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Firm Transition in Indian MSMEs: The role of Govt Assistance, Finance, Innovation on Firm Transition and Its Impact on the Productivity Differences and Productivity of the Firms

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Abstract: Developing countries like India have been observed to lack medium size firms ('missing middle') important for jobs and industrial dynamism. Using a panel of formal manufacturing and service sector firms incorporated during 2000-2008 and following them for the period of 5 years (2007-2015) post incubation, the paper analyses the relationship between firm transition, firm age and firm size.. The results show that the maximum transition is observed in their 4^{th} or 5^{th} year post-incorporation. This finding implies an inverted U-shaped relationship between firm transition and age, a result consistent with the idea of non-linear relationship between age and performance suggested in the literature. However, the interpretation of our results suggests a different possibility. Young firms seem to exhibit a capacity to overcome the liability of newness. Following the Indian regulation on the definition of firm size, the paper categorizes the firms in different size groups using the investment in assets and turnover criteria. The paper shows that choice of definition of size has an impact on transition patterns and hence on size structure of firms. The size structure is found to be skewed in favour of large firms under asset size definition, while under turnover size definition more medium firms are found for manufacturing sector. The results are found to vary between manufacturing and services sectors for both definitions. We draw attention to possible factors underlying this differential outcome and argue that policymakers should be careful while adopting definition of enterprise size for incentivizing growth and transition of enterprises.

Using the prowess database of CMIE, we analyze the determinants expressed as innovation, firm size and ownership structure affecting the size transition of firms among micro, small and medium size enterprises. We use a sample of Indian manufacturing formal sector firms incorporated during 2004-2011 and followed them for the period of 5 years (2006-2017) post incubation. The results highlight the constraining role played by innovation in firm transition. This is further examined for firms of different size categories revealing that the smaller firms drive down the impact of innovation on firm transition. Additionally, we also find evidence on the positive role of group-owned firms engaged in innovation activities being more likely to transition as compared to standalone firms. The present study is highly relevant

as the possible effect of innovation on transition has significant implications for industrial policy in developing countries.

Additionally, the paper have also examined the transition for the informal firms in India. Using unit-level data for 581,672 firms from National Sample Survey (NSS) covering the periods 2010-11 and 2015-16, we examine the transition of the micro firms employing family labour (Own Account Enterprise) to those firms employing hired labour (Establishment). The empirical analysis shows that financial loan assistance is an important determinant indicating a higher probability of firm transition in manufacturing sector. While contrary to popular perception, subsidy do not seem to help firms to transit in the manufacturing sector. However, for service firms, both the financial loan and subsidy support firm transition. Additionally, machinery, equipment, and skill development assistance have a negative and significant impact while other assistance in the form of marketing and raw material has a positive implication on transition of manufacturing firms alone. The study draws attention to the fact that blanket application of government assistance policies is not beneficial for firms. There is a need for more targeted and sector specific policies to achieve desired outcome.

Introduction: Micro, small, and medium enterprises (MSMEs) in majority of developing countries are characterized by the persistence of skewed firm-size distribution. They have an overwhelming presence of smaller size enterprises and few large firms with a conspicuous 'missing middle'[1]. This indicates a problem of firm transition, wherein, firms incorporated as micro or small tend to remain in the same size category and does not transit to the higher size category. The phenomenon of firm transition holds importance because of the following reasons: (i) medium-sized firms provide better quality jobs and are typically more productive than micro firms (Altenburg and Eckhardt 2006), (ii) the contribution made by relatively larger enterprises to the growth indicators like GDP and employment is higher than their smaller enterprise counterparts (Mead 1994; Ayyagari et al 2007) and (iii) aggregate productivity in developing economies is low because of large number of smaller enterprises as compared to developed economies (Hsieh and Klenow 2008).

What could be the possible causes of non-transition of firms? Why do some firms grow fast and transit into medium and large size categories while others prefer to stay small or fail to go beyond a threshold level? A large literature in the area of economics and business management has investigated the determinants of growth of firms and the structure of size distribution of firms (Nichter & Goldmark 2009; Liedholm 2002 ;Mead & Liedholm 1998). A reading of the literature suggests several potentially important causal factors and drivers of change arising from different models. The empirical literature on the dynamics of firm size, firm growth and economic performance (example,productivity and job growth) based on developed country data sets has widely discussed two factors namely, firm size and the age of the firm. However, empirical studies of firm transition in developing countries are very few, slow to emerge because of data constraints and therefore inconclusive. In this study of firm transition, we have examined the role of firm age and firm size in the Indian manufacturing and service sector . This study also addresses the recent concerns in the literature about the impact of firm age on the transition of firms of different sizes. Further, it also provides evidence on the distinctive implication of alternative definitions of firm size on transition patterns and, thus, on size structure of firms across both the sectors. We have selected India for two main reasons: firstly, India is a typical example of a developing economy with the 'missing middle' phenomenon and hence provides an empirical context to the growing research interest in the phenomena of transition in developing countries. . Looking at the fourth MSME census data to understand the structural features of Indian MSMEs, we find that there are around 15 lakh units in the registered sector. Among them the proportion of micro, small and medium enterprises is 94.94%, 4.89%, and 0.17% respectively. It clearly points out the skewness in the distribution of MSMEs in India[2](Government of India 2011). Secondly. discussions are underway in India to change the criteria for defining MSMEs from investment in assets, namely in plant and machinery and equipment, to annual sales turnover[3]. This new definition is a step towards aligning the Indian MSME definition with world standards. Therefore, we use both the existing definition based on asset size and proposed definition based on turnover size to understand the relationship between firm age, size, and transition. More specifically, we focus on the transition of formal sector firms. The formal sector firms have crossed the barrier of informality and

hence studying the pattern of their transition becomes crucial from the perspective of firm growth and productivity.. It is discussed in the literature that formal firms have easy access to formal institutions like finance and legal institutions . This uneven access shifts the benefits away from the informal to formal firms and hence increasing their productivity (De Soto, 1989;La Porta & Shleifer, 2014; Beck & Demirguc-Kunt, 2006,Ayyagari et al., 2008).

The objective of this study is therefore to measure firm transition in terms of movement to different size-class in a consistent way, establish some patterns of change in recent years and their determinants To the best of our knowledge, ours is perhaps the first study to measure size transition of firms in the formal sector. Our study contributes in providing new evidence in the form of an inverted U-shaped relationship between firm age and transition. The paper shows that for manufacturing firms, asset size transition is maximum to the large size category, while, the turnover size transition is maximum to the medium size category. For service firms, the transition is maximum to the small size category. This suggests that adoption of a particular definition may have widely different implications from the perspective of access to resources, identification of targets under various policies and facilities designed for micro, small, and medium sized firms. At a broader policy level, the study draws attention to the issue of size based policies and performance of formal firms in India measured by size transition of firms. We also contribute to the present policy debate on the criteria to be adopted for defining MSMEs.

2 Literature review

2.1 Firm transition

MSMEs are constantly churning, It is not only new firms that are born, and others are exiting, but there are surviving firms are growing or contracting in size. These components of change are condensed in two ideas: (i) net firm creation, and (ii) "mobility" or net firm expansion (Liedholm 2002). Among the surviving firms, a distinction can be made between two categories of MSMEs: transited and non-transited firms.

The firm transition has been understood in different ways in the literature. One important view considers it as transition or graduation of an enterprise from informal to a formal way of operating through registration of their business and fulfilling all legal necessities (De Soto 1989, Ishengoma and Kappel 2006; La Porta and Shleifer 2008; Levy 2008; La Porta and Shleifer 2014). This view is ascribed generally to the developing countries where there exists a large informal sector. It is often argued that the transition of an enterprise to a formal way of operating implies a shift of a firm in a more productive segment (De Mel et al 2011). In contrast, in developed countries where account maintaining is mandatory by regulators, researchers view firm transition as firm's growth from a static or shrinking business to a growing business in terms of productivity, employment, or asset in order to signal an enterprise's performance (Berner et al 2012). Additionally, the firm transition has also been understood as qualitative improvements in product, process, and ways of organizing production (Schmitz and Knorringa 2000; Humphrey and Schmitz 2002).

Alternatively, innovation at firm level resulting in both qualitative and quantitative improvements has also been conceptualized as firm transition which eventually lead to the growth of the size of the firm from micro to small enterprises. (Milagrosa et al 2013). Additionally, the firm transition is also viewed as moving from survivalist enterprise to micro

enterprise (Ardagna and Lusardi 2008; Berner et al 2012). Survivalist enterprise is created by people who do not have access to regular wage employment and economic sector of their choice, while micro enterprise is created by people who identify a specific business opportunity (Reynolds et al 2005). In the Indian context, Raj and Sen (2016a) have studied the firm transition from small family firms to larger firms employing wage labor in the informal manufacturing sector. The study show that larger firms in the informal sector are 40% more productive than small family firms. Therefore, for many small enterprises, the transition to to a stage wherein they hire wage labour instead or in addition to unpaid household workers larger enterprises holds importance for the economy in terms of economic perfromance. Our focus is on firms already operating in the formal sector and their transition in terms of size or scale of operation over time.

2.2 Firm age, size, and firm transition

While increase in the scale of operation or size is an important aspect of firm transition the relationship between the age of the firm and its performance is not straightforward .This has motivated the researchers to investigate if young firms are more growth-oriented and dynamic compared to their older counterparts (Krafft et al 2014; Colombelli et al 2016).Studies indicate that initially performance of a firm falls due to the liability of newness, and later it increases due to maturity but eventually falls due to liabilities of old age[4] (Stinchcombe 1965; Barron et al 1994; Coad et al 2018b). Coad et al (2018a) in their study of Swedish firms divide the sample of firms into different age groups and examine their growth rate persistence. The study noted that young firms experienced positive autocorrelation in growth rates, suggesting that growth in one period is positively corelated with growth in the next period which is however not the case for older firms (Coad et al 2018a. page 71). The literature on firm growth after entry has also found that firm growth rate and age has negative relationship, i.e. young firms grow faster (Evans 1987; Dunne et al 1989; Nichter and Goldmark 2009; Navaretti et al 2014). Moreover, it is shown that most of the age effects occur in the initial 5 to 7 years after the entry of firms after which firm performance stabilizes (Lawless 2014; Anyadike-Danes and Hart 2018; Coad 2018). This is in line with Eurostat-OECD (2007), who define firms up to 5 years of age as young high-growth firms and van Praag Mirjam & Versloot (2007) who define firms under 7 years of age as entrepreneurial firms.

The effect of firm size has also been studied as a determinant of the firm's growth rate (Lawless 2014). Gibrat's law predicts that the growth rate of a given firm is independent of its size. A wide range of empirical studies with more detailed data sets has concluded that Gibrat's Law cannot hold in a strict sense when one accounts for the heterogenity in industries, sectors, and size classes (Santarelli et al 2004; Esteves 2007). Further, Geroski (1995) derives a stylized result where both firm size and age are correlated with the survival and growth of the firms. However, Haltiwanger et al (2013) provides evidence that there is no relationship between firm size and growth when we control for firm age.

While there is an increasing body of literature that provides evidence on the effect of firm age and size on firm growth, there is a dearth of studies analysing the effect of firm age and size on firm transition. The only exception is Milagrosa et al (2013) that have studied firm transition for India, Egypt and Philippines by examining the underlying factors that is required for up gradation of firms. However, the study is mainly descriptive in nature and do not consider age of firm as variable of interest. , Similarly, Raj and Sen (2016) attempted to study factors affecting firm transition in the Indian informal manufacturing sector using unit level

data from the periodic enterprise surveys of NSSO (National Sample Survey Organisation (NSSO). It is based on repeated cross-section data confined to manufacturing enterprises and does not consider formal sector firms

In contrast, our research emphasises on studying the size transition of formal firms in both manufacturing and service sector. We overcome previous data limitations by using the panel data from prowess database of Centre for Monitoring the Indian Economy (CMIE). We further explore the relationship between firm age, size, and transition in Indian MSMEs using both the asset size and turnover size definitions We have classified the sample firms based on their incorporation year and study each firm for a fixed period of 5 years to trace its transition path. Incorporation year provides the starting point from where we can trace the transition of a firm over a specific period. A similar methodology has been used by Anyadike-Danes and Hart (2018) where they considered the firms incorporated in the year 1998. They studied them for a fixed period i.e. first 15 years of life focusing on firm growth and firm death. Similarly, Esteve-Pérez and Sahiti (2019) have studied the survival of new-born firms in Kosovo from 2008 to 2012 and followed every firm until the end of 2013. However, they do not observe firms born in different years for a fixed span of time[5].

3 Data methodology and description

3.1 Data methodology

We have used the Prowess database of CMIE to examine firm transition and its relationship with firm age and size for the formal MSMEs. Prowess is a firm-level database maintained by CMIE comprising around 50000 firms. This database is publicly available and provides detailed information on balance sheets, income statements, product profiles, and incorporation year for both small and large, listed and unlisted formal firms (Allen et al 2012; Singh 2017). It has been widely used to study various aspects of corporate sector by several Indian and international scholars in the areas of economics and finance.

In this study, we have defined the transited firm as the firm that crosses the threshold of one size and moves to the higher size and remains there for at least two years in order to bring stability in determining the actual size category of firms. A transited firm is the one which has moved from one size category to the higher size and a non-transited firm is the one which has remained in the same size category in the study period. Ample literature exists which use employment as a measure of firm size (Tybout 2000; Mazumdar and Sarkar 2009; Hasan and Jandoc 2010; Ramaswamy 2013). We, however, focus on both asset size and turnover size rather than employment growth as indicators to capture the transition of MSMEs. This measure tends to be favoured over employment because of the lumpy nature of employment, which appears to increase with a lag after growth in assets or sales (Parker et al 1995; Liedholm 2002). It might also lead to biases, such as limiting the employment potential of firms and underreporting the number of people employed to save on high social security and compliance costs.

In our study, we use the definition of MSME according to micro, small, and medium enterprises development (MSMED) Act, 2006 of the Govt of India (GOI). According to MSMED Act of 2006, MSMEs are definedas *"all enterprises engaged in production of goods pertaining to any industry specified in first schedule of Industrial (D&R) Act, 1951 & other enterprises engaged in production and rendering of services subject to limiting factor of*

investment in plant & machinery and equipment respectively" (Ministry of Law and Justice, 2006).

Recently, in the year 2018, there has been discussion in policy circles on changing the criteria for defining MSMEs to align it with the needs of current time and changing business ecosystem. As per the proposed definition, MSMEs will be defined based on their annual sales turnover. The threshold for investment in plant and machinery, equipment and annual sales turnover is given in Table 1.

Table 1: The Criteria for Defining Micro, Small and Medium-Sized Enterprises[6]

Enterprise Type	Existing Definition		Proposed Definition
	Investment in Plant & Machinery (Manufacturing)	Investment in Equipment (Service)	Annual Sales Turnover
Medium	≤₹10crore	≤₹5crore	≤₹250crore
Small	≤₹5crore	≤₹2crore	≤₹75crore
Micro	≤₹25lakh	≤₹10lakh	≤₹5crore

In this study, firms incorporated between the years 2000 and 2008 are considered for analysis. The period has been selected because the MSMED Act came into force in 2006, which is a single comprehensive legal framework to define MSMEs. Thus, firms incorporated before 2006 and after 2006 are considered for the study. Initially, all firms having their data for investment in assets and turnover are drawn from the prowess database, which resulted in a total of 32986 firms. Out of these firms, we extract the data for only those firms incorporated between the years 2000 and 2008, which reduces the number of observations to 12578. We next dropped observations with missing values on investment in assets and turnover, and accordingly, the total number of firms identified is 1939. These firms are then classified into manufacturing and service firms based on National Industrial classification (NIC) 2008. The Prowess data follows the NIC 2008 classification and gives NIC codes against each product. The data covers 723 manufacturing firms and 1216 service firms, which are 37 % and 63 % of the total sample, respectively.

Due to data unavailability for the first two years, we have considered the data of each firm from the third year after its incorporation. A recent study by Esteve-Pérez and Sahiti (2019) shows that the risk of firm failure is more in the first two years of firm's incorporation. It implies that chances of survival are high for firms from third year of its incorporation. Hence, we have considered first two years as incubation period in which firms either remain in the business or exit the business. Those firms crossing the incubation period are surviving firms. We then observe each firm for five years after the incubation period, that is, firms incorporated during 2000-2008 are followed for a period of 5 years (2007-2015) after the incubation period. We have fixed the study period of each firm born in different years to five years post incubation to study their transition pattern because of two important reasons. First, comparison between the transition pattern of firms incorporated in different years can be studied explicitly. Second, data availability for firms in the year beyond 2015 has been a constraint.This allows us to get a panel dataset for all the firms incorporated in particular year. These firms are then categorized into micro, small, medium, and large size based on their asset size and turnover size. Finally, we define firm age, our primary variable of interest, as the number of years from the birth of

the firm to the calendar year reported in the data source. Univariate analysis has been used to describe the data, summarize it, and find patterns in the data.

3.2 Data description

The sample is divided into manufacturing and services sector, using both asset size and turnover size definition. For manufacturing firms, defined by asset size, it is found that there are 45% large firms, 13% medium firms, 27% small firms, and 15% micro firms aggregated for all years. Similarly, for service firms, the distribution is 10%, 7.5%, 54%, and 28%, respectively. While using turnover size definition for manufacturing firms, the data shows that there are 19% large firms,12% medium firms, 46% small firms, and 23% micro firms. The size distribution for service firms is 12%, 7%, 41%, and 40% respectively. The percentage distribution of firms is given in Table 2.

