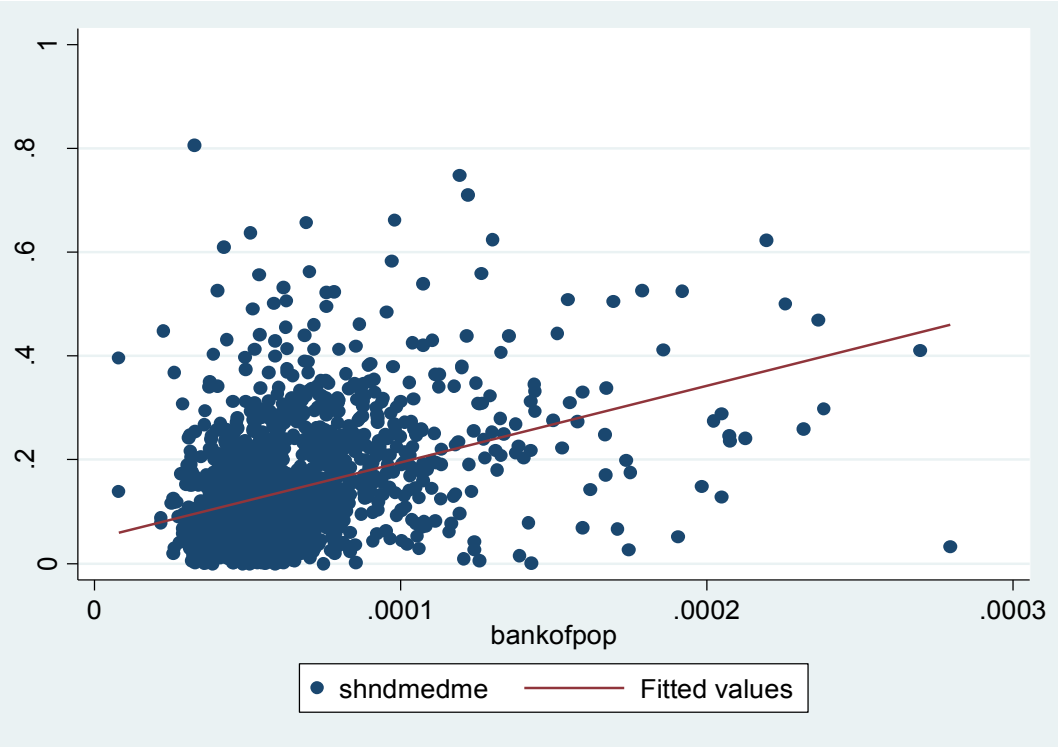


Figure 10: Scatter Plot of Proportion of establishments and Proportion of people with educational level beyond secondary, at the district level

