

Not All Informal Firms Are Alike: Understanding Gender Productivity Gaps across Enterprise Types in India's Informal Manufacturing Sector – Evidence from ASUSE Data

Bishwanath Goldar^a, Suresh Chand Aggarwal^b, and Abdul A. Erumban^c

Abstract: Several studies have observed that labour productivity in female-owned informal sector (non-agricultural) enterprises in India, including those in manufacturing, is significantly lower than that in male-owned ones. Contributing to this literature, we examine the gender gap in labour productivity among informal sector manufacturing enterprises in India using unit-level data from *Annual Survey of Unincorporated Sector Enterprises (ASUSE)*, 2023-24. Our analysis reveals that the labour productivity gap between male- and female-headed manufacturing enterprises is relatively modest in enterprises that employ hired workers (manufacturing ‘establishments’, or MEs), compared with those that do not employ hired workers (own-account enterprises, or OAEs). Within MEs, enterprises employing more than five workers show no statistically significant difference in labour productivity between male- and female-owned enterprises, and among those with higher levels of entrepreneur-owned capital, female-owned enterprises even exhibit a slightly higher productivity. This indicates that the gender gap in labour productivity in India's informal non-agricultural sector is primarily among the OAEs. These enterprises usually operated from home and are commonly based on workers from the owners' family, typically employing one or two workers. Within the OAEs, male-owned enterprises with two or more workers exhibit a smaller productivity gap than one-worker OAEs. Further analysis indicates that (a) the productivity gap is likely linked to the substantially greater likelihood of female-headed OAEs operating from household premises, and (b) among OAEs with more than one worker, the gap tends to narrow when female-owned enterprises possess higher levels of owned assets (capital stock). These findings underscore the importance of improving women entrepreneurs' access to institutional credit to enhance productivity in the informal manufacturing sector.

Keywords: women entrepreneurs; productivity disadvantage; India's manufacturing enterprises

JEL: J16, J24, L25, L60, O17, O53

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1. Prevailing Impression about Relative Productivity of female-Owned Enterprises

Several studies have noted that labour productivity of female-headed informal (or unorganized¹) sector enterprises in India is significantly lower than that of their male-headed counterparts (e.g., Gang et al., 2022; Aggarwal et al., 2025).² Importantly, the persistence of gender-based productivity gap has been reported within the informal sector manufacturing enterprises (e.g., Bose, 2023; Goldar and Aggarwal, 2025), a finding that warrants particular attention given the recent substantial increase in female-ownership of such enterprises in India (Aggarwal and Goldar, 2025). Using ASUSE³ data for 2022-23, Goldar and Aggarwal (2025) found that the average labour productivity – measured as gross value added (GVA) per worker – in female-headed informal sector manufacturing enterprises is only about 40% of that observed in male-headed enterprises, indicating a productivity gap of about 60%. Aggarwal et al. (2025) further observed that the average labour productivity levels in female-owned informal sector enterprises are significantly lower than that in male-owned informal sector enterprises in three broad sectors of the Indian economy, viz. manufacturing, trade, and other services, with the gap ranging from 50 to 70% .

¹ The terms 'informal' and 'unorganized' are not exactly the same though often used interchangeably (see Shekhawat and Kumari, 2025). But this issue is ignored and the term informal is used throughout the paper.

² For instance, Gang et al. (2022) reported a 45% gap in productivity between female-headed and male-headed enterprises in India's non-agricultural informal sector, comprising manufacturing, trade and other services.

³ *Annual Survey of Unincorporated Sector Enterprises*, National Sample Survey Office (NSSO), Ministry of Statistics and Programme Implementation, Government of India. ASUSE covers enterprises that do not belong to a company (registered under India's Companies Acts of 1956 or 2013). For manufacturing, ASUSE also leaves out industrial units that are registered under the Factories Act, 1948 (since the industrial units existing in frame of *Annual Survey of Industries* are excluded), whether or not belonging to a company. This segment of Indian manufacturing enterprises which is covered by ASUSE may be called unorganized sector enterprises or informal sector enterprises, and the latter term is used in this paper, though in the data source utilized for the study, the term unincorporate sector enterprises is used.