Table 2: Percentage Distribution of Firms

Sector/Criteria	Firms	Incorporation Year									Aggregate
		2000	2001	2002	2003	2004	2005	2006	2007	2008	
Manufacturing	Micro	17	14	27	14	6	15	10	13	19	14.66
(Asset size)	Small	22	36	38	38	16	20	29	29	27	27.10
	Medium	9	18	8	12	17	14	19	11	13	13.55
	Large	52	32	27	36	60	51	42	47	41	44.67
	Total	100	100	100	100	100	100	100	100	100	100
Service (Asset size)	Micro	10	23	32	29	19	33	22	30	32	28.28
	Small	66	45	65	52	61	53	56	49	57	54.44
	Medium	7	8	3	8	11	6	8	9	6	7.50
	Large	17	25	0	12	9	8	14	11	6	9.80
	Total	100	100	100	100	100	100	100	100	100	100
Manufacturing (Turnover Size)	Micro	17	14	19	16	21	18	25	23	28	22.68
	Small	52	59	58	59	44	53	42	51	34	45.91
	Medium	9	0	0	6	17	14	11	11	14	11.75
	Large	22	27	23	18	17	14	22	14	25	19.64
	Total	100	100	100	100	100	100	100	100	100	100
Service	Micro	28	18	26	31	42	43	40	41	43	40.04
(Turnover Size)	Small	34	48	55	52	36	41	38	42	41	41.36
	Medium	17	15	0	6	9	8	10	6	4	7.00
	Large	21	20	19	12	12	8	12	11	11	11.59
	Total	100	100	100	100	100	100	100	100	100	100

Source: Authors' computations based on Prowess CMIE data base.

It is evident that the medium size firms form a conspicuously small proportion of MSMEs in all the years for both the manufacturing and service sectors. Additionally, the data shows variation in the size distribution of firms between the two definitions of size in the manufacturing sector Large firms are observed to be dominant in manufacturing when firms are defined by asset size. In contrast, majority of manufacturing are found to be small firms based on turnover size. These observations may be explained by the inter-industry diversification, which can have an impact on firm size (Hutchinson et al 2010). The manufacturing sector has been categorized into seven industry groups as specified in prowess database. The shares of different industry groups in manufacturing sector show that there are around 14% of firms engaged in the production of chemicals and chemical products. This group includes caustic soda, soda ash, fertilizers, pesticides, drugs and pharmaceuticals, organic chemical, petroleum products, plastic, and rubber products. Metal and Metal products which contain ferrous metals like iron, steel, ferro alloys and non-ferrous metals like aluminium and copper are manufactured by 22% of firms.

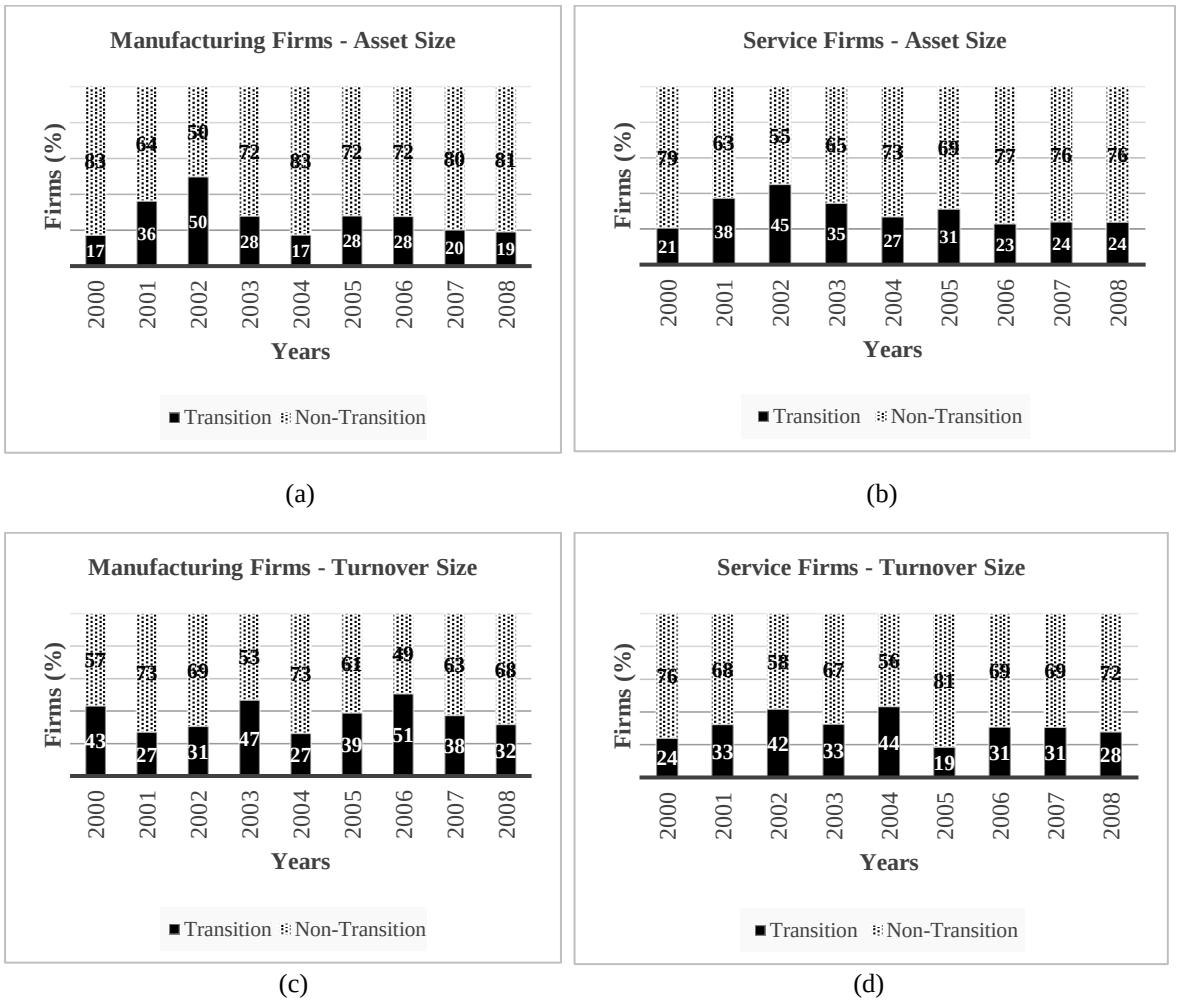
Manufacturing of machinery which comprise of non-electrical machineries like industrial machinery, agricultural machinery, mining, and construction equipment, electrical machinery, and electronics like communication equipment is undertaken by 7% of firms. Transport equipment, which includes automobiles and ancillaries, is manufactured by around 10% of firms, whereas 18% of firms produce construction and construction materials. The rest of the firms are involved in the manufacturing of textiles, food and agro-based products, glass products and other consumer goods like leather products, gems and jewellery and the like. It is discerned that firm size distribution is likely to be more sensitive in capital goods/intermediate goods industries, which involve heavy investment and long gestation period relative to consumer goods industries. However, the size distribution in services sector is found to be dominated by small size firms across the definition of firm size.

4 Results and discussion

4.1 Firm transition

At an aggregate level, there is little evidence of transition to a higher size in both manufacturing and services sector. Asset size transition is observed to be 24% and 26%, while, turnover size transition is found to be 37% and 29% for manufacturing and service firms respectively. The percentage distribution of transited and non-transited firms in different incorporation years is shown in Figure 1. Incorporation year is plotted on the X-axis, and the Y-axis shows the transited and non-transited firms. Figure 1 (a) and (b) represent manufacturing and service firms, respectively, as defined by asset size. Figure 1 (c) and (d) shows manufacturing and service firms respectively based on turnover size. The evidence in Figure 1 clearly suggest that the occurrence of , transition of firms is less in both manufacturing and services sector. The relative proportion of firm transition is similar by both the definitions of size in most of the years.

Figure 1: Distribution of Transited and Non-Transited Firms in Different Incorporation Years by Asset Size and Turnover Size



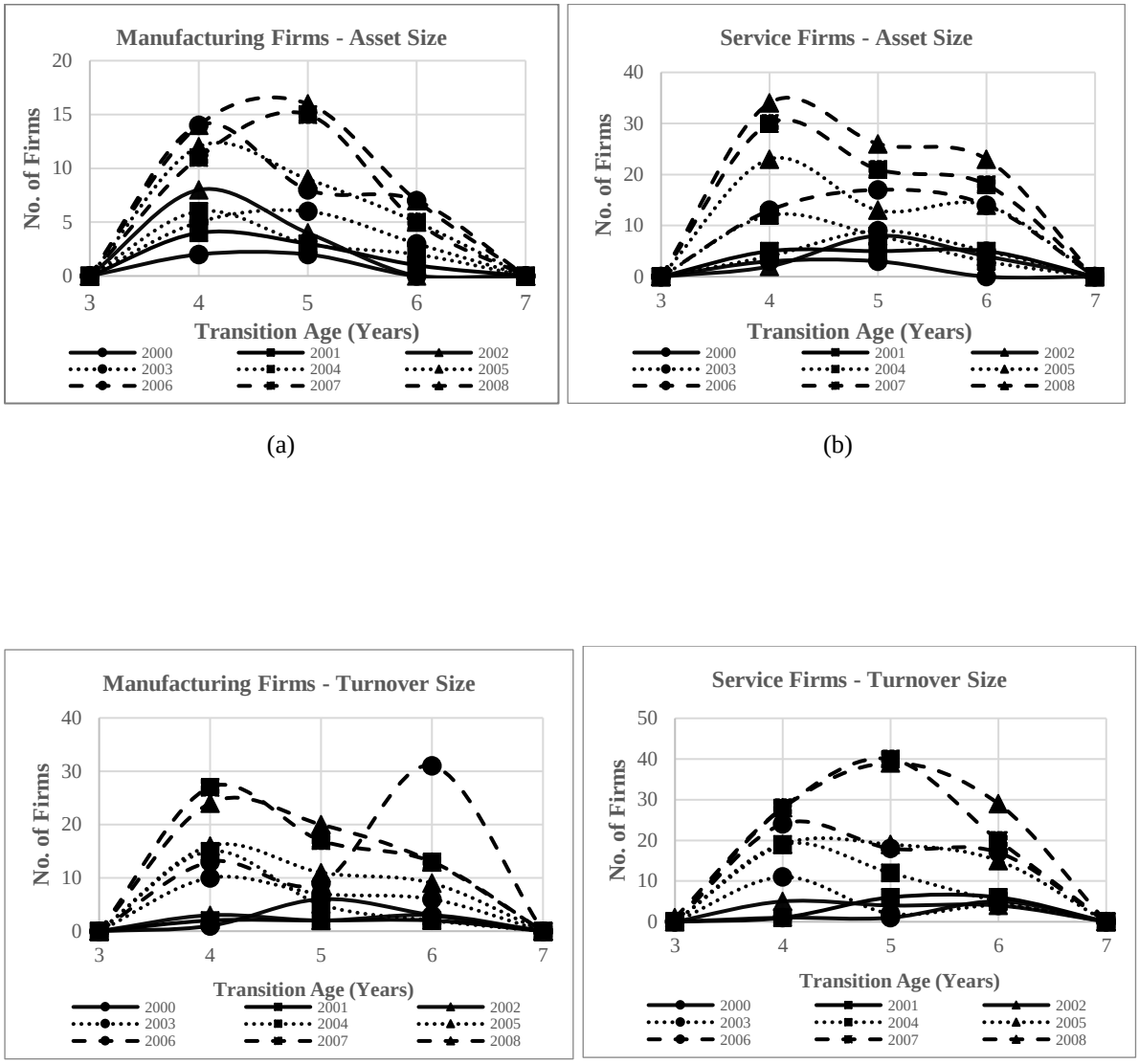
Source: Authors' computations based on CMIE data.

These observations imply that only a few firms manage to transition in higher size category and others, though survive to remain in the same size. It can be further discerned from Figure 1 that turnover size transition is found to be higher than the asset size transition in both the sectors. This difference is observed to be more pronounced for firms in the manufacturing sector. It can be argued that investment in asset by the firms do not show large fluctuation over the years. In contrast, sales show variations over the years.

A more interesting question to understand is the effect of age of the firms on transition. At what age or after how many years of incorporation, the transition takes place, or the firm moves to a higher size. Thus, it is interesting to find out the threshold limit and the time period after which the firms move to the next size.

4.2 Firm age and firm transition

Figure 2: Number of Firms Transiting at a Different Age



(a) (b)

(c) (d)

Source: Authors' computations based on CMIE data.

The relationship between firm age and the total number of firms transited is represented in Figure 2. There are nine curves in each graph for each study period between 2000 and 2008. Figure 2 (a) and (b) show manufacturing and service firms respectively based on asset size, and Figure 2 (c) and (d) shows manufacturing and service firms respectively defined by turnover size. The X-axis in the above graphs shows transition age, which is the number of years firms took to transit after incorporation of firms. The Y-axis shows the number of firms that transited in different years. Given that size transition (performance indicator) is caused by age and not vice versa (reverse causality is ruled out by definition), this graphical representation should be interpreted as a number of firms transited when age takes a specific value.

It is noticed from Figure 2 that there is no transition in the 3rd and 7th year because we have considered data from the third year after the year of incorporation and fixed the study period to 5 years.

Our study finds evidence that maximum transition takes place in the 4th or 5th year after the entry of firms (Figure 2). The number of firms experiencing transition starts to decline after this period (or the fifth year). It shows that most of the firms experience transition at a younger age after entry. This can also relate to a pertinent issue as to what age defines young or old firms. In a study focusing on export performance of Indian firms Pradhan & Das (2016) show that an SME is young when its age is up to 10 years. Further economic survey 2018-19 also considers young SME to be up to 10 years of age.(Ministry of Finance, 2019). The literature on firm age and growth also emphasizes that young firms of up to 5 years of age drive the impact of age on growth (Lawless 2014; Anyadike-Danes and Hart 2018; Coad 2018). After a firm's first 5 years, firm performance tends to stabilize, and growth decline considerably. It implies that even among the young firms most of the age effects occur in the initial 5 years after the entry of firms[vii].

The above graph depicts an inverted U-shaped relationship between the number of firms and transition age, which shows that the number of firms transited increases with increase in age till a certain threshold after which transition declines. The inverted U-shaped relationship holds for both manufacturing and service firms irrespective of the criteria used to define them. Our result is consistent with the observation made in the literature that age performance relationship is non-linear. However, the literature .argues that in the beginning, performance falls due to liability of newness, before it increases due to learning effects and maturity and then finally falls due to liabilities of old age . However, this third stage may be eschewed if firms can innovate and engage in 'strategic renewal' (Agarwal and Helfat 2009).The interpretation of our results suggest a different possibility.

Our analysis shows that those firms which survive the incubation period could overcome the the liability of newness. These firms draw on their initial endowments such as a business idea, human capital, handholding assistance, government support as well as network capital. As time goes by and firms age increases , they may start to suffer from liability of aging (Barron et al 1994; Coad 2018). They may be bogged down by ossified routines and structures making them less agile and less responsive to the challenges by innovative new firms. It may lead to decline in transition for firms over a time period. Interestingly, a similar picture can be discerned for firms of different sizes. The inverted U-shaped relationship is found to hold for all micro, small, and medium size firms irrespective of definition used. This strengthens our observation that the liability of newness factor is much weaker for transiting firms of all sizes. This gets support from one strand of literature by Barron et al (1994), which states that liability of newness hypothesis fades if we control for the size of the firm.

4.3 Firm size and firm transition

An important objective of this paper is to study the sensitivity of transition patterns to alternative definitions of firm size. When we analyse the transited firms, manufacturing sector is observed to experience maximum transition from medium firms to large size categories in terms of asset size, as shown in Table 3. While the transition from medium to large size declines in terms of turnover size. However, significant proportion of them experience transition from small to medium turnover size. Further, asset size transition from micro to small and medium size category is relatively less observed as compared to turnover size transition.

Table 3: Percentage of Firms Transited to Various Size Categories

Size Categories	Manufacturing (Asset Size)	Service (Asset Size)	Manufacturing (Turnover Size)	Service (Turnover Size)
M-S	14	49	20	41
M-ME	1	2	10	6
M-L	13	3	5	6
S-ME	13	30	33	25
S-L	24	8	11	9
ME-L	35	8	21	13
Total	100	100	100	100

Note: M-micro; S-small; ME-medium; L-large
Source: Authors' computations based on CMIE data.

In addition, for the service sector, maximum transition is observed to take place from micro to the small size category. Further a large proportion of firms also transits from small to the medium category in terms of both asset and turnover size. However, transition from medium to large category is less observed for both the definitions. When compared to the manufacturing firms, it is found that size transition in the service sector is mainly in favour of small size firms. It is fascinating to note that both the definitions of firm size show a different pattern of transition within manufacturing sector firms. Moreover, transition pattern differs across manufacturing and service sector for both the definitions.

Therefore, the change in definition has different implications for the phenomena of firm transition in particular and size distribution of firms in general. Further, this also suggests that adoption of a particular definition may have different implications for identification of targets under various policies and facilities designed for micro, small, and medium sized firms.

Section 5: Determinants of firm transition

5.1 Innovation and firm growth

Private sector development in high-income countries is generally driven by innovation, where in, technological capabilities becomes critical for firms' survival and growth. Innovation is a gradual process that describes practices of a firm doing business differently from its competitor and thereby reaping higher-than-average returns ("innovation rents") (Porter, 1998). In Schumpeterian interpretation of firm growth, innovation is located at the heart of economic development which is built around the innovative entrepreneur. He goes on to explain that entrepreneur introduces "creative destruction" through "new combinations" of factors to create new products or to meet existing demand. With new firm entry and upgrading of incumbent firms, only the efficient and innovative firms will emerge and grow. He described a clear link between innovation incentives at the firm level and the aggregate growth of the economy (Schumpeter, 1949).

Despite theoretical literature which establishes that it is the more innovative and efficient firms which will grow more (Nelson & Winter, 1982), empirical studies have found different results. The extant Literature on innovation and firm performance has established a positive association between R&D expenditure and firm growth. Cefis & Marsili (2006) have shown that innovation is an important factor for increasing the survival probability of manufacturing firms. Yasuda (2005) in his study of 14,000 Japanese manufacturing firms investigated the relationship between firm growth and firm size measured by the number of employees, firm age and firm behaviour, such as R&D activity and subcontracting. He shows that firm size and age have a negative effect on firm growth. While R&D expenditure has a significant positive effect on firm growth.