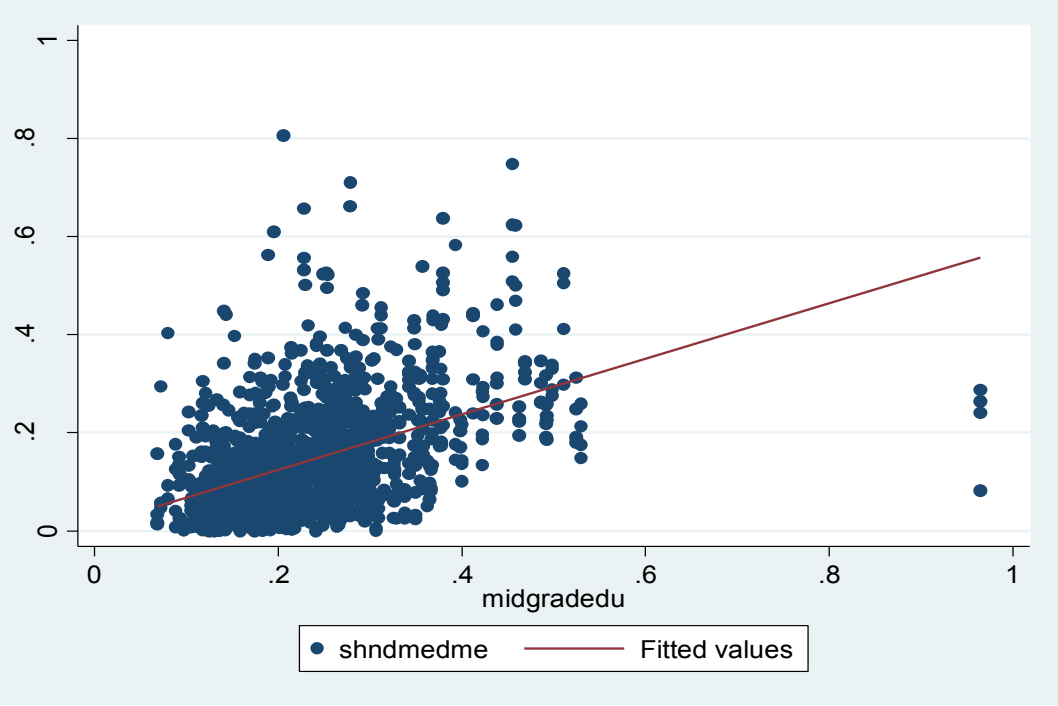


Figure 11: Scatter Plot of Proportion of establishments and Proportion of people from SC/ST background, at the district level

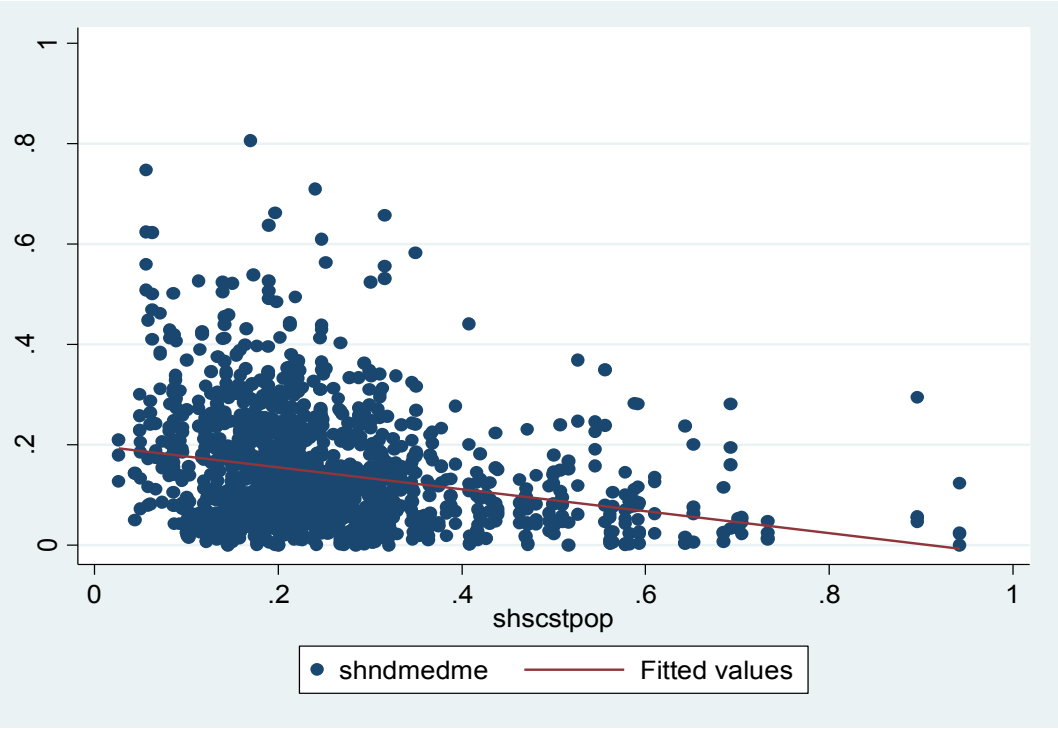


Figure 12: Scatter Plot of ratio of establishments to total enterprises and urbanisation, at the district level