An analysis of productivity differences between male- and female-headed manufacturing enterprises, similar to that of Goldar and Aggarwal (2025), is undertaken in the present paper, using more recent data. We use ASUSE data for 2023-24, and our estimates show that the average labour productivity of female-headed informal sector manufacturing enterprises in India is about one-third of that of male-headed ones. A comparison with 2022-23 further suggests that the gender productivity gap has widened between 2022-23 and 2023-24.

The productivity gap in the manufacturing sector for 2023-24 is depicted in Figure 1 with the help of kernel density functions of the logarithm of GVA per worker of female-headed and male-headed enterprises. The distribution of labour productivity for female-headed enterprises lies to the left of that for male-headed enterprises, implying that the level of labour productivity is relatively lower for female-headed enterprises. The test statistic of the equality of distribution test (the Kolmogorov–Smirnov test) is statistically significant at the one percent level indicating that the two distributions are not equal. The same holds for the t-test of equality of means.

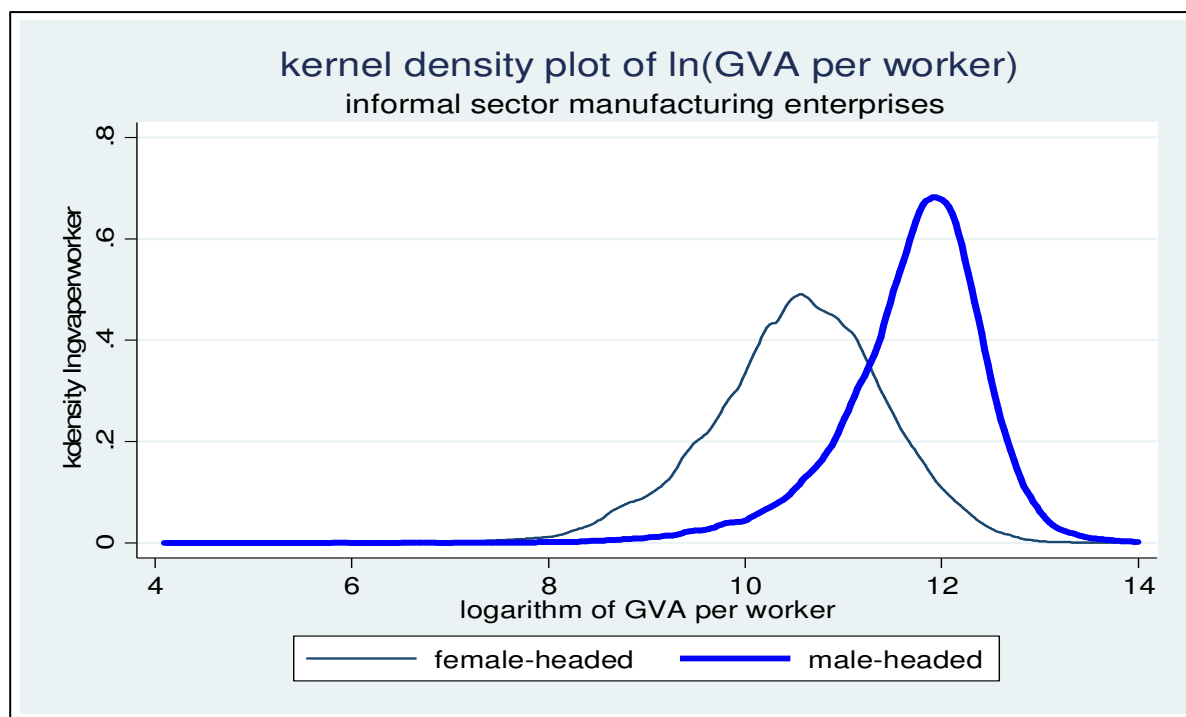


Fig 1: Kernel density function, log of labour productivity in informal manufacturing: male-headed and female-headed enterprises, 2023-24

Note: Sample weighted mean labour productivity is Indian Rupees (Rs) 47 thousand per annum for female-headed enterprises and (Rs)143 thousand per annum for male-headed enterprises.

Source: Authors' computations based on unit-level data of ASUSE, 2023-24

The substantial productivity disadvantage among female-headed informal manufacturing sector enterprises, as reported here based on the ASUSE data, also extends to non-manufacturing enterprises. This persistent gap may be attributed to a range of challenges faced by female entrepreneurs, with inadequate access to finance being a particularly prominent factor (Kapoor et al., 2025; Vidyarani and Malik, 2025).