Further, literature observes that although fastest-growing firms investing in R&D may experience superior performance, there is uncertainty about the future performance of an average firm (Coad & Rao, 2008; Audretsch, Coad, & Segarra, 2014). Additionally , Stam & Wennberg (2009) in their study of start-up firms in the Netherlands have shown that while R&D is important for a set of new high-tech and high-growth firms, it does not affect the growth rate of new low-tech firms. However the alternative view opines that systematic factors like R&D investment have no effect on firm growth rate (Oliveira & Fortunato, 2017). Bottazzi, Dosi, Lippi, Pammolli, & Riccaboni (2001) studied the growth process of worlds' top 150 pharmaceutical firms. It is shown that R&D investment has no visible effect on firm performance as measured by sales growth. Thus, the literature does not seem to be consistent on the importance of role played by innovation for firm growth. However, innovation is important to the advancement of an organisation as it enhances the capabilities and leads to better use of assets and resources and helps it achieve competitive advantage. It is expected that innovative firms experience higher growth (Demirel & Mazzucato, 2012). Therefore, we would expect innovation to have a positive impact on firm transition.

Hypothesis 1 (H1): *Innovation is positively related to firm transition.*

5.2 Firm size, innovation, and firm growth

The literature on relationship between firm growth and firm size is exhaustive. The effect of firm size has also been studied as a determinant of the firm's growth rate (Lawless 2014). Gibrat's law predicts that the growth rate of a given firm is independent of its size. A wide range of empirical studies with more detailed data sets has concluded that Gibrat's Law cannot

hold in a strict sense due to heterogeneous patterns that emerge in diverse industries, sectors, and size classes (Santarelli et al., 2004; Esteves 2007; McPherson, 1996; Sleuwaegen & Goedhuys, 2002). Further, Shanmugam & Bhaduri (2002) in their study on Indian manufacturing firms find that current size and firm growth are negatively related to each other. Additionally, in a study in Japanese manufacturing firms, Yasuda (2005b) also show that firm size has a negative effect on firm growth. Further, literature investigating the relation between firms' R&D expenditures and their growth shows variation with different levels of firm size. Using panel data for Switzerland ranging from 1995 to 2012, Spescha (2018) finds that smaller firms show a more positive relation between R&D expenditures and sales growth than relatively larger firms. The paper further argues that, industries with many small firms show a positive relation between R&D expenditures and sales growth as compared to industries with few large firms. Further, Demirel & Mazzucato (2012) examined the differences in the effect of R&D on firm growth measured as sales growth for small and large US pharmaceutical firms. Their finding suggest that the positive impact of R&D is conditional upon firm size, patenting and persistence in patenting. It is shown that R&D has a positive impact only to a subset of small firms. While for large firms R&D may have a negative impact on growth. Whereas, literature is consistent with the view on the relationship between innovation and firm growth for firms of different size. We would argue that competitive pressures from the large firms might hinder small firms to reap sufficient innovation rents to cover initial investments. This may lead to stagnation of firms impacting on its growth (Altenburg & Eckhardt, 2006; Hampel-Milagrosa, 2011). Further, it is also argued that large firms with their better strategic resources are well equipped to face the competitive challenges while smaller firms are expected to be at greater risks (Etemad, 2004; Pradhan & Sahu 2008) .

Hypothesis 2 (H2): *The relationship between innovation and firm transition is negative for smaller size firm.*

5.3 Ownership, Innovation, and firm growth

The impact of ownership structure of firms in facilitating firm growth has been an important area for discussion. The extensive literature on firms owned by business groups and standalone firms have been found to mainly concentrate on two broad views viz institutional void thesis and organisational resilience thesis. The proponents of institutional void thesis argue that groups are paragons for developing countries. They provide needed infrastructures where financial and legal institutions are weak. They fill in the institutional voids in the emerging

economies, thus playing a positive role in the growth of less developed countries (Chang, Chung, & Mahmood, 2006; Mahmood & Mitchell, 2004; Khanna & Yafeh, 2005; Khanna & Rivkin, 2001).

By contrast, a different viewpoint, argue that groups are parasites for emerging countries. Group affiliations are more advantageous in countries with strong and efficient institutions. It is because when institutions are developed over the growth process, groups become more responsive and have greater incentives and ability to adapt to institutional changes. This enhances their market dominance and superior performance vis-à-vis standalone enterprises (Castellacci, 2015; Xavier, Bandeita-de-Mello, & Marcon, 2014; Sheffi, 2005; Vogus & Sutcliffe, 2007). These views have recently been extended to the study of innovative activities undertaken by affiliated and the standalone firms. It is shown that group affiliation has a strong positive effect on innovation. By virtue of which they experience higher growth relative to standalone firms. Chang et al., (2006) in their study of south Korea and Taiwan observes that groups' ability to share knowledge and financial resources help affiliate firms to be more innovative than standalone firms. Further, Castellacci (2015) also shows that group affiliated firms' has superior innovative performance than standalone firms in Latin American countries. In a study of Indian business groups, Khanna & Palepu, (2000) further advocates that Indian groups are able to mitigate the costs of creating structures, and drive economic benefits to the affiliate firms. Moreover, the literature also highlights the internal capital market as a key channel through which business groups foster innovation and hence growth of affiliate firms (Belenzon & Berkovitz, 2007). Taken together the literature is mainly unanimous in showing the positive role of group ownership on firm growth in general and on innovation activities in particular. We draw on the literature and expect that group owned firms undertaking innovation would experience size transition of firms relative to standalone firms.

Hypothesis 3 (H3): *The relationship between innovation and firm transition is positive for group-owned firms.*

5.4 Other factors

The literature on determinants of firm transition has long emphasised access to formal credit as a very important factor affecting firm growth and it is particularly true for the smallest firms (Beck & Demirguc-Kunt, 2006; Oliveira & Fortunato, 2005; Winker, 1996; Ayyagari et al., 2008; Beck, Demirgüç-Kunt, & Maksimovic, 2005; Donati, 2016; Allen, Chakrabarti, De,

Qian, & Qian, 2012). Moreover, access to alternative formal finance like external equity financing is also constrained to small and medium firms, even with the provision of SME exchange. Literature shows that while listing improves the capital structure of a firm, it does not lead to any improvement in the performance of these firms (Aggarwal & Thomas, 2017). On the other side, studies also highlight the less important role played by financial constraints on firm growth (Raj & Sen, 2016; Nichter & Goldmark, 2009). Thus, the literature does not seem to be consistent on the importance of role played by access to formal finance for small firm growth.

Additionally, exposure to external market through exports by the small firms has been found to be positively impacting firm transition. Loewe (2013) shows that Egyptian manufacturing SMEs were more likely to upgrade if they exported a large share of their products. Further, it is shown in the literature that SMEs that mostly targeted the domestic market tended to grow more slowly than other companies which targeted the foreign market (Milagrosa et al., 2013; Reeg, 2013). Yet, Vannoorenberghe, Wang, & Yu, (2016) find that exports of smaller firms are more volatile as compared to large firms if the export destination is diversified. It might affect the export earnings of the firms and hence their growth.

Furthermore, studies show that the sector of an enterprise significantly affects the likelihood to transition (Parker, Riopelle, & Steel, 1995). The presence of different product demands, cost advantages for existing firms, economies of scale, and the technological intensity may explain these differences (Esteve-Perez & Sahiti, 2019). Therefore, if we intend to consider a group of heterogeneous MSEs, we must allow for differences in sectors.

The empirical literature analysing the impact of determinants on size transition of firms in developing countries has gained prominence in recent years. Milagrosa et al., (2013) have studied firm transition in a cross-country context, taking case studies on India, Egypt, and Philippines based on employment as a measure of firm size. They emphasize on entrepreneur characteristics as key success factors for firm upgrading. Similarly, Raj and Sen (2016) attempted to study factors affecting firm transition in Indian informal manufacturing sector. However, the study does not consider formal sector MSMEs.

In contrast, our research emphasises on studying the size transition of formal firms in manufacturing sector. We try to overcome previous data limitations by constructing the dataset based on the incorporation year from prowess database of Centre for Monitoring the Indian Economy (CMIE). It enables us to trace the transition path of firms from their incorporation

years to the study period. We further explore the impact of various determinants with emphasis on innovation on firm transition using turnover size definition[1]. It is worth mentioning that we also bring out the role of innovation for the transition probabilities of firms of different sizes and ownership structures.

6. Data, variables and model

6.1 Data

We have used the Prowess database of CMIE to examine determinants affecting firm transition for the formal MSMEs in India. Prowess is a firm-level database maintained by CMIE comprising around 50000 firms. This database is publicly available and provides detailed information on balance sheets, income statements, industry information, ownership data, and incorporation year for both small and large, listed and unlisted formal firms (Allen et al 2012; Singh 2017; Bertrand, Mehta, & Mullainathan, 2002).

In this study, the transition is noted when a firm crosses the threshold of one size and moves to the higher size and remains there for at least two years in order to bring stability in determining the actual size category of firms. A transited firm is the one which has moved from one size category to the higher size and a non-transited firm is the one which has remained in the same size category in the study period. Ample literature exists which use employment as a measure of firm size (Tybout, 2000; Mazumdar and Sarkar, 2009; Hasan and Jandoc, 2010; Ramaswamy, 2013). We, however, focus on turnover size rather than employment growth as indicators to capture the transition of MSMEs. This measure tends to be favoured over employment because of the lumpy nature of employment, which appears to increase with a lag after growth in sales (Parker et al., 1995; Liedholm, 2002). It might also lead to biases, such as limiting the employment potential of firms and underreporting the number of people employed to save on high social security and compliance costs.

Recently, in the year 2018, there has been discussion in policy circles on changing the criteria for defining MSMEs to align it with the needs of current time and changing business ecosystem[2]. As per the proposed definition, MSMEs will be defined based on their annual sales turnover. In our study, we use the proposed definition of MSME based on annual sales turnover. The threshold limit for micro, small and medium firms are given in Table 1.

[1] http://pib.nic.in/newsite/PrintRelease.aspx?relid=176353
[2] Refer to footnote 1

Table 4: The Criteria for Defining Micro, Small and Medium-Sized Enterprises[1]

Enterprise Type	**Proposed Definition**
	Annual Sales Turnover
Medium	≤₹250crore
Small	≤₹75crore
Micro	≤₹5crore

In this study, firms incorporated between the years 2004 and 2011 are considered for analysis. Initially, all firms having their data for sales turnover are drawn from the prowess database, which resulted in a total of 32986 firms. Out of these firms, we extract the data for only those firms incorporated between the years 2004 and 2011, which reduces the number of observations to 12578. We next dropped observations with missing values on turnover, and accordingly, the total number of firms identified is 3083. The total number of firm-year observations over the years is 15410.

These firms are further classified into manufacturing and service firms by NIC 2008. The Prowess data follows the NIC 2008 classification and gives NIC codes against each product. The data covers 760 manufacturing firms and 2323 service firms which are 25% and 75% respectively.

Due to data unavailability for the first year, we have considered the data of each firm from the second year after its incorporation. A recent study by Esteve-Pérez and Sahiti (2019) shows that the risk of firm failure is more in the initial year of firm's incorporation. Hence, we have considered first year as incubation period in which firms either remain in the business or exit the business. Those firms crossing the incubation period are surviving firms. We then observe each firm for five years after the incubation period, that is, firms incorporated during 2004-2011 are followed for a period of 5 years (2010-2017) after the incubation period. We have fixed the study period for each firm to five years, first, to make the comparison possible and second, due to data unavailability for the last year for firms born in 2011.

These firms are then categorized into micro, small, and medium size based on their turnover size. For these firms, we have obtained data for six variables. We use econometric analysis to formally test the role of innovation, firm size, and ownership structure while controlling for access to finance, export income, and sector on the upward progression of firms in the formal MSMEs in India. We employ a logit estimate on the impact of selected independent variables on the propensity of a firm to upgrade.

6.2 Variables

The dependent variable has been the transition, described as a shift from one firm size to another, particularly in the presence of policy thresholds of various kinds. In this study, the transition is noted when a firm crosses the threshold of one size and moves to the higher size and remains there for at least two years in order to bring stability in determining the actual size category of firms. A transited firm is the one which has moved from one size category to the higher size and a non-transited firm is the one which has remained in the same size category in the study period. The policy threshold has been taken as the proposed definition of MSME in India based on annual sales turnover. CMIE do not give classification of firms based on firm size in its database. Thus, using the data, we have first calculated the actual size category of firms based on turnover at the time if its incorporation. Subsequently we note the change in their size category over the years in the study period and observe the transition from one size to another for each firm.

Table 6 Variables definitions

Variable	Description
Transition	It is a dummy variable taking value 1 if firms move from lower size to the higher size category and 0 if firms remain in the same size category.
Innovation	Total outlay of the company on research and development activities undertaken by firms.
Sharek	It is the share finance which includes equity share capital and preference share capital
Xincome	Export income measured as total earnings of a company through the exports of goods
Group and standalone firms	Ownership dummy taking value 1 for group-owned firms and 0 for standalone firms.
High-tech	Sectoral dummy taking value 1 for high technology firms in the manufacturing sector and 0 otherwise
Low-tech	Sectoral dummy taking value 1 for low technology firms and 0 otherwise
Medhightech	Sectoral dummy taking value 1 for Medium high technology firms in the manufacturing sector and 0 otherwise
Medlowtech	Sectoral dummy taking value 1 for Medium low technology firms in the manufacturing sector and 0 otherwise

Micro	Size dummy taking value 1 for micro size firms and 0 otherwise
Small	Size dummy taking value 1for small size firms and 0 otherwise
Medium	Size dummies taking value 1 for medium size firms and 0 otherwise
Year dummies	Time dummies to control for common macroeconomic effect

The primary explanatory variable is the innovation, which, in line with previous research, is measured by the total outlay of the company on research and development during an accounting period. It is the sum of expenditures incurred on both capital account and current account. Research and development expenses information is mostly furnished by manufacturing companies. Thus, we have limited our analysis to the manufacturing firms. Research and development expenses incurred by the company form part of the technology absorption details[2]. There are variety of measures available in literature to capture innovation, like, R&D spending, patenting, technological balance of payments, machinery imports and diffusion. Yet, most researchers have preferred to use R&D spending as their measure of innovation, mainly for reasons of data availability and reliability, rather than on theoretical grounds (Cameron, 1996).

Literature measures financial access using various financial ratios, including debt to sales, liquid assets to total assets, cash flows to total assets, dividend pay-out ratio, bank loans to total assets etc. (Jinjarak & Wignaraja, 2016). To measure financial access, we use share finance. Although debt finance is an important measure of financial access for firms, we take share finance as a proxy for financial access due to high and significant correlation of debt finance with innovation and export income. The size of share finance is captured by both the equity share capital and preference share capital. It measures access to institutional sources of formal finance to firms.

Export income (Xincome) represents the total earnings of a company through the exports of goods. It provides a measure of the degree of exposure of a company to exports market. As discussed in the literature, exporting firms have advantages in terms of better access to resources, both physical and human, know-how, linkages with the global value chain and market access. Therefore, these firms are better placed in transition path and hence they are controlled for.

Ownership shows whether the company belongs to a particular business group or is government owned or a private entity and so on and so forth. In this study, we classify firms into two

ownership types viz. group owned firms and standalone firms. Business groups are composed of legally independent companies that function as a single economic entity through a common source of control and standalone firms are the independent operating firms that is not a subsidiary of another company.

Sectoral dummies are classified as High-technology industries, Low-technology industries, Medium-high-technology industries and Medium-low-technology industries. The classification has been taken from OECD industry classification (Hatzichronoglou, 1997). It classifies manufacturing firms into above mentioned four groups. It controls for shocks at the industry level. Size dummies shows the classification of firms into various sizes on the basis of proposed annual sales turnover criteria described above in table 1.

The variable δt is the year-specific dummy. The year dummies capture the likelihood that economy-wide shocks may have an impact on firm transition. We estimate the model using the maximum likelihood method. Further we have used clustered standard errors by year. It is done to account for heteroskedasticity across clusters of observations such as year in our case.

Model

$$Y = \propto 0 + \beta 1 innovation\_l1 + \beta 2 sharek\_l1 + \beta 3 xincome\_l1 + \beta 4 hightech + \beta 5 medhightech + \beta 6 lowtech + \beta 7 micro + \beta 8 small + \beta 9 micro\_innovation + \beta 10 small\_innovation + \beta 11 group + \beta 12 group\_innovation + \delta t$$

In the above equation, the dependent variable is transition, denoted by Y, which is a categorical variable ranging between 1 and 0 (1 = transition, 0= non-transition). *Innovation* is taken as total outlay of the company on research and development activities undertaken by firms. *Sharek* is the share finance which includes equity share capital and preference share capital. Further *Xincome* is measured as total earnings of a company through the exports of goods. *High-tech, medhightech* and *lowtech* are sectoral dummies to control for any shocks at the industry level. *Micro* and *small* are size dummies and are included to observe any possible dependence of transition on size. *Micro_innovation* is the interaction of micro firms undertaking innovation activities. This helps to see the possible effect of innovation on transition for micro firms. Similarly, to see the effect for small firms we use the interaction of small firms with innovation given as *small_innovation*. Further, *group* represents the group-owned firms and takes value 1 and 0 for standalone firms. *Group_innovation* is the interaction of group-owned firms undertaking innovation activities. This helps us analyse the likely effect of innovation on transition for group-owned and standalone firms. We also used year dummies (δ) to control for

any macroeconomic shocks. We included lagged values of innovation, share finance and export income to control for any endogeneity in the dataset (Ahn, Yoon, & Kim, 2018).

5.3 Descriptive statistics

We begin the empirical analysis by presenting the summary statistics for the independent variables used in our analysis as shown in table 3. The firm-level characteristics across the transition and non-transition firms is also presented in table 4.