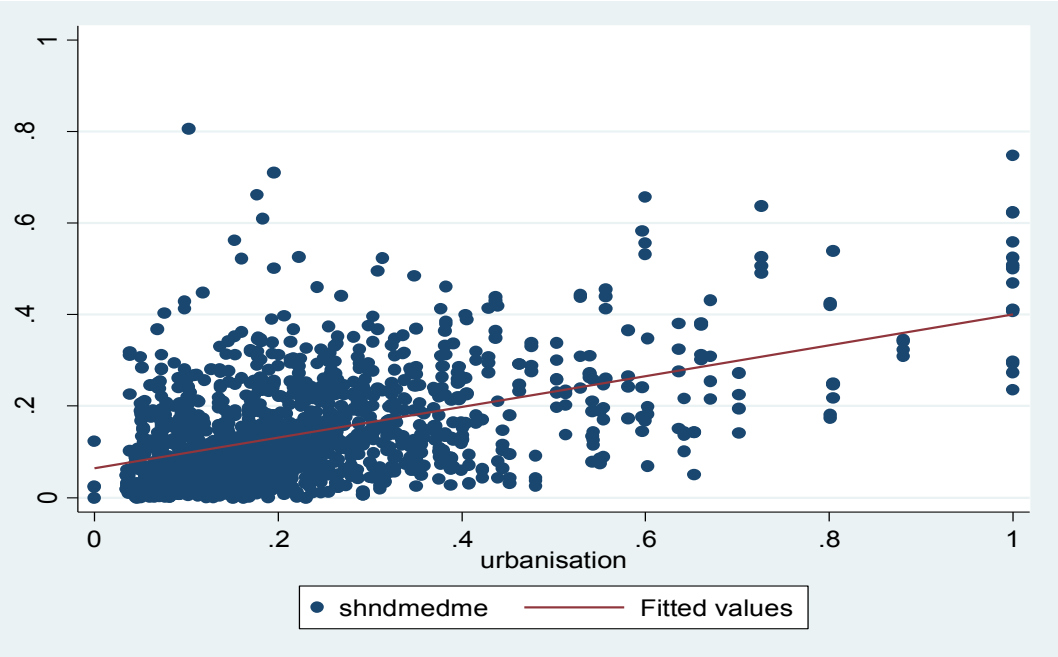


Figure 13: Scatter Plot of ratio of establishments to total enterprises and road connectivity, at the district level

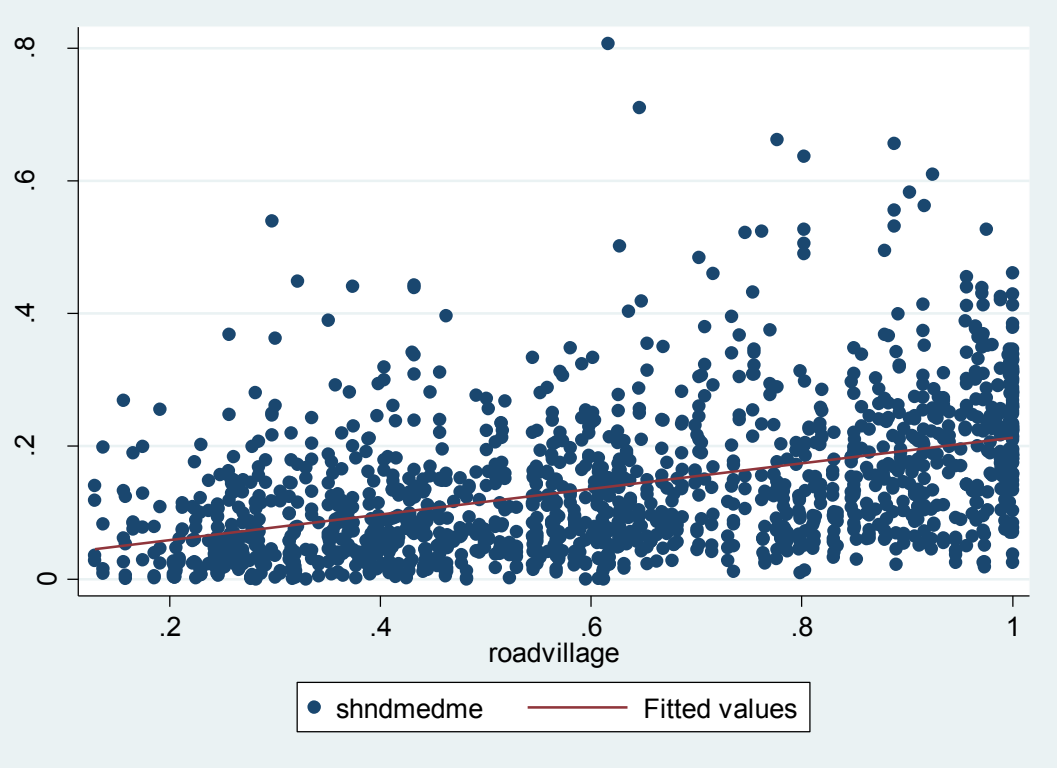
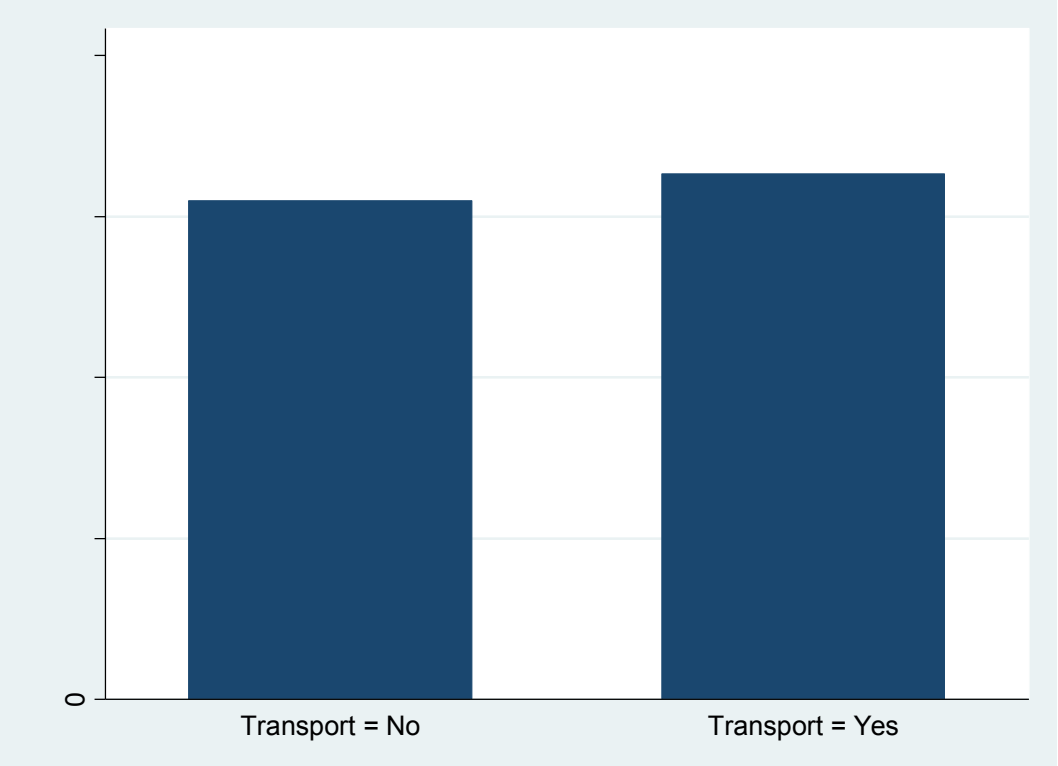


