Abstract

The study intended to investigate into the firm size distribution in organised manufacturing in India, specifically focussing on the absence of mid-sized firms. The absence of mid-sized firms is also referred to as "Missing Middle". The emergence of missing middle emanates from the process of growth and structural change. Following structural changes, as observed from the presentation of stylised facts, an interesting feature is said to have emerged in Indian manufacturing sector with regards to firm-size distribution in the form of "missing middle". Further, it was observed from stylised facts that apart from aggregate manufacturing, the absence of mid-sized firms are observed at the disaggregated level, across states, product groups and technology categories. The scalar distribution of firms in organised manufacturing also suggests growth of large firms along with pre-dominant share of small firms and relative stagnation of medium sized firms. The absence of mid-sized firms warranted a deeper exploration of transformation in the scalar structure firms in the Indian manufacturing sector.

The theoretical literature on missing middle dates back to the empirical illustration of Little (1987), who first pointed towards missing middle in organised manufacturing in India. The theoretical literature on missing middle has been divided in two stands, the first view talks of the institutional environment in developing countries favouring growth of large firms through preferential treatments in form of credit constraints, unequal access of resources and markets, and government biases, while the small firms struggle to get the necessary impetus to grow. The second view dates back to the dual economy view by Lewis (1954) which argued that while the medium and large firms face fixed cost and constraints, the small firms do not. These factors contribute to the absence of mid-sized firms. A more recent theoretical literature for instance, Dasgupta (2016), shows that the bimodality in distribution of firms disappears with increases in mean knowledge of new born firms over time.

Globally, the presence of missing middle as absence of mid-sized firms had been acknowledged by Tybout (2000), Krueger (2013), Ramaswamy (2013), Landesmann & Stollinger (2018) and Agarwal (2018). However, the definition of missing middle or the mid-size class varied. In the Indian context as well, Aggarwal (2012, 2018), Mazumder & Sarkar, (2009b), Wei & Balasubramanyam (2015), among others, referred to the missing middle as absence of mid-sized firms and pointed out that labour legislation is one of the prime factors influencing the bimodal distribution of manufacturing firms. On the other hand, Hsieh & Olken (2014), Chatterjee & Kanbur (2014), Nagaraj (2018), Ghosh & Abraham (2020) do not find evidence of absence of mid-sized firms.

The existing literature has the following gaps. First, the literature does not converge on the definition of missing middle. For instance, while Krueger (2013) define the middle bin as the 200-499 worker class, while Tybout (2000) defines the middle bin to be 10-49 worker class, in short, the definition of the middle bin needs to be addressed. Second, the existing literature on missing middle is based on analyses at the aggregate level, and not at the sub-national level. Third, a study based on product level classification and technology-based classification is rare and a disaggregate analysis on the absence of mid-sized firms based on industry groups and technological categories is yet to be studied. Fourth, most studies employ parametric method and do not use frequency density as a metric even if the class width is unequal to understand firm size distribution. Moreover, the use of non-parametric method is rare in the literature deciphering missing middle. Last, even though the association of labour regulations and missing middle has been investigated in the literature, there exists ample scope to develop a better index more suitable to represent the state wise disaggregate level labour regulation scenario. Construction of labour legislation scale needs quantification of the labour regulations and is susceptible to subjective judgment. Further, even though the literature highlights the primacy of labour legislations, it does not focus on the role of firm-specific and state specific factors, among others, in determining the missing middle in Indian manufacturing

Based on the gaps, the first objective was to study the (non)existence of missing middle at the aggregate level by suggesting methodological improvements. The methodological improvements for studying the size distribution of firms included use of frequency densities, use of different worker categories such as regular, contract and total workers, use of equal and unequal bins and the use of parametric as well as non-parametric methods for estimation. The second objective was to decode the missing middle phenomenon at the disaggregate level and the third objective was to investigate whether the (non) existence of missing middle depends on labour legislation.

The analysis of the three core essays has been done using unit level or plant level data provided by the Annual Survey of Industries (ASI) between 2000-01 to 2017-18. The missing middle has been studied based on the employment criterion, the values of which have been obtained from the variable "average persons employed" in Block E of the unit level records of the ASI. Using the multipliers provided in Block A of the unit level records, the population figures were arrived at from the sample figures. The empirical analyses were carried out using both equal spaced bins and unequal spaced bins in terms of frequency densities. Apart from parametric method, non-parametric Kernel density estimation was carried out. Further, an econometric model, a pooled ordered logit model in specific, was estimated where a set of firm and industry specific control variables were used to study the association between missing middle and labour legislations.

At the aggregate level, while the parametric analysis using frequency curve clearly rejects the presence of bimodality in the firm size distribution of regular workers and total workers, the non-parametric analysis using the Kernel density estimates for the aggregate level data revealed that the presence of missing middle in the distribution of regular workers in 25-50 bin across most years between 2005-06 to 2016-17. However, except for the year 2016-17, the distribution of total workers did not reveal presence of bimodality in the distribution.