Table 5.2 Summary statistics-firm attributes, 2006-2017 Variables for transition and non-transition firms

Transition	**0**				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Xincome	51	.4871	.7896	.001688	3.35693
Innovation	51	.2606	.5939	.001321	3.16058
Sharek	51	.3100	.5029	.000163	2.49377
Hightech	51	.1176	.3253	0	1
Lowtech	51	.1764	.3850	0	1
Medhightech	51	.5490	.5025	0	1
Micro	51	.0980	.3003	0	1
Small	51	.5098	.5048	0	1
Group	51	.1764	.3850	0	1
Group_Innovation	51	4.163	14.59	0	76.8
Micro_Innovation	51	3.335	13.82	0	86.1
Small_Innovation	51	53.26	154.06	0	868.6
Transition	**1**				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Xincome	42	1.485	3.789	.000158	17.8622
Innovation	42	.1720	.3100	.000249	1.54815
Sharek	42	.5223	.7542	.003718	3.55556
Hightech	42	.1666	.3771	0	1
Lowtech	42	.1428	.3541	0	1
Medhightech	42	.6904	.4679	0	1
Micro	42	.1190	.3277	0	1
Small	42	.4285	.5008	0	1
Group	42	.1666	.3771	0	1
Group_Innovation	42	7.448	22.78	0	103.122
Micro_Innovation	42	1.130	3.987	0	21.2
Small_Innovation	42	11.55	29.29	0	126.6

Table 6 Characteristics of transition and non-transition firms (number of firms and percentage), 2006-2017

Variables	***Transition firms***		***Non-Transition firms***	
	Numbers	**Percentage**	**Numbers**	**Percentage**
N	5185	33.65	10,225	66.35
Hightech	155	54.39	130	45.61
Lowtech	505	42.08	695	57.92
Medhightech	505	44.89	620	55.11
Medlowtech	470	39.50	720	60.50
Standalone	4125	35.26	7,575	64.74
Group	1060	28.57	2650	71.43
Micro	1,230	25.12	3,667	74.88
Small	1,907	43.18	2,509	56.82
Medium	739	46.33	856	53.67

In our data set, micro firms are around 45%, small firms are 40%, and 15% are medium firms which is consistent with the idea of skewed firm size distribution in favour of smaller firms as discussed in the literature (Krueger, 2007; Dhar & Lydall, 1961; Ramaswamy, 2013; Mazumdar & Sarkar, 2009; Tybout, 2014). Further, around 33.65% are transition firms and 66.35% are non-transition firms of the total firms. It is clearly visible from the data that the transition of firms is not a usual phenomenon among the MSMEs. Furthermore, among the transited category, medium size firms form the majority while micro firms are predominant among the non-transited category. Moreover, high-technology firms are the dominant industry type in the transited category, while medium-low-technology and low technology firms are key type among the non-transited category of firms. It is supportive of the arguments made in the literature that high-tech firms are better placed for superior performance as compared to low-tech firms (Coad & Rao, 2008; Audretsch et al., 2014; Stam & Wennberg, 2009). Additionally, firms owned by business groups are highest as compared to the standalone firms in the non-transited category. Further around 26% of firms in non-transition category are undertaking innovation. It is significantly different and low for firms in the transition category which is around 17%. This shows that average innovation is more for smaller firms as compared to larger firms. It also points to the observation that innovation do not seem to increase the chances for firm transition. However, we do not see significant difference in access to finance for both the category of firms. While we observe a clear bias in average export income towards firms

in the transition category which is significantly higher as compared to firms in the non-transition category.

6. Results

We employ a logit estimate on the impact of selected independent variables on the propensity of a firm to upgrade. Table 5 presents the estimates of the logit regression model given in Eq. (1). In all, we estimate three specifications of Eq. (1). Model (1) results relates to the regression of firm transition, on its lagged values for innovation, access to finance, and export income along with sectoral, year and size dummies. It is observed that the impact of innovation is highly significant and negative. While that of exports is positive and the estimate is highly significant. Finance is also positive and is highly significant. Model (2) results have added interaction variables between innovation and size dummies. The innovation variable has stayed negative and significant. Further the effect of innovating micro and small firms is also negative and significant. Model (3) results have added ownership types and the interaction of ownership types with the innovation variable. The innovation variable continues to be negative and highly significant. Yet innovating group owned firms have positive and highly significant impact on firm transition.

Table 3 Results: Logistic regression estimates for manufacturing firms

Variables	**(1)**	**(2)**	**(3)**
High-tech	15.30***	17.00***	16.62***
	(26.35)	(23.63)	(25.91)
Lowtech	14.92***	16.37***	16.65***
	(15.13)	(16.26)	(22.05)
Medhightech	15.71***	17.54***	17.15***
	(26.73)	(31.83)	(31.41)
Micro	-0.198	1.711***	-0.0431
	(-0.43)	(4.29)	(-0.09)
Small	-0.0977	0.149	-0.173
	(-0.30)	(0.40)	(-0.50)
xincome_l1	0.201***	0.158***	0.246***
	(13.51)	(4.68)	(5.90)
innovation~1	-0.981**	-0.991**	-0.904***

	(-2.95)	(-3.27)	(-2.72)
sharek_l1	0.561***	0.870***	0.440***
	(6.41)	(4.63)	(3.13)
micro_inno~n		-0.129***	
		(-2.55)	
small_inno~n		-0.00582***	
		(-8.22)	
Group			-0.981
			(-1.15)
group_inno~n			0.0195***
			(2.55)
Year dummy	Y	Y	Y
N	93	93	93
Pseudo R-sq	0.1437	0.2136	0.1541

***, ** and * stand respectively for level of significance at 1, 5 and 10%
t statistics in parentheses

The results account for endogeneity of the innovation variable and are significant. However, we do not get support for our first hypothesis as the impact of the innovation is consistently negative across different specifications in influencing firm transition. It can be argued that innovation might act as a trigger for transition of firms by driving its development, it is the innovation rents (Porter, 1998) that support enterprise growth. However, due to fierce levels of competition among firms which might act as a hindrance for them to not be able to reap sufficient innovation rents to cover initial investments. These dynamics limit the opportunities for MSEs to start necessary upgrading processes (Altenburg & Eckhardt, 2006; Hampel-Milagrosa, 2011). Our conjecture is yet strengthened by the fact that, relatively higher percentage of firms undertaking innovation exists in non-transition category. Further we present the marginal effects in table 6 to interpret the magnitude of change of explanatory variables on the transition of firms. It is shown that a firm undertaking innovation is around 18% less likely to transition. Moreover it is shown by Deschryvere, (2014) that only continuous product and process innovators show positive associations between R&D growth and sales growth. In view of that, it is argued that introducing novelty in production through continuous efforts in innovation in product and processes could help firms gain competitive advantage and support transition (Mukherjee, 2018; Schmitz & Knorringa, 2000).

Table 4 Marginal effects of explanatory variables on firm transition for manufacturing firms

Variables	**dy/dx**	
hightech	3.195***	(0.2360)
lowtech	3.076***	(0.3190)
medhightech	3.295***	(0.1919)
micro	0.3215***	(0.0594)
small	0.0280	(0.0700)
xincome_l1	0.0297***	(0.0065)
innovation_l1	-0.1861***	(0.0535)
Sharek_l1	0.1635***	(0.0282)
micro_innovation	-0.0242***	(0.0083)
small_innovation	-0.0010***	(0.0001)
Group_innovation	0.0040***	(0.0014)
Group	-0.2013	(0.1698)

Figures in parentheses are standard errors
***, ** and * stand respectively for level of significance at 1, 5 and 10%

Although the results on the effect of firm size on transition is not consistent across models. Our results unequivocally suggest that the relationship between innovation and firm transition is negative for smaller size firms which precisely supports our second hypothesis. It is also shown that innovating micro firms are 2.5% less likely to transition. It is quite plausible that large firms with their better strategic resources and access to better developed technology are well equipped to face the competitive challenges while smaller firms are expected to be at greater risks (Etemad, 2004; Pradhan & Sahu 2008). Therefore, small firms are not able to compete, and they stagnate impacting on its growth. We have also given the joint significance test in table 7. It shows that our variables involving firm size and their interaction with innovation are jointly significant on transition.

The results also show that group-owned firms by itself is not a preponderant factor if we do not consider innovation activity by these firms. Thus, there is a significant positive effect of group-owned firms undertaking innovation on firm transition. The results draw on the extant literature on business group which observes that groups have the ability to share knowledge and financial resources, its internal capital market and, driving economic benefits to the affiliate firms. whereas a standalone firm do not have access to such benefits and hence it depends on its own liquidity. This acts as a key channel which help affiliate firms to be more innovative than standalone firms (Chang et al., 2006; Khanna & Palepu, 2000; Belenzon & Berkovitz, 2007).

The joint significance test as given in table 7 also shows that the joint effect of variables in significant on transition.

Table 5 Joint significance test

Variables	**Micro** **micro_innovation**	**Small** **small_innivation**	**Group** **Group_innovation**
$\chi 2$ -statistics	193.11	101.39	34.16
p-value	0.000	0.000	0.000

Section 6: Firm Transition in the Informal Sector:

We next examined the firm transition in the informal sector of India. Using unit-level data for 581,672 firms from National Sample Survey (NSS) covering the periods 2010-11 and 2015-16. Although the importance of MSME sector has been highlighted across the world, there are various factors that have constrained the growth of the sector. Among them are lack of adequate and timely access to finance, poor infrastructure, inadequate market linkages, stiff international competition, Lack of Skilled Labour Technological Up-gradation, Lack of Information/awareness, Managerial Incompetence, Government Regulations, Corruption in registration, licensing etc. that has continued to be a challenge for the MSME sector.

However, the biggest challenge that is faced by MSME is the composition of the sector in terms of enterprise type or firm size distribution, which is highly skewed across regions. The developing countries have a presence of a large number of microenterprises and some large firms, but fewer small and medium enterprises. In developed countries, this distribution is more in favor of small and medium enterprises[3]. This SME gap in developing countries is known as 'missing middle.' In the Indian case as per the National Sample Survey (NSS) 73rd round conducted during the period 2015-16, there were 633.88 lakh unincorporated non-agriculture MSMEs in the country engaged in different economic activities excluding the registered sector MSMEs. The Micro sector with 630.52 lakh estimated enterprises accounts for more than 99% of the total estimated number of MSMEs. The small sector with 3.31 lakh and Medium sector with 0.05 lakh estimated MSMEs accounts for 0.52% and 0.01% of total estimated MSMEs, respectively, as shown in figure 1. According to the final report of the Fourth MSME census

3 https://sites.hks.harvard.edu/cid/efl/finance.html

on the registered sector, there are around 15 lakh units out of the which the proportion of micro, small and medium enterprises is 94.94%, 4.89%, and 0.17% respectively as shown in figure 2 (MoMSME, 2013). Above data clearly shows skewness in the distribution of MSMEs in India with an overwhelming presence of micro firms.

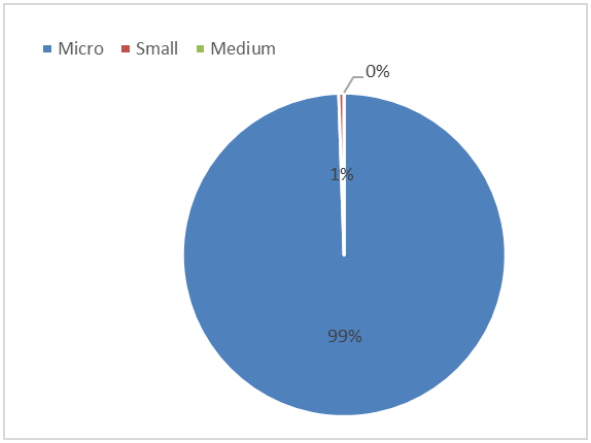


Figure 1 Distribution of firms into micro, small and medium enterprises in the Unregistered sector in India

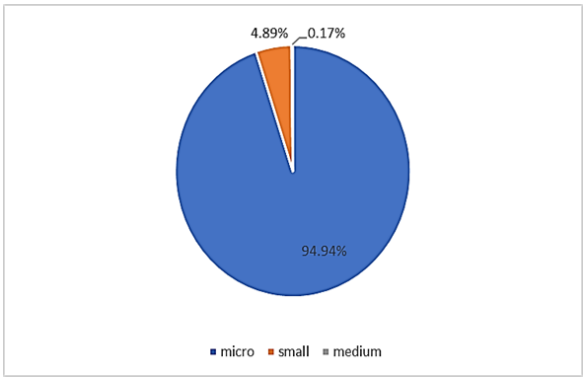


Figure 2 Distribution of firms into micro, small and medium enterprises in the Registered sector in India

The predominance of micro enterprises in the MSME sector has an impact on the level of firm growth and productivity as well(La Porta & Shleifer, 2014). Moreover, the presence of a large number of micro enterprise in the informal sector in these countries gives an important reason why aggregate productivity in these economies remains low as compared to advanced economies (Hsieh & Klenow, 2008). The productivity of these firms is lowest among all firms in the MSME sector, and these firms are not capable to grow in size and make the transition to larger firms (Woodruff, Mel, & Mckenzie, 2010). Therefore, firm transition in the MSME sector holds importance. The research on firm transition in MSMEs is in a nascent stage. Milagrosa, Loewe, & Reeg, (2013) has studied firm transition in cross country context taking

case studies on Egypt, India and the Philippines based on employment as a measure of firm size in the formal sector.

Recently, Raj & Sen, (2016) made an attempt to study the firm transition from small firms employing own labor to large firms employing hired labor in the Indian informal manufacturing sector. The study does not highlight MSMEs and is confined to the manufacturing sector only. However, analyzing firm transition taking investment and turnover as a measure of firm size for Indian MSMEs is in its infancy. Much of the literature use employment as a measure of firm size (Mazumdar & Sarkar 2009; Tybout 2000; Hasan &Jandoc 2010; Ramaswamy, 2013) This measure tends to be favored over employment as a measure of transition because of the types of biases that might arise and because of the lumpy nature of employment, which appears to increase with a lag after growth in sales or assets (Parker,1994; Liedholm, 2002).

Accordingly, we begin by examining how manufacturing and service enterprises are distributed across different firm sizes in Indian informal MSMEs and study their transition in terms of investment in asset criteria. Further scant literature on transition shows various determinants that have been found to be constraining and/or driving a firm transition in formal MSMEs. These are access to finance, innovation, age and sector of the enterprise, location and geographical factors, informality, infrastructure, human capital, and so on. However, given the heterogeneous nature of the MSME sector, the study of factors affecting its growth cannot be universalized. Therefore, the present study explores the determinants affecting size transition in informal MSME sector highlighting the role of location, geographical regions, ownership pattern, network, registration, access to government assistance, access to labor, account maintaining by firms, access to infrastructure, credit, labor productivity, and ict. Using the National Sample Survey (NSS) data for 67^{th} and 73^{rd} round, conducted by National Sample Survey Office, Ministry of Statistics & Programme Implementation during the period 2010-11 and 2015-16 respectively, the present study examines the determinants of firm transition in informal MSMEs using investment criteria for both manufacturing and service sector. We used ordered logit model to test for the impact of chosen variables on the probability of firms being in either of the firm sizes viz micro, small, and medium across the manufacturing and service sector. We find persuasive evidence that ICT, business network, firm type, ability of firms to maintain accounts, government assistance and registration are most important determinants which are associated with the likelihood of firm transition across different size categories. In contrast we find availability of labour to be negatively related to the likelihood of firm

transition. For service firms, along with the above variables, provision of electricity and credit has a positive impact on firm transition.

In the present study, we have also seen a transition from unregistered to registered firms and from own account enterprise to the establishment within the micro sector itself to highlight factors affecting growth within the micro sector. This gives the targeted point of intervention for policy implication. We find that the ICT, firm type, business network and location of firms are important factors impacting the likelihood of firms being registered. However, availability of labour for manufacturing firms and ownership pattern has negative impact on likelihood of firm being registered. For service firms labour availability is positively related to registration of firms. Further likelihood of a firm being in an establishment is affected by registration, business network and ownership. The effect of ownership is different for service firms However, it is shown that female-owned firms are less likely to be an establishment for both manufacturing and service sector. We do not find evidence on labour availability impacting likelihood of firm being an establishment. We also find that government assistance negatively impacts probability of firm being an establishment.

Determinants of Firm Transition

Access to Finance

Access to formal finance can help firms overcoming financing constraints and provide financial support for businesses to grow. Yet, in developing countries, credit access is very limited, and it is particularly true for the smallest firms (Beck & Demirguc-Kunt, 2006, Oliveira & Fortunato, 2005,Winker, 1996, Ayyagari et al., 2008). Hubbard et al., (1987) indicate that financial constraints are important determinants of firms' investment decisions. Rajan & Zingales, (1998) find that financial market development affects growth in the average size of existing enterprises and the growth in the number of new enterprises in those industries dependent on external finance. The presence of greater financial constraints thus exerts a negative influence on the growth of small firms (Beck, Demirgüç-Kunt, & Maksimovic, 2005; Oliveira & Fortunato, 2005; Donati, 2016; Allen, Chakrabarti, De, Qian, & Qian, 2012) In India it is reported that the share of formal finance to the MSME is INR 7 trillion ($ 140 million) and covers only 10-11 million enterprises. An estimated 67% of enterprises remain un-served by the formal financial sector (IFC, 2012). Moreover, access to alternative formal finance like external equity financing is also constrained to small and medium firms, even with the

provision of SME exchange. Literature shows that while listing improves the capital structure of a firm, it does not increase a firm's access to finance from formal financial institutions like banks. Further listing does not lead to any improvement in the performance of these firms (Aggarwal & Thomas, 2017). On the other side, studies also highlight the less important role played by financial constraints on firm growth (Raj & Sen, 2016).

Government Policies

The focus on government policies in academic and policy-oriented works is because of its importance in economic growth. Yet, there exists an old debate between neoclassical and structural approaches that whether increasing regulatory policies will encourage or dampen the private sector. The rationale for regulation is provided by the existence of market failures. It is understood that weak institutions and ineffective state policies lead to market failure, which dampens private sector development. The role played by economic institutions and regulatory policies in influencing business outcomes has been highlighted by a world bank (Djankov et al., 2002). Regulation can strengthen economic and legal institutions, which in turn can influence the decisions of entrepreneurs to register their businesses, to comply with tax policies, to invest in physical or human capital or technology adoption. However, Doing Business reports suggest that complex regulation and its enforcements are one of the main constraints to growth in many developing countries (The World Bank, 2018).

Registration Policy

It is argued in the literature that in most developing countries, regulatory policies are burdensome, very complex, and often used as opportunities to accept bribes (Djankov et al., 2002). He shows that in transition economies informal firms pay around 20% of their revenues in the form of bribes which is an implicit tax that in any case is lower than the tax paid by the registered firms. Therefore most MSEs remain informal to avoid the cost of taxation and remain excluded from public services and formal credit markets (Beck & Demirguc-Kunt, 2006; Beck et al., 2005).