Figure 14: Mean Bank offices per capita by Availability of Transport Facility



References

Aghion, P., Fally, T. and Scarpetta, S. 2007. Credit constraints as a barrier to the entry and post-entry growth of firms, *Economic Policy*, 22, 731-779.

Angelini, P. and Generale, A. (2008), On the Evolution of Firm Size Distributions, *American Economic Review*, 98 (1), 426-38.

Angelini, P. and Generale, A. (2005), Firm size distribution: do financial constraints explain it all? Evidence from survey data, Working Paper No. 549, Banca D'Italia.

Audretsch, D. and Elston, J. (2002), Does firm size matter? Evidence on the impact of liquidity constraints on firm investment behavior in Germany, *International Journal of Industrial Organization*, 20(1), 1-17.

Ayyagari, M., Beck, T. and Demirgüç-Kunt, A. (2007), Small and Medium Enterprises across the Globe: A New Database, *Small Business Economics*, 29(4), 415-434.

Ayyagari, M., Demirguc-Kunt, A. and Maksimovic, V. (2008), How Important Are Financing Constraints? The Role of Finance in the Business Environment, *The World Bank Economic Review*, 22, 483-516.

Banerjee, A.V. and Duflo, E. (2004), Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program, CEPR Discussion Paper 4681.

Beck, T. (2003), Financial Dependence and International Trade, Review of International Economics 11 (2), 296-316.

Beck, T. (2007), Financing constraints of SMEs in Developing Countries: Evidence, Determinants and Solutions, Mimeo.

Beck, T. and Demirgüç-Kunt, A. (2006), Small and Medium-Size Enterprises, Access to Finance as Growth Constraint, Journal of Banking and Finance 30, 2931-43.

Beck, Thorsten, Demirgüç-Kunt, A., Laeven, L. and Levine, R. (2005), Finance, Firm Size, and Growth, World Bank Policy Research Working Paper 3485.

Beck, T., Demirgüç-Kunt, A. and Maksimovic, V. (2005), Financial and Legal Constraints to Firm Growth: Does Firm Size Matter?, Journal of Finance 60, 137-177.

Beck, T., Demirgüç-Kunt, A. and Levine, R. (2005), SMEs, Growth, and Poverty: Cross-Country Evidence, Journal of Economic Growth 10, 197-227.

Beck, T., Demirgüç-Kunt, A. and Maksimovic, V. (2004), Bank Competition and Access to Finance: International Evidence." Journal of Money, Credit and Banking 36, 627-48.

Becker, B. and Greenberg, D. (2005), Financial Development and International Trade, mimeo, University of Illinois at Urbana-Champaign.