Amin and Ali (2025) observe that unlike men, women in business face a variety of unique barriers. These include less initial capital, limited access to finance, mobility restrictions, need to shoulder greater family responsibilities, and having to navigate cultural norms that discourage work outside the home. In their comparison of male and female business heads in India using the World Bank Enterprise Survey 2022 data, they find that the overall efficiency (relative to the global frontier) of female-led hotels is lower than that of male-led hotels, and nearly all of this efficiency gap is driven by external environment factors. While on average, the “technology gap” for women-led hotels is 36%, it is only 2% for men-led hotels.

2. A closer look at the productivity gap in informal manufacturing

The comparison presented in Figure 1 above and the inference drawn therefrom about the relative productivity of female-headed informal sector manufacturing enterprises can be misleading on some counts. One of the issues is addressed in this section, and a few others are addressed later.

The first important point to note is the composition of informal enterprises in the manufacturing sector, in terms of the presence of hired workers. Nearly 97% of female-headed informal manufacturing enterprises are ‘own account enterprises’ (OAEs) operating without any hired workers. By contrast, nearly 40% of male-owned enterprises employ hired workers and are consequently classified as ‘hired worker establishments’ (HWEs) (i.e., enterprises with at least one hired worker).⁴ Therefore, to make a meaningful and valid comparison, female-headed OAEs

⁴ In the NSS 67th and 73rd round surveys of unincorporated enterprises in India, the terms ‘own-account enterprise’ and ‘establishment’ were used, the former referring to an enterprise that does not employ hired workers and the latter referring to an enterprise that has at least one hired worker. This has been the practice in previous surveys of unorganized manufacturing enterprises (Government of India, 2025). In the literature on unorganized sector enterprise in India, therefore, the terms own account enterprise and establishment were used with the same connotation (e.g., Goldar et al., 2010; Mazumdar and Sarkar, 2013). In ASUSE, the terms have been changed to ‘own account establishment’ and ‘hired worker establishment’ with the same meaning. In this paper, we continue, by and large, with the same

should be compared with male-headed OAEs, and similarly, female-headed HWEs should be compared with male-headed HWEs. Such a comparison is presented in Figure 2.

Figure 2 reveals that most of the gender productivity gap is coming from the OAE's (right panel). The mean labour productivity of female-headed informal manufacturing hired worker establishments (written hereafter as MEs or as manufacturing establishments) is only about 20% lower than that of male-headed MEs, compared to the 60 to 67% gap in the overall informal manufacturing sample noted earlier. The productivity gap becomes further small and statistically insignificant when the comparison is confined to MEs with own capital stock of Rs one million or more.⁵ On the other hand, when the OAEs are compared, there is a significant difference - the ratio in productivity level between female- and male-headed OAEs is about 1:2.5.

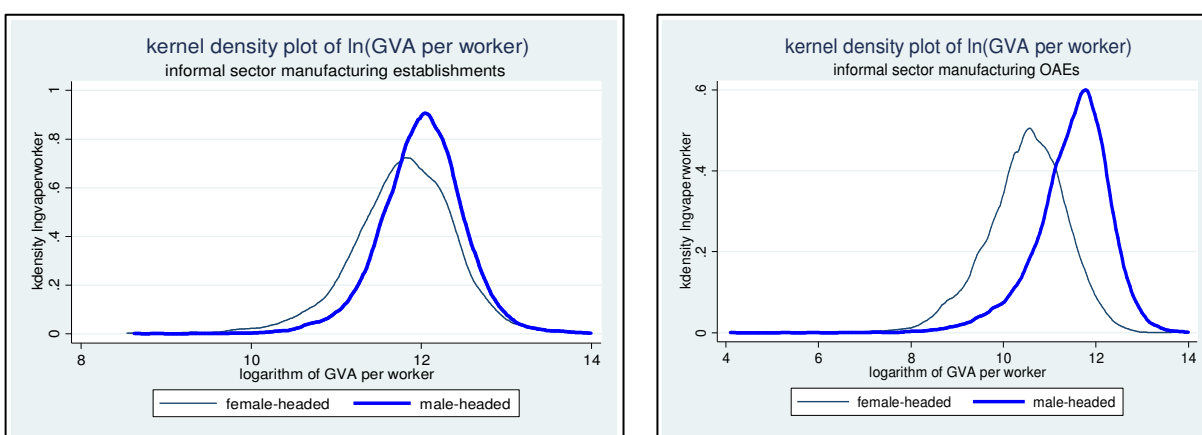


Fig 2: Kernel density function, log of labour productivity in informal manufacturing, male-headed and female-headed enterprises, MEs vs. OAEs, 2023-24

Source: Authors' computation from unit-level data of ASUSE, 2023-24

When a similar analysis is done using data for NSS 73rd round (for 2015-16) and ASUSE 2022-23, the results are basically the same (see Annexure-A). The productivity gap between male- and female-headed MEs is relatively small and that between male- and female-headed manufacturing OAEs is larger and significant.

terminology as used in many previous studies on India's unorganized sector based on NSS enterprise surveys.