In this perspective, regulation is seen as a cost acting as a deterrent to formalization. Cost of formalization can be categorized into formal entry cost and operating cost (De Soto, 1989, Loayza & Serven, 2010). When a firm enters the formal sector, it must undergo various procedures like obtain licenses, registering with government bodies, screening, etc. However, the number of procedures, the time taken, and the cost involved differs from country to country. The average number of procedures facing a new entrant is 6.26 worldwide (Djankov et al.,

2002). Operating cost involves compliance with tax laws, labor regulations, property registration, inefficient contract enforcement, etc. It is argued that this regulation may lead to losses in efficiency and productivity (Klapper, Laeven, & Rajan, 2006).

There are many benefits of the registration policy. It encourages the formalization of the enterprise that influences firm performance. These benefits can be legal protection, effective contract enforcement, access to public goods and services, and so on. Literature has shown that there exists a positive association between simple registration process on formalization and firm performance. For example, the introduction of a business tax reduction and simplification scheme (SIMPLES) in Brazil led to a significant increase in formality (Fajnzylber, Maloney, & Montes-Rojas, 2011). Another study of Mexican microenterprises shows that being part of the business association, paying taxes increases its profits levels (Fajnzylber et al., 2011).

Taking the case of India, where around 95% of MSMEs are unregistered, the government has, time to time, simplified the registration process to provide maximum benefits to all types of enterprises. The registration scheme for small scale industries was introduced in the early 1960s mainly to provide incentives, facilities, and other services offered by the government. The registration scheme was voluntary in nature. In subsequent years further simplification and rationalization was carried out in the procedures for registration. According to the results produces by first MSME census conducted in 1973-74, the registered SSI units up to 30-11-1973 were 2.58 lakh units. This number increased to 9.87 lakh SSI units up to 31-3-1988 as per the second MSME census. In the third MSME census, the size of the registered sector up to 31-3-2001 was 13, 74, 974 units and that of the unregistered sector was estimated to be 91, 46, 216 lakh units.[4]

Subsequent to be implementation of Micro, Small and Medium Enterprises Development Act, 2006 with effect from October 2006 filing of Entrepreneurs Memorandum Part-I and Part-II came into vogue. As per the provisions of the Act, MSMEs file Entrepreneurs Memorandum (Part-I) at District Industries Centres (DICs) which entitles an enterprise to seek financial credit and also other facilities like land, industrial set-up, and water/electricity/telephone connections. Entrepreneurs Memorandum (Part-II)/[EM-II] is filed after commencement of the project. However, it is mandatory only for medium scale enterprise to get registered. Further in 2015, to enable ease of registration of MSME's, Udyog Aadhaar online filing system has been notified. It is a simple one-page registration Form 'Udyog Aadhaar Memorandum' (UAM)

[4] http://www.dcmsme.gov.in/ito_msme/censuses.htm

which replaces the filing of Entrepreneurs' Memorandum (EM part-I & II). Under the new system of Udyog Aadhaar Memorandum, the growth of registrations of the MSMEs is impressive. More than 2.30 lakh units have been registered as on 17.02.2016.

This shows that with streamlining the registration process, the number of MSMEs registering themselves has increased. However, over the years, the size of the unregistered sector has also increased. As per the 73rd round of NSSO the size of unregistered sector MSME stands at 633.88 lakh units, and as per the 4th MSME census size of the registered sector is 16 lakh units. There is still a huge gap between the size of registered and unregistered sectors. The above facts simply point out that with the ease of the registration process, the number of new registered MSME increases. Nonetheless, it does not say anything about the already existing unregistered MSME whether they are registering their businesses or not. In a recent paper, Sharma (2014) finds that registration leads to 32 per cent gain in sales per employee and 56 per cent gain in value-added per employee for firms in the small-scale sector. La Porta & Shleifer, (2014) also reported a productivity gap of 120 percent on average between unregistered firms and registered SMEs for 24 Sub-Saharan African countries. These studies show the registered firms are more productive and exhibit better performance than their unregistered counterparts. However, the effect of registration on the size transition of firms still remains a little-explored area. Further, the factors affecting the transition from unregistered to the registered sector need closer understanding in order to bridge the gap between the size of registered and unregistered sectors.

Despite these benefits and the steps taken by various governments world over to ease the registration procedure and reduce the cost of formalization, the firms self-select to not register. In the Third Census of MSMEs, the reasons for non-registration were elicited. It was shown that 53.13% of the units informed that they were not aware of the provision for registration, while 39.86% of the units indicated that they were not interested.

Literature gives the evidence that registration cost is not a compelling factor for firms not transitioning to formalization. Rather these firms perceive the benefits of being formal to be modest(De Mel et al., 2011). The advantages of informality are viewed to be more by the firms as they can avoid taxes and burdensome regulations (Levy, 2008). Weighing on the costs and benefits of operating formally and informally, a firm decides whether to remain informal or formalize their operation. Although it is argued in the literature that as firms grow, it becomes important for firms to take recourse to formal institutions (Loayza et al., 2010) as informal

networks and institutions become insufficient to enhance firm performance and support its upgrading.

Protection Policy

The incentives offered to MSMEs are generally to protect them against unequal competition from the large firms. These incentives relate to inclusion under priority sector lending scheme of banks, lower rates of interest, exemption under various tax laws, subsidies, and other support services such as marketing and export assistance. However, these size-dependent regulations reduce the average firm size, thereby affecting the output and productivity of firms. In a study based in India of Tirupur cotton knitwear industry, it is shown that Indian state policy for the small-scale industries discouraged MSEs from growing their businesses beyond a certain size (Cawthorne, 1995). The policy eventually subsidized vertically integrated firms. These firms divided themselves into many MSEs in order to look smaller to avail the benefits. These size-dependent government regulations discourage size expansion and lead to a misallocation of resources that drive a wedge between firms of different sizes (Ramaswamy, 2016). His study is based on a large unbalanced panel of manufacturing factories in the formal sector spanning the period 1999-2008 and a panel of manufacturing companies covering the period 1990-2010 in India. He shows that size-dependent tax incentives could lead to the disintegration of production and prevent the natural transition of firm sizes.

Labour Market Regulation

Labor market regulations pertain to hiring and firing of workers, terms, and conditions of work, workers protection, etc. Hasan & Jandoc, (2010) have extensively examined the relationship between the distribution of firm size in terms of employment and labor regulations in Indian manufacturing. They have used ASI and NSSO data from 3 years: 1994/1995, 2000/2001, and 2004/2005. It is shown that rigid labor regulations affect firm size distribution adversely(Fonseca & Utrero, 2017; Hasan & Jandoc, 2010). there is a large literature that shows significant violations of labor regulation the world over (Levy, 2008,Lemos, 2004). Complying with labor regulations raises the costs of production and constrain firms from making quick adjustments to employment levels. This gives an incentive for firms to stay below the relevant threshold and continue to operate informally (Ayyagari, Beck, & Demirguc-Kunt, 2007).

Business Networks

Networks are the base of many of our interactions. They play an important role in the organization of some significant economic relationships; such networks include the

relationships among friends and relatives with whom information and favors are exchanged on a regular basis and reach as far as influencing decisions regarding the choice of business partners and how they conduct their business. In emerging economies like India, despite the range of government policies for every size category of firms, MSME face host of constraints like financial, legal, infrastructure, marketing, technological, etc. which inhibit its growth. These constraints arise mainly because of weak institutions and ineffective state policies (Aterido, Hallward-Driemeier, & Pagés, 2011, Beck & Demirguc-Kunt, 2006, Markus, 2011, Ayyagari et al., 2008).

The firms then collaborate and exploit their social capital to enter into a long term ethnically based business relationship (Biggs & Shah, 2006, Kerr & Mandorff, 2015, Wang & Maani, 2014). These social connections solve the problems of information and commitment (Munshi, 2015) and thus facilitate exchange. Moreover, the reduction of uncertainty, reliability, responsiveness, and access to information are other important concerns addressed by networks (Powell, 1990) which demand its formation. The idea that network effects are present in MSMEs, and it affects its growth and performance is being studied in the literature (Khanna & Palepu, 2000, Uzzi, 1996). However, little is known about the extent to which MSME growth is contingent upon a network.

Research has shown that inter-firm network plays an important role in the process of enterprise formation and growth (Meagher, 2013). The regular exchange with other firms and people broadens the firms access to capital, technology, markets, opportunities, and information. This indicates that networking helps raising required resources, such as financing, knowledge, and emotional support and thereby help in the firm transition. Inter-firm or business networks are those between a firm and its buyers, suppliers, and other firms or competitors that relate only to the business. This inter-firm network can further be classified as formal and informal networks. A firm formal network comprises of its membership to any govt body like a trade association, chambers of commerce, financial institutions, etc. While firms informal network comprises of its relationship with other local business, friends, and family, local moneylenders, etc.

Inter-firm networks can be in the form of horizontal and vertical linkages with each other. Horizontal network are longer-term cooperative arrangements among firms that involve interdependence, trust, and resource pooling in order to jointly accomplish common goals and vertical network shows forward and backward linkages of firms with its buyers and suppliers.

It connects economic actors along a specific product line from the input, manufacturing, marketing to the final stage of consumption. Both types of linkages are seen to have an Impact on small firm upgrading.

Market Dynamics

It focuses on the demand and supply forces of the market. In an economy when the demand for modern products is not sufficient, a firm is less likely to transition to modern production technologies since it will not cover their fixed costs of investments. In such economies, low-quality goods are supplied cheaply to people who cannot afford the output of the higher quality(La Porta & Shleifer, 2014). The idea about demand constraints gave rise to the Big Push theory, which talks of simultaneous modernization of multiple sectors of the economy to generate enough demand for modern products which can make firm transition profitable. Further, even in the case of expansionary demand for modern products, entry-limiting regulation may hinder technology adoption by reducing competitive pressures. It can cause incumbent firms to grow more slowly and impact firm transition (Nicolrtti & Scarpetta, 2003, Klapper et al., 2006, La Porta & Shleifer, 2014).

Gender of the Entrepreneurs

There is a growing consensus in the literature that the MSME run by women tend to grow more slowly than those run by males (Hampel-Milagrosa, 2011, Liedholm, 2002, McPherson, 1996). However, these differences in growth rates might be due to various socio-cultural factors associated with women's roles in society that constrain their business opportunities, like ensuring the wellbeing of dependents and childbearing and rearing rather than the lack of personal entrepreneurial characteristics.

Sector of Enterprise

MSMEs constitute a heterogeneous group of firms operating in different sectors. Firms in different sectors face different costs and demands, which significantly affects their likelihood to upgrade. These sectoral differences in the propensity to upgrading were found to exist at the country level (Parker, Riopelle, & Steel, 1995).

Location and Geographic Factors

There exists ample evidence on the positive role of locational factors on firm growth. Different studies have used different measures to capture the effect of location on firm growth. Some studies indicate that urban-based firms grow faster than those based in rural areas (Piore & Sabel, 1984). They associate an urban location with faster firm growth. Further, McPherson

(1992) adds that firms located in business districts tend to grow more than home-based businesses. Raj & Sen, (2016) has also seen the impact of location on firm growth. They find that firms located in urban areas and closer to the state capital are more likely to grow.

Informality

Literature provides evidence that being informal limits the growth prospects of firms (La Porta & Shleifer, 2008,La Porta & Shleifer, 2014). Informal enterprises face greater difficulties in accessing formal credit and benefits from regulatory institutions. Further, informal firms lack the legal requirements to participate in formal contracts, thus limiting their business opportunities (De Soto, 1989, Levy, 2008,Ishengoma & Kappel, 2006). For these and other reasons, informal MSEs could be less efficient and more slow-growing than formalized enterprises.

Infrastructure

Infrastructure is critical to firm growth as it helps firms to get connected to core economic activities and thus increase productivity. Available evidence point to a strong positive relationship between access to infrastructure and firm growth and productivity (D. Mazumdar & Sarkar, 2009). They use access to electricity as a proxy for infrastructure. Ayyagari et al., (2008) also show that the lack of access to infrastructure is correlated with low firm performance. Further Raj & Sen, (2016) also finds that transition is faster among firms that have access to better infrastructure, especially power.

Assets

A firm's ability to manage risk depends on their assets that can be liquidated to cope with risks. Literature shows that increases in productive assets increase the ability of a firm to undertake riskier projects to grow (Loewe, 2013). Further investment in assets can give firms better access to credit markets (Abdel-Kader, 2006).

Labour Productivity

The theoretical contributions on the relation between firm growth and productivity have provided arguments that productivity may affect firm growth (Alchian, 1950). there has been sparse empirical literature, however, seems to suggest that firm growth and productivity growth are only weakly associated with each other (Coad & Broekel, 2007)

ICT

The use of information and communications technologies (ICT) in business transactions such as use of the Internet, having web presence, placing orders using internet etc. are important tools for all firms because they provide even the smallest of enterprises with the ability to reach national and international markets at low cost (The World Bank, 2014). It enables MSMEs to search for raw material, experts, online adoption of best practices to improve quality of products and services, undertake direct, faster and better transactions and gaining competitive advantage (MSME, 2016) which helps firms to grow and increase performance.

6.3. RESEARCH HYPOTHESIS

Given the heterogeneous nature of the MSME sector, the study of factors affecting its growth cannot be universalized. Although the firm transition has been studied through different angles in the literature, the focus has been mainly on firms moving from informal to the formal way of operating (La Porta & Shleifer, 2014, Ishengoma & Kappel, 2006, De Mel et al., 2011, De Soto, 1989). The research on size transition of firms in MSMEs is in its infancy. The present study is motivated to study the phenomenon of MSE-SME transition in Indian informal MSMEs. Recently Milagrosa, Loewe, & Reeg, (2013) has studied firm transition in cross country context taking case studies on Egypt, India and the Philippines based on employment as a measure of firm size in the formal sector. Raj & Sen, (2016) made an attempt to study the firm transition from small firms employing own labor to large firms employing hired labor in the Indian informal manufacturing sector. The study does not highlight MSMEs and is confined to the manufacturing sector only. However, analyzing firm transition taking investment as a measure of firm size for Indian MSMEs is in nascent stage. Much of the literature use employment as a measure of firm size (Mazumdar & Sarkar 2009; Tybout 2000; Hasan &Jandoc 2010; Ramaswamy, 2013). This measure tends to be favored over employment as a measure of transition because of the types of biases that might arise and because of the lumpy nature of employment, which appears to increase with a lag after growth in sales or assets (Parker,1994; Liedholm, 2002). The understanding firm transition would require the study of factors that are constraining or/and driving the transition. Milagrosa, Loewe, & Reeg, (2013) has focussed on determinants in the formal sector and brings out the role of entrepreneurial characteristics like education of owners and their motivation level as crucial factors determining transition in formal MSMEs. In, our study we propose to focus on business network, registration status, ict, government assistance, firmtype, ownership, location, electricity and labour as major factors affecting transition in informal MSMEs

To guide our research, we formulated several research hypotheses that are based on assertions about the factors important for MSME transition that are made in the literature. Each hypothesis refers to one factor that could explain the transition of MSMEs. There are three sets of hypotheses. H1 pertains to the question of determinants of firm transition in unorganized MSME sector. H2 is based on the question of factors affecting registration status of firms. The third set of hypotheses, H3, relates to the factors affecting the transition from an own account enterprise (OAE) to the establishment.

H1a: Likelihood of firms being in micro, small, or medium size categories is positively associated with business networks of firms.

H1b: Likelihood of firms being in micro, small, or medium size categories is positively associated with government assistance provided to firms.

H1c: Likelihood of firms being in micro, small, or medium size categories is positively associated with registration status of firms.

H1d: Likelihood of firms being in micro, small, or medium size categories is positively associated with usage of ict by firms.

H1e: Likelihood of firms being in micro, small, or medium size categories is positively associated with the firm type.

H2a: Registration status of a firm will be positively associated with the location of firms.

H2b: Registration status of a firm will be positively associated with ownership.

H2c: Registration status of a firm will be negatively associated with the business networks.

H2d: Registration status of a firm will be positively associated with the availability of labor.

H2e: Registration status of a firm will be positively associated with the firm type.

H3a: Firm transition from oae to establishment is positively associated with the business networks.

H3b: Firm transition from oae to establishment is positively associated with the ownership patterns.

H3c: Firm transition from oae to establishment is positively associated with the registration status.

H3d: Firm transition from oae to establishment is positively associated with the government assistance.

H3e: Firm transition from oae to establishment is positively associated with the availability of labor.

6.4. DATA AND METHODOLOGY

6.1 Data

The main sources of data relating to the unorganized sector are the socio-economic surveys conducted by the National Sample Survey Office (NSSO) Ministry of Statistics & Programme Implementation. The National Sample Survey Organisation (NSSO) is the agency that collects unit-level data on various aspects of the enterprises in the informal sector using a stratified random sampling procedure. These are nationwide enterprise-level surveys covering all states and union territories. For this study, we combine NSSO data from 2 years:2010-11 (67^{th} round) and 2015-16 (73^{rd} round). The choice of the time period for our study is governed by the fact that these two rounds cover the same subject viz. unincorporated non-agricultural enterprises (excluding construction).

For our unit-level data, initially, we had 624587 firms from both the rounds. We removed those firms which are engaged in economic activity not covered in either of the rounds. For example, 67th round does not cover Activities related to Non-captive electric power generation, transmission and distribution by units not registered with the Central Electricity Authority (CEA) which are included in the 73rd round. We remove these firms from our dataset. Further, we also drop firms which do not report data for investment in assets. Accordingly, we have 581672 firms in the pooled data set, across both the manufacturing and service sectors for two years. The data covers 148881 manufacturing firms and 432791 service firm, which are 26% and 74% respectively. These firms are categorized into micro, small, and medium firms on the basis of the definition given under MSMED act based on investment in assets criteria.

In this study, our interest is to locate the factors that could explain the firm transition in the informal sector. Transition is noted when a firm crosses the threshold of one size and moves to the higher size (i.e. from micro to small and then to medium). However, the NSSO does not reveal the identity of the firm, and the same firms may not be surveyed in each round. Therefore, the lack of availability of panel data is a limitation of our analysis. Instead, we use repeated cross-sections for the analysis.

We use econometric analysis to formally test the role of location, ownership pattern, network, registration, access to government assistance, firm type, access to labor, access to infrastructure, and ict. on the upward progression of firms in the informal MSMEs in India. We employ an ordered logit model to capture the firm transition in the informal sector. We also

employ logit models to study the factors affecting registration status and to analyze the transition from OAE to the establishment within the micro sector.

6.2 Model and Variables

For the first set of hypotheses, the model is given in equation1.