Binks, M. and Ennew, C. (1996), Growing Firms and the Credit Constraint Small Business Economics, Vol. 8, No. 1, 17-25

Cabral, M. B. and Mata, J. (2003) On the Evolution of the Firm Size Distribution: Facts and Theory, American Economic Review, 93(4), 1075-1090.

Canepa, A. and Stoneman, P. (2008), Financial constraints to innovation in the UK: evidence from CIS2 and CIS3, Oxford Economic Papers, 60(4), 711-730.

Carpenter, R. E. and Peterson, B. C. (2002), Is The Growth Of Small Firms Constrained By Internal Finance?, The Review of Economics and Statistics, 84(2), 298-309.

Chaffai, M., Landivar, D. and Plane, P. (2011), Financial Constraints and Productivity Under Unobserved Heterogeneity of the Technology: An Application to the Moroccan Garment Sector Using Latent Class Stochastic Frontier Models, CERDI Working Paper.

Demirguc-Kunt, A. and Maksimovic, V. 1998. Law, Finance and Firm Growth. Journal of Finance, 53, 2107-2137.

Hottenrott, H. and Peters, B. (2011), Innovative capability and financing constraints for innovation more money, more innovation?, ZEW Discussion Papers 09-081, Center for European Economic Research

Hyytinen, A. and Toivanen, O. (2005), Do financial constraints hold back innovation and growth?: Evidence on the role of public policy, Research Policy, 34(9), 1385-1403.

Keasey, K. and Watson, R. (1992) Investment and Financing Decisions in the Performance of Small Firms, National Westminster Bank, London.
Kumar, A. and Francisco, M. (2005), Enterprise Size, Financing Patterns, and Credit Constraints in Brazil :Analysis of Data from the Investment Climate Assessment Survey, Washington, DC: World Bank.
Kumar, K., Rajan, R. and Zingales, L. (1999), What Determines Firm Size?, NBER Working Paper No.7208.
Kuntchev, V., Ramalho, R., Rodriguez-Meza, J. and Yang, J. S. (2012), What have we learned from the Enterprsie Surveys regarding access to finance by SMEs?, Mimeo.
Laeven, L. (2003), Does financial liberalisation reduce financing constraints?, Financial Management, 32, 5-34.
Ojah, K., Gwatidzo, T. and Kaniki, S. (2010), Legal environment, finance channels and investment: The east african example, Journal of Development Studies, 46, 724-744.
Oliveira, B. and Fortunato, A. (2006), Firm Growth and Liquidity Constraints: A Dynamic Analysis, Small Business Economics, 27, 139-156.
Rajan, G. R. and Zingales, L. (1998), Financial Dependence and Growth, American Economic Review, 88, 559-586.
Schiffer, M. And Weder, B. (2001), Firm size and the business environment: Worldwide survey results, Discussion Paper Series, Washington, DC: International Finance Corporation.
Ughetto, E. (2008), The financing of innovative activities by banking institutions: policy issues and regulatory options, in B. Laperche and D. Uzunidis (Eds.), Powerful finance and innovation trends in a high-risk economy, Palgrave Macmillan
Winker, P. (1999), Causes and Effects of Financing Constraints at the Firm Level, Small Business Economics, 12, 169-81
Zia, B. (2007), Export Incentives, Financial Constraints, and the (Mis)allocation of Credit: Micro-level Evidence from Subsidized Export Loans, Journal of Financial Economics, 87, 498–527.

[1] For instance, the 62nd round of NSSO survey conducted in 2005-2006 covered the whole of the Indian Union except (i) Leh and Kargil districts of Jammu & Kashmir, (ii) interior village of Nagaland situated beyond five kilometres of bus route and (iii) villages of Andaman and Nicobar Islands which remain inaccessible throughout the year. A stratified sampling design was adopted for selection of the first stage units (FSUs). The FSUs were villages in rural areas and Urban Frame Survey (UFS) blocks in urban areas. A total of 9,923 FSUs consisting of 4,798 villages and 5,125 urban blocks were surveyed. The ultimate stage units (USUs) for the survey were enterprises. The method of circular sampling has been employed for selecting the USUs from the corresponding frame in the FSU. A total of 80,637 enterprises (Rural: 42,050 and Urban: 38,587) were surveyed all over India. A detailed note on the sample design and estimation procedure followed in the 62nd survey is given in the Appendix B of the survey report (NSSO 2007).

[2]Though the proportion of firms facing borrowing constraint is more or less same across enterprise types (about 36 per cent), it needs to be noted that more than 65 per cent of firms in our sample are OAMEs.

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