⁵ The test statistic for the quality of mean test and the equality of distribution test (the Kolmogorov – Smirnov test) are statistically insignificant at the one percent level.

According to the estimates of the number of workers and GVA per worker given in the ASUSE report for 2023-24, the estimated GVA of MEs was about 1.5 times that of OAEs in manufacturing.⁶ Thus, the productivity gap between male-headed and female-headed manufacturing enterprises is small in the segment of informal manufacturing which made a bigger contribution to India's manufacturing GDP, and for a sub-segment within the establishments, the gap is marginal.

The productivity differences between male- and female-headed MEs are examined further in the next section, and the productivity difference in OAEs is discussed further in Section 4.

3. Productivity analysis of directory manufacturing establishments

In India's enterprise surveys in the past, the MEs were divided into two segments. The establishments that employ between one and five workers form one segment, which were called non-directory manufacturing establishments (NDME) and the establishments that employ more than five workers form the second segment were called directory manufacturing establishment (DME) (Government of India, 2025). However, these terms are no more in use in enterprise surveys done by the National Sample Survey Office (NSSO) in the recent period. Several studies have analyzed the performance of unorganized manufacturing in India, comparing the performance of OAME (own account manufacturing enterprise), NDME and DME (see, for example, Goldar et al., 2010; Gupta and Sanjay, 2012; Mawkhiew and Thangkhiew, 2022). In a study on manufacturing enterprises in Asia, comparing India with other Asian countries, Mazumdar and Sarkar (2013) have focused on India's DMEs. They have also considered OAME, NDME and DME.

In the ASUSE 2023–24 survey sample, DMEs account for 7% of all informal manufacturing enterprises surveyed, compared to 17% for NDMEs and 76% for OAMEs. When extrapolated to the national population of informal enterprises using sample weights (i.e., multipliers), DMEs account for about 3.5% of all informal manufacturing enterprises. Despite their

⁶ MEs form about 12% of the existing number informal sector manufacturing enterprises and about 35% of employment in such enterprises. Own fixed capital per establishment in MEs is seven times that in manufacturing OAEs.

small share, DMEs contribute nearly one-third of value added, and close to one-fifth of both employment and entrepreneur-owned capital stock. It would be interesting to examine how the labour productivity of male-headed DMEs compares with that of female-headed DMEs. This comparison is presented in Figure 3.