$Y^*_{ijt} = \propto 0 + \beta 1 sector + \beta 2 richstate + \beta 3 transitionstate + \beta 4 poorstate + \beta 5 proprietary\_m + \beta 6\ proprietary\_f + \beta 7 partnership + \beta 8 businw + \beta 9 firmtype + \beta 10 regist + \beta 11 govtassist + \beta 12 electricity + \beta 13 credit + \beta 14 acmaint + \beta 15 labour + \beta 16 labprod + \beta 17 ict + \beta 18 status + \gamma i + \delta t + \mu_{ijt}$ ……Equation 1

For the second set of hypotheses, the model is given in equation 2.

$Y = \propto 0 + \beta 1 sector + \beta 2 proprietary\_m + \beta 3 proprietary\_f + \beta 4 partnership + \beta 6 businw + \beta 7 firmtype + \beta 8 labour + \beta 9 status + \beta 10 credit + \beta 11 electricity + \beta 12 invest + \beta 13 ict + \gamma i + \delta t + \mu i$ ……Equation 2

For the third set of hypotheses, the model is given in equation 3.

$Y = \propto 0 + \beta 1 sector + \beta 2 richstate + \beta 3 transitionstate + \beta 4 poorstate + \beta 5 proprietary\_m + \beta 6\ proprietary\_f + \beta 7 partnership + \beta 8 businw + \beta 9 credit + \beta 10 regist + \beta 11 govtassist + \beta 12 electricity + \beta 13 demand + \beta 14 acmaint + \beta 15 labour + \beta 16 status + \beta 17 invest + \gamma i + \delta t + \mu i$ ……Equation 3

The dependent variable in equation (1) is a firm size, denoted by y, which is an ordered categorical variable ranging from 1 to 3 for manufacturing firms (1 = micro, 2 = small and 3 = medium) and 1 to 4 for service firms (1 = micro, 2 = small and 3 = medium, 4 = large). The dependent variable in equation (2) is regist, denoted by *Y*, which is a categorical variable taking values 1 and 0 (1 = registered firms and 0 = unregistered firms). The dependent variable in equation (3) is firmtype, denoted by Y, which is a categorical variable taking values 1 and 0 (1 = establishment and 0 = own account enterprise).

Sector refers to the rural and urban area of the country as adopted in the latest population census. It intends to capture the benefits that a firm may derive by being located in urban areas. It is expected to capture differences among firms in access to better infrastructure and larger markets for skilled labor, raw materials, and outputs. The NSSO surveys report whether the firms are located in rural or urban areas. The sector takes the value 1 if the firm is located in urban areas and 0 if the firm is located in rural areas. The expectation is that firms that are located in urban areas will experience faster expansion in size than their counterparts.

Rich states, transitional states, and poor states encapsulate the geographical regions where firms are located. This classification is given by Mazumdar, Teachout, Chaudhuri, & Marimoutou, (2012) based on NSDP and productivity difference among states. It intends to capture the benefits that a firm may derive by being located in these regions. Rich states include Gujrat, Maharashtra, Tamilnadu, Karnataka, Kerela, Haryana, Punjab, and Delhi. Transitional states include West Bengal, Andhra Pradesh, Telangana, and Rajasthan.

Poor states include Assam, Orissa, Uttar Pradesh, Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh, and Uttaranchal. Rest of the states has been categorized in the other states category. It takes the value 1 if firms are located in particular states and 0 otherwise. The expectation is that rich states will have higher probability of firms being small or medium size as compared to micro firms.

Proprietary and partnership represent ownership pattern of firms. Proprietary enterprises are those where an individual is the sole owner of the enterprise. Partnership is defined as the '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'. In the Proprietary firms, a distinction is made between the male and female proprietors. Our conjecture is that the ownership pattern positively impacts the likelihood of firms registering and transiting to the establishment category. Businw refers to the business network or the inter-firm network that firms have with its buyers, suppliers, and other firms or competitors that relate only to the business. We code this variable as 1 if firms have a business network and 0 if they do not. Our conjecture is that the firms that have a business network are more likely to scale up their size as they may be needing the specialized skills, access to capital, technology, markets, opportunities and information that network bring. We also envisage that the network will have negative impact on the registration of firms. this is based on the arguments given for the formation of networks due to the weak institutions and ineffective state policies (Aterido, Hallward-Driemeier, & Pagés, 2011, Beck & Demirguc-Kunt, 2006, Markus, 2011, Ayyagari et al., 2008).

Firmtype classifies firm into own account enterprise and establishment. Own Account Enterprises (OAE) are those enterprises that do not employ hired workers on a fairly regular basis, and the Establishments are those employ at least one hired worker on a fairly regular basis. Our conjecture is that establishment will be small or medium in size as compare to OAE, which will be mainly micro firms. We code OAE as 0 and establishment as 1. We also argue that registrations will be more for establishments.

The survey also asks the firms whether they receive any assistance from the government towards finance, subsidy, training, and marketing. We label this variable govtassist and assign the code 1 if the firm received any assistance and 0 if it did not. We argue that any such type of assistance will be positively associated with the firm transition in the informal sector. Acmaint is another variable which takes the value 1 if the firm maintains a regular account and 0 if it does not. Our contention is that firms that maintain account are better organized and are more likely to shift to the next size class in the informal sector. The NSSO surveys also ask the firms whether they have registered under any Act or authority. We maintain that being a part of an Act/authority could help the firm to access and secure a range of financial and non-financial resources that are otherwise mostly unavailable to the firms in the informal sector. We denote this variable regist and code it 1 if they have registered under any Act and 0 if they did not. We envisage a positive relationship between regist and firm transition. electricity indicates whether the firm has access to electricity, and it takes the value 1 if it has access to electricity and 0 if it lacks access to it. We envisage that better provision of electricity would have a positive influence on firm transition. Credit captures the availability of credit to firms, and we code it as 1 if firms have the availability of credit and 0 otherwise. Our surmise is that more the access to finance, more will be the firm transition. demand refers to the demand for the product of a firm and is coded as 1 if a firm has demand for its product and 0 if it faces fall in demand. We would expect higher demand will lead to more firm transition. Labour refers to the availability of labor as and when needed by the firms. it is coded as 1 if a firm has labor availability and 0 otherwise. We expect labor availability to have a positive influence on firm transition.

Labprod is the labor productivity, which is measured as the ratio of GVA to a number of employees. We propose that labor productivity will positively influence firm transition. Ict refers to the use of information and communication technology by the firms. NSSO asks firms in its surveys if it has access to the internet, has web presence etc. we code it as 1 if firm has access to ict and 0 otherwise. We propose that the use of ict by firms will have a positive influence on transition as well as registration of firms. We also introduce two firm-specific control variable status and invest. Status indicates whether the firm has been expanding in the past three years (status = 1 if the firm has been expanding 0 if the firm has been stagnant or contracting). Invest indicates investment in assets which we take to control for the size even within the micro firms.

The variables γi and δt are the industry-specific dummies and the year-specific dummies, respectively. We control for economic activity effects to address the differences in the distribution of micro, small, and medium-sized firms across industries in the manufacturing and service sectors. The year dummies capture the likelihood that economy-wide shocks may have an impact on firm transition. We estimate the model using the maximum likelihood method. In all these estimations, we use firms as units of analysis. Table 5 summarizes the independent variables.

Table 6 Variables Description

Variable	Description	Authors	Expectation
sector	Sector refers to the rural and urban area of the country as adopted in the latest population census Rural=0 Urban=1	Piore & Sabel, (1984); Raj & Sen, (2016)	Positively influence
rich states, transition states, poor states	Geographical regions. Classification on the basis of NSDP and productivity.	Mazumdar, Teachout, Chaudhuri, & Marimoutou, (2012)	Positively influence
proprietary and partnership	Ownership status of firms.	Hampel-Milagrosa, (2011), Liedholm, (2002), McPherson, (1996); The World Bank, (2014).	Positively influence
businw	Business network that firms have with its buyers, suppliers, and other firms or competitors that relate only to the business. Businw=0 if no network Business=1 if network	Aterido, Hallward-Driemeier, & Pagés, (2011), Beck & Demirguc-Kunt, (2006), Markus, (2011), Ayyagari et al., (2008)	Positively influence firm transition and negatively influence registration status.
firmtype	It classifies firm into own account enterprise and establishment. Own Account Enterprises (OAE) are those enterprises that do not employ hired workers, and the Establishments are those employ at least one hired worker. Firmtype =0 if oae and firmtype=1 if establishment.	Raj & Sen, (2016)	Positively influence
regist	firms registered under any Act or authority. Regist=0 if un-registered Regist=1 if registered.	Djankov et al., (2002), Beck & Demirguc-Kunt, (2006); Beck et al., (2005), Fajnzylber et al., (2011), Sharma (2014)	Positive influence
electricity	Availability of electricity. Electricity=0 if no access Electrivity=1 if access.	D. Mazumdar & Sarkar, (2009), Ayyagari et al., (2008)	Positive influence
govtassist	Government assistance. and assign the code 1 if the firm received any assistance and 0 if it did not	Raj & Sen, (2016)	Positive influence
credit	Availability of credit. Credit=0 if no access	Beck, Demirgüç-Kunt, & Maksimovic, (2005); Oliveira &	Positive influence

	Credit=1 if access.	Fortunato, (2005); Donati, (2016); Allen, Chakrabarti, De, Qian, & Qian, (2012)	
acmaint	Account maintenance bu firms. Acmaint=0 if firms donot maintain account and 1 otherwise.	Raj & Sen, (2016)	Positive influence
labour	Availability of labour. Labour=0 if no labour shaotage Labour=1 if labour availability.	Hasan & Jandoc, (2010); Levy, (2008)	Positive influence
labprod	Labour productivity which is measured as GVA/number of workers	Alchian, (1950), Coad & Broekel, (2008)	Positively influence
ict	Ict refers to the use of information and communication technology by the firms ict=0 if no use of ict. Ict-1 if firm uses ict	The World Bank, (2014), MSME, (2016)	Positive influence
demand	Demand for a product. Demand=0 if fall in demand Demand=1 increase in demand	Nicolrtti & Scarpetta, (2003), Klapper et al., (2006), La Porta & Shleifer, (2014)	Control variables
status	Status indicates whether the firm has been expanding in the past three years.status = 1 if the firm has been expanding and 0 if the firm has been stagnant or contracting.		Control variables
invest	Invest indicates investment in assets. Invest_mfg =1 if investment in plant and machinery and 0 otherwise. Invest_ser=1 if the investment is in equipment and 0 otherwise.		Control variables
γi and δt	Economic activity dummies and year dummies respectively	(Raj & Sen, 2016)	Control variables

6.5.RESULTS AND DISCUSSION

We present our results in three separate sections pertaining to three equations.

6.1 Determinants of firm transition in Unorganized MSME sector

Univariate analysis

We begin the empirical analysis by presenting the summary statistics for the independent variables used in our analysis is shown in table 6 and table 7 for manufacturing and service firms, respectively. The size wise distribution of manufacturing and service firms across the two rounds are also presented in table 8 and table 9.

In our dataset, micro firms in total manufacturing and service sector are more than 99% in both the rounds, which shows that the data is highly skewed in favor of micro firms. among them more than 40% of firms are the establishment, and around 74% are male-headed firms in manufacturing and 87% in the service sector. A very high proportion of firm report availability of credit, which is around 93% in both the sectors. Around 32% of manufacturing firms and 47% of service firms are registered under any act or authority, while 10% of manufacturing firms have the inter-firm network. This figure is very low for service firms, which is only 0.56%. Very few firms received any assistance from the government in the period 2010-2015. Urban enterprise constitutes 48% of manufacturing firms and 52% of the service firms surveyed. More than 85% of firms have access to electricity connection, but only about 15% of firms maintain accounts. Notably, around more than 32% of firm owners feel that their firms are expanding.

Table 7 Summary statistics-firm attributes, 2010–2011 to 2015-16 Variables for manufacturing firms

Variable	Obs	Mean	Std. Dev.	Min	Max
sector	148,881	0.4845615	0.4997633	0	1
richstates	148,881	0.3861272	0.486862	0	1
transition~s	148,881	0.2139024	0.4100601	0	1
poorstates	148,881	0.3078969	0.4616252	0	1
otherstates	148,881	0.0920735	0.2891307	0	1

proprietar~m	148,881	0.741149	0.4380051	0	1
proprietar~f	148,881	0.2283367	0.4197621	0	1
partnership	148,881	0.0298829	0.1702649	0	1
others	148,881	0.0006314	0.0251194	0	1
firmtype	148,881	0.4212492	0.493761	0	1
acmaint	148,881	0.1212982	0.3264746	0	1
credit	148,881	0.9319053	0.2519091	0	1
demand	148,881	0.8418334	0.3648984	0	1
electricity	148,881	0.8874672	0.3160219	0	1
labour	148,881	0.9285671	0.2575474	0	1
govtassist	148,880	0.0181153	0.1333687	0	1
status	145,165	0.3248786	0.4683311	0	1
regist	148,881	0.3197386	0.4663768	0	1
businw	148,881	0.0986358	0.2981734	0	1
ict	84,183	0.0061414	0.0781264	0	1

Table 8 Summary statistics-firm attributes, 2010–2011 to 2015-16 Variables for service firms

Variable	Obs	Mean	Std. Dev.	Min	Max
sector	432,791	0.5250756	0.4993714	0	1
richstates	432,791	0.3676625	0.4821694	0	1

transitio~s	432,791	0.1935623	0.3950902	0	1
poorstates	432,791	0.3351525	0.4720443	0	1
otherstates	432,791	0.1036228	0.3047709	0	1
proprietar~m	432,791	0.8740339	0.3318116	0	1
proprietar~f	432,791	0.0768662	0.2663793	0	1
partnership	432,791	0.0273042	0.1629685	0	1
others	432,791	0.0217957	0.1460162	0	1
firmtype	432,791	0.4004173	0.4899835	0	1
acmaint	432,780	0.1873146	0.3901643	0	1
credit	432,791	0.9312578	0.2530155	0	1
demand	432,791	0.8859126	0.3179178	0	1
electricity	432,791	0.9516325	0.2145417	0	1
labour	432,791	0.9677835	0.1765748	0	1
govtassist	432,790	0.0162504	0.1264371	0	1
status	423,053	0.3691405	0.4825726	0	1
regist	432,791	0.4668327	0.4988993	0	1
businw	432,791	0.0057326	0.0754964	0	1
ict	221,752	0.025303	0.1570443	0	1

Further, there are around 60% of OAE, which are micro firms, and only 2% of OAEs are small firms. while 98% of the establishment are small firms in both the rounds in both manufacturing and service firms. There has been a significant increase in the percentage of establishment from 67th to 73rd round, which signal that firms are moving up to the higher size. Further looking at the state-wise distribution of firms, it is seen that 65% in 67th round and 54% in 73rd round of small size firms are located in rich states. While this number is around 40% for micro firms. which implies that rich states have larger size firms. this is also true for service firms where rich states have more medium and large size firms. Further, we find that access to infrastructures like electricity and labor is more for micro firms in both the rounds for both manufacturing and service sectors which hints at the observation that even with the access to infrastructure firms are not moving to the higer size. It could be because firms self selects to remain in lower size in order to avail benefits. Additionally, we find a significant difference between the two rounds for firms engaged in the business network where small firms are more networked than micro firms. Interestingly only around 5% of firms involved in business network receive any type of government assistance. It shows that network acts as an alternative or substitute for government institutions where policy is either ineffective or do not reach the masses, firms rely on network arrangements. We also find a significant difference between the registered firms in micro and small firms across two rounds. There are around 98% of small registered firms while only 32% of micro registered firms in the manufacturing sector. In the service sector, around 90% of small firms are registered, and 45% of micro firms are registered, which shows that registration is more for larger size firms. Moreover, among the total registered firms, only 2% of firms have business networks which again shows that network acts as an alternative to government institutions providing access to benefits which is otherwise available to firms involving certain cost. Use of ict between the two rounds for both manufacturing and service firms shows that ict usage is higher for larger size firms as compared to micro firms in both the rounds indicating that ict gives these firms access to larger markets, faster and better transactions and gaining competitive advantage.

Table 9 Size wise distribution of manufacturing firms across two rounds

Variables	67th Round			73th Round		
	Micro	Small	Medium	Micro	Small	Medium
N (%)	66047	173	1	82103	555	2
	(99.74)	(0.26)	(0.00)	(99.33)	(0.67)	(0.00)
oae	59.28	1.16	0	57.24	2.16	0
establishment	40.72	98.84	100	42.76	97.84	100

rural	50.34	60.69	100	52.53	45.95	50
urban	49.66	39.31	0	47.47	54.05	50
richstates	40.23	64.74	0	37.15	53.33	50
transitionalstates	22.40	16.76	0	20.62	16.22	50
poorstates	29.66	10.98	0	31.80	22.16	0
otherstates	7.71	7.51	100	10.42	8.29	0
credit	94.07	93.64	100	92.50	90.81	100
demand	88.45	97.11	100	80.72	85.23	100
electricity	85.23	70.52	100	91.69	84.32	50
labor	92.42	71.68	100	93.40	70.99	100
govtassist	2.25	15.03	0	1.40	6.49	0
businw	5.86	15.03	0	13.02	18.56	0
regist	31.25	95.38	100	32.00	93.69	100
ict	15.23	20.88	100	0.24	15.14	0
proprietary male	74.45	51.45	0	73.88	76.76	100
proprietary female	22.52	9.83	100	23.24	3.96	0
partnership_hh	1.99	16.18	0	1.84	7.75	0
partnership_out	0.96	19.08	0	1	10.99	0
others	0.08	3.47	0	0.04	0.54	0
acmaint	10.77	88.44	100	12.57	84.50	100
expanding	34.01	44.51	100	31.13	40.41	100
stagnating	65.99	55.49	0	68.87	59.59	0
regist	31.25	95.38	100	32.00	93.69	100

Table 10 Size wise distribution of service firms across two rounds

Variables	67th Round				73th Round			
	Micro	Small	Medium	Large	Micro	Small	Medium	Large
N (%)	223116 (98.91)	2403 (1.07)	48 (0.02)	16 (0.01)	203266 (98.10)	3704 (1.79)	146 (0.07)	92 (0.04)
oae	66.01	3.79	0	0	55.04	6.75	0.68	1.09
establishment	33.99	96.21	100	100	44.96	93.25	99.32	98.91
rural	46.93	46.48	64.58	56.25	48.23	41.33	40.41	47.83
urban	53.07	53.52	35.42	43.75	51.77	58.67	59.59	52.17
rich	36.22	48.23	50	50	37.20	38.42	33.56	41.30
transitional	20.47	18.68	35.42	37.50	18.09	20.95	28.77	25.00
poor	33.90	18.73	10.42	0	33.41	26.62	31.51	25.00
otherstates	9.41	14.36	4.17	12.50	11.30	14.01	6.16	8.70
credit	93.51	96.63	100	93.75	92.61	96.09	95.89	98.91
demand	91.01	95.17	100	100	85.82	90.01	93.84	91.30
electricity	94.73	94.80	89.58	100	95.67	94.30	90.41	92.39
labor	97.40	87.68	93.75	100	96.32	90.52	98.63	94.57
govtassist	1.51	7.12	14.58	37.50	1.59	5.91	6.85	11.96

businw	0.36	1.12	0	0	0.77	2.08	0.68	0
ict	19.59	37.72	71.74	93.75	0.81	19.49	52.74	73.91
proprietary male	88.12	70.70	27.08	25.00	87.20	70.09	44.52	30.43
proprietary female	7.55	4.00	6.25	0	7.93	5.35	1.37	3.26
partnership_hh	1.48	5.66	2.08	0	1.67	5.24	6.16	7.61
partnership_out	0.84	4.62	10.42	0	1.23	6.70	10.96	17.39
others	2.01	15.02	54.17	75	1.96	12.63	36.99	41.30
acmaint	15.24	66.29	97.92	100	20.92	71.57	93.84	94.57
expanding	37.09	59.22	68.75	75	36.08	53.78	60.84	71.11
regist	43.48	92.72	100	100	48.81	88.58	97.26	97.83

1.