Conversely, the national level non-parametric analysis confirms the presence of bimodality implying the existence of missing middle. At the sub-national level, the parametric and non-parametric analysis for regular and total workers using the unequal as well as equal bins revealed the nuanced presence of bimodality in the distribution of manufacturing employment around the regulatory threshold of 100 workers. The analysis revealed that bimodality is present in the distribution of regular workers, but not in the distribution of total workers. The aggregate findings are in tandem with those of Tybout (2000), Mazumder & Sarkar (2009b), Krueger (2013) and Ramaswamy (2013, 2015). Avoiding the arbitrary binning of the manufacturing employment and backed by the non-parametric analysis it can well be inferred that there exists a missing middle in the distribution of manufacturing employment and one of the causes for bimodality in the distribution may be the labour regulations. The role of contract workers in shaping the distribution of manufacturing employment also highlights its importance as a way out for evasion of stringent labour regulations.

The second objective was to explore the size distribution of firms at the disaggregate level more specifically across different product groups (following 2-digit NIC classification) and across different levels of technology adoption. The non-parametric analysis strengthens the findings of the shrinking middle phenomenon. The incidence of shrinking middle actually increases over time. By 2017-18, the analysis identifies 12 out of the 21 industries exhibiting this phenomenon. This suggests a potentially accelerating shift in the firm size landscape. Furthermore, the analysis reveals another intriguing aspect – the bin sizes where the shrinking middle is observed also exhibit variations. Unlike the specific range identified through parametric estimates, non-parametric analysis suggests that the shrinking middle phenomenon might be impacting firms across a wider spectrum, ranging from those with as few as 50-75 employees to those with 175-200 employees. This variation underscores the complexity of the phenomenon and suggests that factors beyond a single, specific employee band size might be at play. The prevalence of shrinking middle has been more in the high-technology sectors such

as electronics, pharmaceuticals and motor vehicles. The mere existence of missing middle or mid-sized firm decline, which are likely to be the key job creators, may be contributing to slower job growth or even job losses. The aggregate and disaggregate findings laid the basis for further research in terms of a detailed causal analysis of 'missing middle'.

The third core essay examined the association between labour legislation and missing middle. While the labour regulations may have a role to play, the research indicates other causes such as access to capital, competitiveness from large firms, or difficulty in coping up with new technologies. The decline of medium-sized companies may be driving some enterprises to remain small in order to escape regulations. An interesting point to note is that the plots for regular, contract and total worker evidently indicate that the intensity of contract worker is on the rise. This change is brought about by several factors including globalization, competition from imports, and the call for flexibility in the labour market (Goldar & Aggarwal, 2012; Sapkal, 2015; Saha et al., 2013; Nagar, 2018; Chakraborty et al., 2020). Indian firms have been found to opt for contract employees rather than regular employees to avoid stringent labour regulations, lower overhead expenses, and improve competitiveness (Bose & Ramaswamy, 2020; Mitra & Ghosh, 2021; Nagar, 2018; Neog & Sahoo, 2019).

The relationship between labour legislation and missing middle has been explored by highlighting the role of contract workers. The study finds that Indian firm size significantly correlates with technology adoption, impacting competitiveness and productivity. Studies (Fatema & Islam, 2021; Rhaiem, 2015; Dhanora et al., 2020; Kale & Rath, 2018) consistently show larger firms in India exhibit greater high-technology adoption and integration, leading to enhanced performance and innovation. This advantage stems from better access to capital and resources necessary for technological advancements (Rhaiem, 2015). Consequently, larger firms can invest more in R&D and technology upgrades, improving operational efficiencies and labour utilization (Singh & Kumar, 2022). This disparity poses challenges for smaller

Indian firms with resource limitations, potentially necessitating policy support for their technological advancement to ensure competitiveness in the global market.

Overall, the contrasting dynamics between the lower, middle, and higher bins underscore the complexity of labour utilization in the Indian economy. The reliance on contract workers reflects a strategic approach to managing labour costs and flexibility, while the trends observed in the middle and higher bins indicate a shift towards more stable employment practices and investment in skilled labour. These findings are critical for understanding how firms navigate labour market challenges and optimize their workforce in response to varying economic conditions.

The lack of mid-sized firms limits growth and job creation in manufacturing. In addition, missing middle may also constrain firms from participating in the global market. The absence of mid-sized firms suggests that there is need for an enabling environment so that small firms can graduate to medium-sized ones. Labour market rigidities might not be the sole factor determining relative absence of mid-sized firms. The other barriers include infrastructural bottlenecks and ineffective regulatory environment. In this context, the findings of the present study has various policy implications.