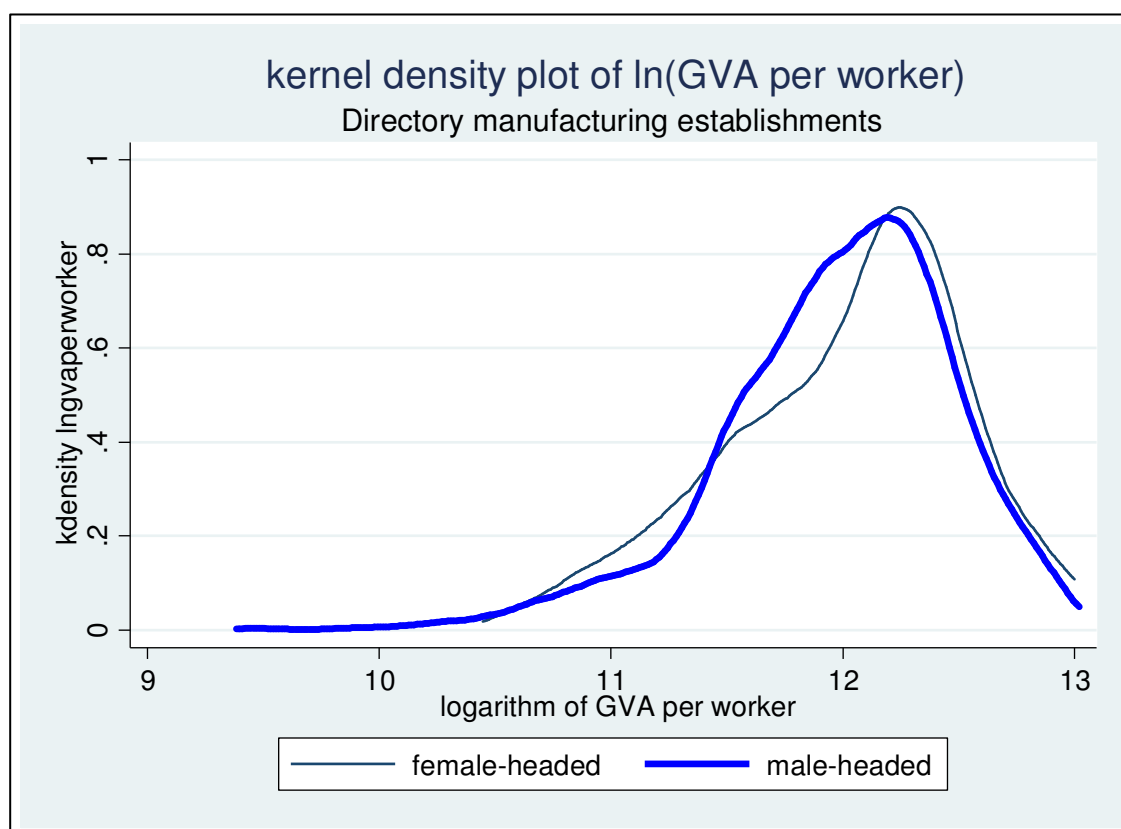


Fig 3: Kernel density function, log of labour productivity in informal manufacturing for male- and female-owned establishments with at least six workers, at least one hired worker, and own capital stock of Rs 0.25 million or more, 2023–24

Source: Authors' computations from unit-level data of ASUSE, 2023-24

The comparison shown in Figure 3 is confined to DMEs in which the market value of owner's fixed capital stock is at least Rs 0.25 million. In this case, interestingly, the average labour productivity of female-headed DMEs is slightly higher than that of male-headed DMEs. The difference is, however, not statistically significant. The Kolmogorov–Smirnov test also does not indicate that the two distributions are different. Thus, the results indicate that in DMEs in which the owner has a capital stock of Rs 0.25 million or higher, the female-owned DMEs are not

performing any worse than the male-owned ones in terms of productivity.⁷ This shows a picture very different from that in Figure 1, which has so far been the basis for the prevailing impression that relative productivity of male- and female-headed informal sector enterprises are substantially different.

DMEs are somewhat akin to the lower end of the spectrum of formal sector factories registered under the Factories Act, 1948 (see, in this context, Mazumdar and Sarkar, 2013). Based on the results discussed above, it may be inferred that if the business operations of a manufacturing enterprise are in a setting similar to that of an organized sector factory, even if the turnover is lower, the female entrepreneurs are likely to be able to match the efficiency levels of comparable male entrepreneurs, or at least not fall much short of the performance level of male entrepreneurs. Thus, in such a setting, the female entrepreneurs would circumvent the previously mentioned variety of unique barriers the women in business face. However, a female entrepreneur who sets up initially a small OAE is likely to find it difficult to reach the business levels of a DME because the investments required are sizeable. The initial capital stock of the enterprise therefore plays an important role in determining the productivity of a female-owned informal sector manufacturing enterprise. Also, access to institutional credit therefore become a critical factor in enabling the transition from an OAME to a DME and thus raise productivity. An indication of the increase in invested fixed capital assets required to make a transition from an OAME to a DME is indicated by Table 1, which compares entrepreneurs' own fixed capital in OAMEs vis-à-vis that in DMEs. It is interesting to note that the female-headed DMEs have a higher own capital stock than male-headed DMEs, barring the bottom 25 to 30% cases.

⁷ Previously, while analyzing labour productivity in MEs, a cut-off of Rs one million was taken. Here, a lower cut-off has been taken to show that even with a lower cut-off used for entrepreneur's own capital stock, there is no productivity disadvantage for female-headed DMEs. A figure similar to Figure 3 using a higher cut-off of Rs one million (as before) is given in Annexure-B. No significant productivity difference between male- and female-headed DMEs is found. How big the DMEs are in terms of own capital stock is indicated by Table 1.