Regression Analysis

Table 10 and Table 11 presents the estimates of the ordered logit regression model for manufacturing firms and service firms, respectively given in equation (1). In all, we estimate four specifications of equation (1). In model 1, we introduce the businw variable, industry dummy, and year dummy. In model 2, we include locational variables and those representing firm characteristics like firmtype, regist, acmaint, govtassist, and labor productivity. We bring in variables like electricity, labor, credit, and ict in model 3, and we keep all variables except states and ict in model 4. Different models are estimated to check the robustness of the results.

Our results unequivocally suggest that business network plays a positive role in the upward progression of firms in the informal sector. The firms that are involved in inter firm network are more likely to expand in size, which is quite plausible as these firms will be needing the specialized skills, technology, information that outside firms bring. Our conjecture is further strengthened by the fact that, relatively, a higher share of small size firms has business networks as compared to micro size firms. The sector has a negative relation with the firm transition in the informal MSMEs, which is not in line with our expectation which shows that firms located in urba areas are more likely to be micro firms. Further, there is, less evidence that geographical regions play a significant role in the upward progression of firms.

Acmaint is positively correlated with firm transition suggesting that the progression of firms to immediate size class is more evident among firms that maintain regular accounts. This result is in line with that of Raj & Sen, (2016) who shows that maintain accounts makes firms more organized and support its upgrading. As conjectured, regist is also positively associated with firm transition. This shows that firms that are part of an organization or authority or those registered under any act tend to grow in size as against firms that are neither a member of an

organization nor registered under any act. the results draw on the literature showing that the performance of registered firm is more than their unregistered counterparts (Fajnzylber et al., 2011; Sharma ,2014). It is also evident from the results that assistance provided to firms play a positive role in the upward progression of firms. however, results do not support finding by Raj & Sen, (2016) who do not find government assistance to be a significant factor in firm transition.

Results of our study show that access to electricity and labor has negative and significant coefficients indicating that they are negatively associated with firm transition in informal sector MSMEs in India. This is possible because of size dependent regulations which provide benefits to these small firms; these firms do not grow in size even after the availability of infrastructure (Cawthorne, 1995; Ramaswamy, 2016). However, counter to our expectation credit is negatively related but do not show significant association with firm transition. We notice a positive and significant relationship between ict and firm transition, indicating that ict is an important dimension affecting firm expansion in the informal sector (The World Bank, 2014). (MSME, 2016). Although labor productivity is positively related to firm transition, it does not seem to have much impact as its coefficient is very small.

Table 11 Results: ordered logistic regression estimates for manufacturing firms

Variables	(1)	(2)	(3)	(4)
businw	0.558***	0.249***	0.331***	0.215**
	(0.0985)	(0.102)	(0.107)	(0.103)
sector		-0.423***		-0.340***
		(0.0774)		(0.0801)
richstate		0.120		
		(0.145)		
transitionstate		-0.379*		
		(0.167)		
poorstate		0.210		
		(0.161)		
firmtype		2.398***		2.399***
		(0.277)		(0.278)
acmaint		2.449***		2.416***
		(0.111)		(0.112)
govtassist		0.719***		0.636***
		(0.142)		(0.144)
regist		1.772***		1.752***
		(0.166)		(0.167)

labprod_gva		0.0000019***		0.0000019***
		(0.000000188)		(0.000000189)
electricity			-0.422***	-0.369***
			(0.111)	(0.100)
labour			-1.307***	-0.371***
			(0.0938)	(0.0875)
credit			-0.140	-0.190*
			(0.146)	(0.138)
ict			2.895***	
			(0.145)	
Industry dummy	Y	Y	Y	Y
Year dummy	Y	Y	Y	Y
N	148881	148676	84183	148676
pseudo R-sq	0.054	0.316	0.131	0.320

Standard errors in parentheses
***, ** and * stand respectively for level of significance at 1, 5 and 10% levels

Table 12 Results: ordered logistic regression estimates for service firms

Variables	(1)	(2)	(3)	(4)
businw	0.986***	0.481***	0.629***	0.449***
	(0.101)	(0.104)	(0.115)	(0.104)
sector		-0.417***		-0.414***
		(0.0266)		(0.0266)
Rich state		-0.256***		
		(0.0419)		
Transition state		-0.110*		
		(0.0470)		
Poor state		-0.197***		
		(0.0464)		
firmtype		2.465***		2.331***
		(0.0580)		(0.0582)
acmaint		1.435***		1.436***
		(0.0298)		(0.0298)
govtassist		1.039***		1.027***
		(0.0554)		(0.0555)
regist		1.187***		1.177***
		(0.0455)		(0.0456)
labprod_rcpt		0.000000125***		0.000000125***
		(9.61e-09)		(9.55e-09)
electricity			0.0384	0.0874
			(0.0613)	(0.0563)

labour			-0.886***	-0.462***
			(0.0531)	(0.0438)
credit			0.654***	0.348***
			(0.0793)	(0.0686)
ict			2.607***	
			(0.0424)	
Industry dummy	Y	Y	Y	Y
Year dummy	Y	Y	Y	Y
N	432791	431577	221752	431577
pseudo R-sq	0.010	0.213	0.100	0.214

Standard errors in parentheses

***, ** and * stand respectively for level of significance at 1, 5 and 10% levels

In the case of service firms we find a major difference with respect to provision of electricity which is positively impacting firm transition as against manufacturing firms where electricity is negatively impacting firm transition. This gives support to the literature that with an increase in access to infrastructure, a firm is likely to expand and move to the next size category (Mazumdar & Sarkar, 2009; Ayyagari et al., 2008; Raj & Sen, 2016). Further, Availability of credit has a positive and significant relationship with firm transition for service firms as against manufacturing firms which show a credit to be negatively impacting firm transition. the results on credit draw on the literature which notes access to finance to improves small firms performance (Beck & Demirguc-Kunt, 2006,Oliveira & Fortunato, 2005, Winker, 1996, Ayyagari et al., 2008; Rajan & Zingales, 1998).

To lend exact interpretation of the magnitude of change of explanatory variables on firm transition, we compute the marginal effects of explanatory variables on firm transition. These results are presented in Table 12 and Table 13 for manufacturing and service firms, respectively. We start with the ict variable as they are the most important determinants of firm transition, according to our study. Our estimates of marginal effects suggest that a firm using ict has 7.7% more chances of being a small manufacturing firm and 15% to be a small service firms as compared to firms not using ict. If a firm has an inter firm network, it has 0.25% more chance of being a small manufacturing firm and 0.18% small service firms as compared to firms without a network. Further, an establishment has 0.13% chances for being a small manufacturing firm and 1.24% chance of being a small service firm.

The registered firm has a 0.40 % more chance of being a small service firm. However, the coefficient for the manufacturing firm is very small to interpret. If a firm maintains accounts,

the probability of it being small is 0.25% for manufacturing firms and 0.75% for service firms. The firms that receive govt assistance 0.54% more likely to be small service firms and 0.03% to be small manufacturing firms. contrary to our conjecture firms with easy availability of labor is 1.2% more likely to be in micro sectors. This is in order to save on the social security cost, which would apply if firms move to the higher size categories. The coefficients of electricity, credit, and labor productivity is too small to lend any meaningful interpretation.

Table 13 Marginal effects of explanatory variables on firm transition for manufacturing firms

Variables	Micro	Small	Medium
businw	-0.0025***	0.0025***	0.00001*
	(0.0005)	(0.00056)	(0.00001)
Sector	0.00015***	-0.00015***	-3.13e-07*
	(0.00004)	(0.00004)	(0.00000)
richstate	-.000039	.00003	1.56e-07
	(.00005)	(.00005)	(.00000)
transitionstate	.00011**	-.00011**	-4.40e-07*
	(.00005)	(.00005)	(.00000)
poorstate	-.00007	.00007	2.81e-07
	(.00006)	(.00006)	(.00000)
Oae	-0.0013***	0.0013***	2.76e-06*
	(0.0001)	(0.0001)	(0.00000)
acmaint	-0.0025695***	0.0025629***	6.59e-06*
	(0.00048)	(0.00048)	(0.00000)
govtassist	-0.0003402***	0.0003393***	8.71e-07*
	(0.00011)	(0.00011)	(0.00000)
regis	-0.0009069***	0.0009046***	2.32e-06*
	(0.00017)	(0.00017)	(0.00000)
labprod	-6.35e-10***	6.34e-10***	1.63e-12
	(0.00000)	(0.00000)	(0.00000)
electricity	0.0025289***	-0.0776***	-0.000011*
	(0.00079)	(0.01091)	(0.00001)
labour	0.0121954***	-0.0121417***	-.0000537*
	(0.00144)	(0.00143)	(0.00003)
credit	0.0007444	-0.0007412	-3.24e-06
	(0.00082)	(0.00082)	(0.00000)
ict	-0.0776113***	0.077245***	0.0003663*
	(0.01091)	(0.01085)	(0.00022)

Figures in parentheses are robust standard errors

***, ** and * stand respectively for level of significance at 1, 5 and 10% levels

Table 14 Marginal effects of explanatory variables on firm transition for service firms

Variables	Micro	Small	Medium	Large
businw	-0.0018***	0.0017***	0.00005***	0.00002***
	(0.0005)	(0.0005)	(0.00002)	(0.00001)
sector	0.0013***	-0.0013***	-0.00003***	-0.00002***
	(0.0001)	(0.0001)	(0.0000)	(0.0000)
richstate	.00079***	-.0007***	-.00002***	-.00001***
	.00013	.00012	.00000	.00000
transitionstate	.00033**	-.0003**	-9.35e-06**	-5.14e-06**
	.00014	.00013	.00000	.00000
poorstate	.00060***	-.0005***	-.00001***	-9.26e-06***
	.00014	.00014	.00000	.00000
Oae	-0.0129***	0.0124***	0.00033***	0.00018***
	(0.0003)	(0.0003)	(0.00003)	(0.00002)
acmaint	-0.0079***	0.0075***	0.00022***	0.00012***
	(0.0003)	(0.0003)	(0.00002)	(0.00001)
govtassist	-0.0056***	0.0054***	0.00016***	0.00008***
	(0.0005)	(0.0005)	(0.00002)	(0.00001)
regis	-0.0042***	0.0040***	0.00011***	0.00006***
	(0.0002)	(0.0001)	(0.00001)	(0.00001)
labprod	-4.05e-10***	3.87e-10***	1.14e-11***	6.18e-12***
	(0.00000)	(0.0000)	(0.00000)	(0.00000)
electricity	-0.00027*	0.0002*	7.65e-06*	4.17e-06
	(0.0001)	(0.0001)	(0.00000)	(0.00000)
labour	0.0018***	-0.0017***	-0.00005***	-0.00002***
	(0.00023)	(0.0002)	(0.00001)	(0.0000)
credit	-0.00097***	0.00093***	0.00002***	0.00001***
	(0.0001)	(0.0001)	(0.00001)	(0.0000)
ict	-0.1693***	0.1582***	0.0071***	0.0040***
	(0.0060)	(0.0056)	(0.0005)	(0.0004)

Figures in parentheses are robust standard errors
***, ** and * stand respectively for level of significance at 1, 5 and 10% levels

However, as seen above from the marginal effects tables for both manufacturing and service firms, the magnitude of variables affecting firm transition is very small to give a meaningful interpretation. Further, as 99% of firms are in micro sector, it becomes pertinent to see the factors that affect growth within the micro sector. It is important from the viewpoint of policy formulation and its implication. Therefore, we have re-defined transition for the purpose of the present study to capture factors affecting growth within the micro sector. As seen in table 8 and table 9 there are 98% of the establishments which are small firms in both the rounds in both manufacturing and service firms and only 2% of OAEs are small firms. Moreover, there are

around 98% of small registered firms while only 32% of micro registered firms in the manufacturing sector. In the service sector, around 90% of small firms are registered, and 45% of micro firms are registered, which shows that registration is more for larger size firms. therefore we take transition from unregistered firms to registerd firms and from OAE to establishment to capture the dynamics within the micro sector.

Factors affecting transition from unregistered firms to registered firms.

Univariate analysis

We present the distribution of registered and unregistered firms for both the rounds in table 14 for the manufacturing sector and table 15 for the service sector. Within the micro manufacturing sector, registered firms are 32% for both the rounds and for service firms it is 41% for 67th round and 48% for 73rd round. Within the registered sector, we find that the percentage of the establishment are much higher than the percentage of OAEs for manufacturing firm in both the rounds. For service firms, OAEs have reduced significantly from 48% in 67th round to 37% in 73rd round. While establishments have increased significantly from 52% to 63% across two rounds. This shows that registration is more for larger size firms as compared to smaller size firms. further, it is seen that more registered firms are located in the urban areas as compared to rural areas for both manufacturing and service firms. However, we do not find much difference in access to infrastructure like electricity and credit for registered and unregistered firms for both the sectors. Nonetheless, there is higher availability of labor for unregistered firms implying a large number of unskilled labor working at low wages without social security benefits. Additionally, we find less than 1% of registered service firms engaged in the business network. while for manufacturing firms, networked firms have increased from 67th to 73rd round, it is true for both the registered and unregistered sector. moreover, as mentioned above, that among the total registered firms, only 2% of firms have business networks which show that network acts as an alternative to government institutions.

We also find that govt assistance is more for the registered firms, which is basically a reason given for registration by government authorities in general. For manufacturing firms, we find a significant difference between registered firms which are male-owned and unregistered firms which are mainly female-owned which implies that female-headed firms are relatively small and less growth-oriented. Further, we also find registered firms use ict more than the unregistered firms indicating their larger growth through faster and cheaper transactions.

Table 15 Distribution of registered firms in micro manufacturing sector across two rounds

Variables	67th Round		73rd Round	
	Unregistered firms	Registered firms	Unregistered firms	Registered firms
N (%)	68.75	31.25	68	32
Oae	73.32	28.39	71.27	27.43
Establishment	26.68	71.61	28.73	72.57
rural	54.29	41.65	57.94	41.04
urban	45.71	58.35	42.06	58.96
credit	94.13	93.95	92.01	93.52
demand	87.51	90.51	79.65	82.98
electricity	87.72	79.59	92.96	88.98
labor	96.08	84.36	95.95	88.00
govtassist	1.10	4.80	0.76	2.75
businw	5.44	6.77	13.15	12.74
ict	12.50	15.79	0.01	0.71
proprietary male	68.31	87.95	67.00	88.50
proprietary female	30.06	5.92	31.28	6.17
partnership	1.61	3.91	1.71	5.24
others	0.02	0.22	0.01	0.10
acmaint	3.37	27.03	4.94	28.81
expanding	30.33	42.09	28.12	37.45

Table 16 Distribution of registered firms in micro service sector across two rounds

Variables	67th Round		73rd Round	
	Unregistered firms	Registered firms	Unregistered firms	Registered firms
N (%)	56.52	43.48	51.19	48.81
Oae	79.78	48.11	72.06	37.19
Establishment	20.22	51.89	27.94	62.81
rural	53.05	38.97	55.21	40.92
urban	46.95	61.03	44.79	59.08
credit	92.64	94.63	90.34	94.99
demand	90.35	91.87	84.45	87.25
electricity	94.96	94.43	95.66	95.67
labor	98.39	96.11	97.47	95.12
govtassist	0.76	2.48	0.88	2.34
businw	0.25	0.51	0.67	0.88
ict	16.69	20.43	0.06	1.60
proprietary male	88.21	88.01	87.35	87.05
proprietary female	9.56	4.93	9.84	5.93
partnership	1.33	2.31	1.79	4.05

others	0.91	3.45	1.01	2.96
acmaint	4.92	28.66	7.60	34.89
expanding	32.66	42.84	31.36	41.00

Regression Analysis

Table 16 presents the marginal effects table to interpret the magnitude of change of explanatory variables on the transition from unregistered firm to registered firms.

Table 17 Marginal effects of explanatory variables on firm transition from unregistered to registered firms for manufacturing and service firms

Variables	Manufacturing firms	Service firms
sector	0.0868***	0.0784***
proprietary_m	-0.3297***	-0.3486***
proprietary_f	-0.4824***	-0.3783***
partnership	-0.2535***	-0.2592***
firmtype	0.1627***	0.1491***
businw	-0.0207***	-0.00079***
credit	0.0217***	0.0559***
electricity	0.0064*	0.0412***
ict	0.5513***	0.4165***
labour	-0.0587***	0.0006
status	0.0427***	0.0377***
invest_mfg	0.1620***	0.2128***

***, ** and * stand respectively for level of significance at 1, 5 and 10 % levels

We start with the ict variable as they are the most important determinants of firm transition according to our study. Our estimates of marginal effects suggest that a firm using ict has 55% more likely to be a registered manufacturing firm and 41% more likely to be a registered service

firm. It is because of the ease with which a firm can register without hassles and also the access to information required for registration is easily available. As conjectured 8.6% of registered firms in manufacturing and 7.8% of registered firms in services are more likely to be located in urban areas. Further establishments in the manufacturing sector are 16% more likely to be registered and that, in service sector 14% more likely to be registered. We find the network to be negatively related to registration. This is in line with our argument that networks act as a substitute for government policies. It is because networks are formed because of the void created by ineffective or cumbersome policies (Aterido, Hallward-Driemeier, & Pagés, 2011, Beck & Demirguc-Kunt, 2006, Markus, 2011, Ayyagari et al., 2008, Biggs & Shah, 2006, Kerr & Mandorff, 2015, Wang & Maani, 2014). However, contrary to our expectation, ownership pattern negatively affects the registration status of firms. results show that both proprietorship and partnership firms are less likely to register their businesses. It can be because as the registration process is voluntary in nature, firms self select not to register to as they find benefits to be less as compared to cost (De Mel et al., 2011). This is also highlighted in the 3rd MSME census where around 40% of firms choose not to register their firms. Further contrary to our argument, availability of labour reduces the likelihood of firm getting registered. It could be in order to avoid the labor laws applicable to the registered firm and saving on the cost involved in terms of increasing wages of social security assistance (Ayyagari et al., 2007, De Mel et al., 2011).

5.3 Factors affecting transition from OAE to establishment

Univariate analysis

We present the distribution of OAE and establishment for both the rounds in table 17 for the manufacturing sector and table 18 for the service sector. There has been a significant increase in the percentage of establishment from 41% to 43% between two rounds for manufacturing firms and from 36% to 45% for service firms. majority of the establishment are located in urban areas and rich states. However, we do not find much difference between OAE and establishments in the distribution of electricity, credit, and demand for products. We do see that labor availability is more for OAE, which indicates the kind of labor available, which could be unskilled and working in small family firms. Additionally, we see that establishment firm engage in the business network more than OAEs. Since establishments are relatively larger in size, it implies that network helps firms to grow. Further, we find that 90% of establishment are male-owned as compared t0 6%, which are female-owned. It is also seen that 55% of manufacturing establishment and 67% of service establishment are registered implying more

benefits to the establishment helps them to grow. Even the govt assistance is more for the establishment as compared to OAEs, which gives these firms advantage over OAE in terms of subsidy, marketing, and technical assistance, etc helping them grow faster.

Table 18 Distribution of firm type in micro manufacturing sector across two rounds

Variables	67th Round		73th Round	
	Oae	Establishment	Oae	Establishment
N (%)	39,153 (59.28)	26,894 (40.72)	46,998 (57.24)	35,105 (42.76)
rural	55.20	43.26	57.59	45.76
urban	44.80	56.74	42.41	54.24
rich	38.64	42.56	33.51	42.03
transitional	20.46	25.22	19.91	21.58
poor	33.08	24.69	36.11	26.03
otherstates	7.83	7.53	10.47	10.36
credit	94.15	93.96	92.73	92.19
demand	86.34	91.51	79.06	82.94
electricity	88.56	80.25	93.87	88.76
labor	98.61	83.40	98.53	86.54
govtassist	1.13	3.89	0.76	2.24
businw	4.32	8.11	11.94	14.46
ict	6.90	16.17	0.00	0.55
proprietary male	64.36	89.14	61.85	89.98
proprietary female	34.24	5.45	36.24	5.84
partnership_hh	1.11	3.26	1.51	2.28
partnership_out	0.22	2.05	0.37	1.84
others	0.07	0.10	0.01	0.07
acmaint	2.40	22.94	4.19	23.79
expanding	28.85	41.51	26.48	37.33
regist	14.97	54.96	15.33	54.31

Table 19 Distribution of firm type in micro service sector across two rounds

Variables	67th Round		73th Round	
	Oae	Establishment	Oae	Establishment
N (%)	63.92	36.08	54.90	45.10
rural	52.56	35.99	54.40	40.68
urban	47.44	64.01	45.60	59.32
rich	34.73	39.11	33.23	42.06
transitional	20.24	20.93	19.45	16.43
poor	35.85	30.11	36.30	29.87
otherstates	9.19	9.85	11.02	11.64

credit	92.68	95.12	91.39	94.09
demand	89.99	93.00	84.64	87.26
electricity	95.79	92.66	96.50	94.65
labor	99.28	93.73	99.19	92.81
govtassist	1.30	1.92	1.60	1.59
businw	0.21	0.67	0.46	1.15
ict	16.02	20.57	0.02	1.79
proprietary male	87.62	89.08	86.10	88.55
proprietary female	9.06	4.61	9.97	5.44
partnership_hh	1.06	2.30	1.41	1.97
partnership_out	0.33	1.82	0.45	2.19
others	1.92	2.19	2.06	1.84
acmaint	7.12	31.02	9.24	35.21
expanding	32.60	45.81	30.75	42.58
regist	31.69	66.38	32.98	68.19

Regression analysis

Table 19 presents the marginal effects table to interpret the magnitude of change of explanatory variables on the transition from oae to establishment.

Table 20 Marginal effects of explanatory variables on firm transition from oae to establishment for manufacturing firms and service firms

Variables	Manufacturing firms	Service firms
sector	0.0652***	0.0596***
richstates	0.0083**	-0.0068***
transitionalstates	0.0596***	0.0216***
poorstates	-0.0221***	0.0216***
proprietary_m	0.1052***	-0.0891***
proprietary_f	-0.0954**	-0.1266***
partnership	0.0831**	-0.0330***
businw	0.0834***	0.1278***
credit	-0.0086**	0.0317***
demand	0.0338***	0.0216***
electricity	0.0106***	-0.0601***
labour	-0.2693***	-0.3156***
acmaint	0.1378***	0.1906***
govtassist	0.0096	-0.0182***
status	0.0544***	0.0512***
regist	0.1321***	0.1032***
invest_mfg	0.1895***	0.1994***

***, ** and * stand respectively for level of significance at 1, 5 and 10 % levels

We start with the registration variable as they are the most important determinants of firm transition from OAE to the establishment according to our study. Our estimates of marginal effects suggest that a registered firm is 13% more likely to be an establishment in a manufacturing firm and 10% more likely, in service establishment. It is because registration with government authority entitles a firm to host of financial and non-financial benefits, which helps them to grow. However, less than 1% of firms getting govt assistance are likely to be established in the manufacturing sector. This number is negative for service firms implying firms getting govt assist are 1.8% less likely to be established. This could be because firms show themselves as small and keep getting govt assistance as policies are mainly size-dependent for MSMEs. As a conjectured firm with the business network is 8.5% more likely to be establishment in the manufacturing sector and 13% more likely in the service sector. This is because firms with the network have access to capital, technology, expertise, etc which helps firms to grow. Further male ownership is 10% more likely, and partnership is 8% more likely to be established. While female ownership firms are 9.5% less likely to be established. This result is different for service sector firms where all male, female, and partnership firms are less likely to be established. This could be because the decision making is vested with the proprietors and partners as compared to trusts and self-help groups. And therefore, these firm select to remain small. Further, we find that female-owned firms are less likely to be an establishment for both manufacturing and service sector, implying the role of social and cultural factors. In contrary to our argument on availability of labor results show that firms with labor availability are 26% less likely to be establishment in the manufacturing sector and 31% less likely in the service sector. As discussed above It could be because of the lack of skills required in embellishment and in order to avoid paying higher wages and other benefits which a worker in the establishment would get (Ayyagari et al., 2007; De Mel et al., 2011).

6. CONCLUSION

The discourse on missing middle and the need for the firm transition has been an area of concern considering its impact on overall economic development of the country. In this study, We use a very rich firm-level data set drawn from representative all-India surveys of the informal sector conducted by NSSO for our empirical analysis. we combine NSSO data from 2 years:2010-11 (67th round) and 2015-16 (73rd round) to examine the determinants

of firm transition in the informal MSMEs to understand why so few micro firms which the predominant type of firms in the MSMEs, fail to make the transition to the larger firms in developing economies. We use investment in assets criteria given under MSMED Act 2006 to define MSMEs. We also examine how the determinants of firm transition varies across manufacturing and service enterprises. The data shows that there more than 99% of micro firms in total manufacturing and service sector in both the rounds, which shows that the data is highly skewed in favor of micro firms. Our findings suggest that usage of ICT, business network, firm type, ability of firms to maintain accounts, government assistance and registration are most important determinants which are associated with the likelihood of firm transition across different size categories. In contrast we find availability of labour to be negatively related to the likelihood of firm transition.

In addition, there is a difference between manufacturing and service firms with respect to provision of electricity which is positively impacting firm transition as against manufacturing firms where electricity is negatively impacting firm transition. Also the availability of credit has a positive and significant relationship with firm transition for service firms as against manufacturing firms which show a credit to be negatively impacting firm transition. Therefore, we find support for all our hypothesis on factors affecting firm transition in informal MSMEs. In addition, present study has re-defined transition to capture factors affecting growth within the micro sector. we examine factors affecting transition from unregistered to registered firms and from own account enterprise to the establishment within the micro sector.

From the above study, we found that the ict, firm type, business network and location of firms are important factors impacting the likelihood of firms being registered. However, we do not find support for our hypothesis on availability of labour for manufacturing firms and ownership pattern which contrarily has negative impact on likelihood of firm being registered. For service firms labour availability is positively related to registration of firms.

Further our findings on factors affecting likelihood of firms being a establishment suggest that registration, business network and ownership are the most important factors. The effect of ownership is different for service firms suggesting both proprietorship and partnership firms are likely to be OAE. However, it is shown that female-owned firms are less likely to be an establishment for both manufacturing and service sector. We do not find support for our hypothesis on labour availability indicating that firms with availability of labour is less likely to be establishment. Our hypothesis on government assistance is rejected for service firms.

Several policy implications follow from our study, firstly, size dependent policies for MSMEs needs to be formulated carefully in order to encourage size expansion. Smaller firms continue to remain in the same size to take advantage of these policies which prevent natural transition of firm sizes. Secondly, policymakers can provide greater incentives for firms to register with the relevant authorities and as well as educating them about simplified registration procedure Thirdly, implementation of various policies providing government assistance should be streamlined. Because of ineffective govt policies, firms take recourse to alternative institutions in the form of business networks. Although inter-firm network plays an important role in the process of enterprise formation and growth , it is argued that as firms grow, it becomes important for firms to take recourse to government institutions (Loayza et al., 2010) as informal networks and institutions become insufficient to enhance firm performance and support its upgrading. Fourthly, the government can encourage skill upgradation among owners and managers of informal firms and provide targeted support to grow their businesses to larger size. Finally, there needs to be a stronger emphasis on female-owned firms providing them with better infrastructure and vocational training to help them transit to larger size.

Our results suggest that while there are clear impediments to firm expansion in the Indian informal MSMEs, a more supportive policy environment would go a long way in easing these impediments. Given that the majority of India's workforce is concentrated in low productive micro enterprises in the informal sector, this study would allow a route out of poverty, thereby improving the livelihood conditions of millions of people. It would also offer huge potential for industrial growth across the country contributing to a more dynamic manufacturing sector in India.

Conclusion:

The need for firm transition arising from the discourse on missing middle has been an area of concern considering its impact on the overall economic development of the country. The literature measuring size transition in a consistent way is in its infancy. Moreover, the analysis of relationship between age, size, and transition has been largely unexplored in the extant literature. In this study, we have used firm-level data set to measure firm transition in both manufacturing and services sectors in India. Using a sample of MSME firms in the formal sector, we further examined the relationship between firm age, size, and transition. We defined MSMEs based on asset size, the current definition, and the proposed definition based on

turnover size. We have attempted to understand the variations in transition patterns and age effects across alternative definitions of firm size.

The sample data shows that the size distribution of firms is bimodal with a peak for small and large sized firms and very few medium size firms, consistent with the idea of missing middle. It is observed that firm size distribution is likely to be more sensitive in capital goods/intermediate goods industries, which involve heavy investment and long gestation period relative to consumer goods industries. However, the size distribution in services sector is found to be dominated by small size firms across both the definitions.

Our results show that firm transition is closely linked with the definition of firm size and age of the firm. It is shown that transition is not a usual phenomenon in both the manufacturing and service sector firms. However, as compared to the asset size transition, turnover size transition is found to be higher. Further, we posit an inverted U-shaped relationship between firm transition and age. Our result is consistent with the observation made in the literature that age performance relationship is non-linear. However, the literature is inconclusive on the shape of the relationship between age and performance with performance dimensions often measured by different indicators like profitability, innovation, exports etc In our study, we have used size transition as the performance indicator. It is observed that firms surviving the incubation period do exibit the capacity to overcome the liability of newness. Therefore, firms experience transition in the initial 5 years. . As time goes by, they may suffer from ossified routines and structures, leading to a decline in transition for firms over the time period. In addition, the paper shows that transition pattern differs within the manufacturing sector firms across both the definitions of firm size. The pattern of transition also varies across manufacturing and service sectors for both the definitions.

The results of the study have important policy implications and open new issues for future research. Observation made from the research shows that age effects start at a younger age, and transition reaches a peak in 4^{th} or 5^{th} years. Thus, policymakers should focus on younger firms instead of older firms. The policy should, therefore, not only focus on firm size but also the firm age. In a related study, Ramaswamy (2016) shows that industrial protection and promotion policies for small scale industries discourage firms from growing and lead to misallocation of resources. In otherword, size dependent policies could turn out to be counterproductive.

The next policy implication relates to the definition of MSMEs. Exploiting the change in definition from asset size to turnover size in India, this paper has shown that the pattern of firm transition is critically dependent on the definition of firm size. Therefore, it is suggested that caution should be exercised while adopting the definition of enterprise size as thresholds

to define the eligibility for public support. This certainly calls for more detailed study and the issue of size dependent polices opens up several avenues for research in Indian industry and policy

The paper studies the role of innovation on firm transition in the Indian manufacturing sector. It is seen that most smaller size enterprises in developing countries never grow beyond a particular size. Therefore, need for firm transition has been an area of concern considering its impact on the industrial dynamism and overall economic development of the country. Given the importance of innovation as the driver of competitiveness, development and economic growth, this work further develops understanding on the impact of innovation accounting for firm size and ownership structure.

Our results show that innovation is not an enabling factor for firm transition. Furthermore, micro and small sized firms undertaking innovation activities are found to be more handicapped and therefore negatively associated with firm size transition. The competitive advantage which innovation brings is limited for small firms due to the fierce competition from the large firms. It restricts their potential to grow and start upgrading process and therefore they stagnate. Lastly, the results show that group-affiliated firms by itself is not a significant factor if we do not consider innovation activity by these firms. There is a significant positive effect of group-affiliated firms undertaking innovation on firm transition. It is possibly due to the groups' ability to share knowledge, financial resources, and economic benefits to the affiliate firms which gives them advantage over standalone firms supporting its transition. We find that the effect of innovation on transition varies with the size of the firm and the ownership structure of firms.

The results of the study have important policy implications and open new issues for future research. Observation made from the research shows that impact of innovation on firm transition varies with firm size. The micro and small size firms are less likely to benefit from

the innovation activities undertaken by them. Hence, it is imperative that policy instruments should have special focus on MSEs. An effective policy mechanism is needed to ease the constraints which handicap their growth outlook and thus their transition process. Moreover, providing financial support for initial technology development and technology absorption to MSEs helping them to cover the cost of innovation would be an important policy intervention.

Besides, the findings also show that group affiliated firms that invest in R&D experience transition relative to standalone firms. However, proving financial benefits and support to the standalone firms which are being provided to the affiliate firms would make them competitive too and help in their transition. Our study suggest that a focussed and supportive policy environment would offer huge potential for industrial dynamism across the country. However, researchers should be warned of the limitations put by the dataset that do not have information of all the firms for all the years, leading to selection bias. Further, our analysis does not consider back transition resulting due to a contraction in the size of firms. Although the back transition observed in this study is few, further study on firm transition accounting for back transition would be an important value addition.

1 'Missing Middle was first pointed our by Dhar and Lydall and later discussed by Little, Tybout, Krueger, Ramaswamy among others. (see Dhar and Lydall 1961; Little, I M D et al 1987; Krueger 2007; Mazumdar and Sarkar 2009; Ramaswamy 2013; Tybout 2014)

[2] We abstained from discussing the informal enterprises like the OAMEs which are essentially subsistence enterprises, and the informal enterprises are beyond the scope of the present study. It could be argued that transition within formal sector are more crucial for firm growth and productivity, and firm age will be very relevant for policy design (See Hasan and Jandoc (2010) for instance)

[3] Govt to soon change definition of MSMEs: Nitin Gadkari, 22 october2019, moneycontrol.com, https://www.moneycontrol.com/news/business/economy/govt-to-soon-change-definition-of-msmes-nitin-gadkari-4558561.html, fourth para

[4] "The relationship between age and performance indicators is admittedly non-linear. It could vary depending on the performance dimension variable under consideration, for example profitability or return on capital,

innovation etc. It suggests that empirical evidence on the relationship between age and performance is found to be inconclusive" (Coad et al 2018b) (para 2,page 5)

[5] In their study, all firms born in 2008 are studied for 6 years i.e.2013. Then firms born in 2009 are studied for 5 years that is till 2013 and so on. It shows that firms born in 2012 will be studied only for 1 year that is 2013. This way time span is different for firms born in particular year. The importance of observing each firm for a fixed number of years was first pointed out by Dr. Kaushik Krishnan in a seminar presentation at IGIDR. We thank him for this suggestion.

[6] Press Information Bureau, Micro, Small and Medium Enterprises Development Act, 2006 to change the criteria of classification and to withdraw the MSMED (Amendment) Bill, 2015 7-feb-2018, http://pib.nic.in/newsite/PrintRelease.aspx?relid=176353

[vii] It is shown that most of the age effects affecting firm growth is largely driven by young firms of up to 5 years of age who grow much faster than the others. After the initial period of growth, firm performance tends to stabilize at least in relative terms , and growth declines. (Coad 2018) (page 31 para 1 & page 36 para 1)

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