Table 1: Value of fixed capital stock owned by the entrepreneur, median and percentiles
(in Rs 000)

Percentile	Own account enterprises		DMEs	
	Male-headed	Female-headed	Male-headed	Female-headed
10	17	17	44	36
25	43	41	116	109
50 (median)	94	83	507	756
75	216	169	2,066	3,814
90	440	348	5,631	9,219

Source: Authors' computations from unit-level data of ASUSE, 2023-24

4. Productivity analysis of own account enterprises

This section compares the relative productivity of male- and female-headed OAEs in manufacturing. While doing so, it is important to consider the two following aspects. First, the industry composition of the informal manufacturing matters. Nearly 95% of female-headed manufacturing enterprises are concentrated in five industries, as classified by the National Industrial Classification (NIC)-2008. Specifically, 70% are in NIC 14 (wearing apparel), while NIC 10 (food products), 12 (tobacco products), 13 (textiles), and 32 (other manufacturing) together account for the remaining 25%. Therefore, comparing labour productivity between female- and male-headed enterprises within these industries might provide a clearer and more valid assessment.

Second, the owner-worker composition in male- and female-owned manufacturing OAEs differs markedly. Among female-headed manufacturing OAEs, 93.6% have a single worker, 5.7% have two workers, and only 0.7% have three or more (proportions in the sample). In contrast, 68% of male-headed OAEs have a single worker, 27% have two workers, and 5% have three or more. Accounting for these differences is important for an accurate comparison of productivity gaps within the OAE category.

Econometric analysis using an extended Cobb-Douglas production function

To study the labour productivity differences between male-headed and female-headed own-account manufacturing enterprises, the following regression equation has been estimated, which may be interpreted as an extended Cobb-Douglas production function:

$$\ln\left(\frac{GVA}{L}\right) = c + \beta \ln\left(\frac{K}{L}\right) + \gamma FEM + \delta \left[\ln\left(\frac{K}{L}\right) \times FEM\right] + \sum_s \mu_s X_s + u \dots (1)$$

In this equation, L denotes the number of workers and K denotes the market value of capital stock (own plus rented). GVA/L is labour productivity (dependent variable) and K/L denotes capital intensity. FEM is a dummy variable for female-headed enterprises. An interaction between $\ln(K/L)$ and FEM is included in the model. X denotes a set of controls including education of the owner/major partner, social group of owner/major partner, urban versus rural location of the enterprise, two-digit level industry dummies and state dummies. Model estimation has been done by applying quantile regression.

The above equation has been estimated for OAEs belonging to the above mentioned five two-digit manufacturing industries, separately for (a) enterprises with one worker, (b) enterprises with two workers, and (c) enterprises with two to four workers. This helps in making a more appropriate comparison of productivity between male-headed and female-headed enterprises. The results are shown in Table 2. Only the coefficients of the capital intensity variable, the dummy variable for female-headed enterprises and the interaction term are shown, and the results for the controls are not shown, since the focus is on whether female ownership of an own-account manufacturing enterprise is associated with a lower level of labour productivity.

The regression results show a positive effect of capital intensity on labour productivity which is expected. The estimated coefficient is statistically significant and has a plausible numerical value.

The negative coefficient of the female ownership dummy variable (FEM) signifies a productivity disadvantage of female-headed OAEs compared on male-headed OAEs. The marginal impact of the FEM dummy on $\ln(GVA/L)$ at the sample mean depends on (i) the coefficient of the FEM dummy, (ii) the coefficient of the interaction term, and (iii) the mean value of $\ln(K/L)$ (which is shown at the bottom part of the table). The results indicate that this negative impact on productivity is relative grater for single worker OAEs than the two worker or 2-4 worker OAEs.

Table 2: Regression results, explaining GVA per worker of OAEs belonging to five select two-digit industries of the informal manufacturing sector (dependent variable: $\ln(\text{GVA}/L)$)

Explanatory variables	Single worker enterprise	Enterprises with two workers	Enterprises with 2-4 workers
$\ln(K/L)$	0.097 (16.87)	0.105 (12.33)	0.100 (13.03)
FEM	-0.987 (-12.51)	-1.056(-6.65)	-0.974 (-6.70)
$\ln(K/L) \times \text{FEM}$	0.002 (0.32)	0.031 (2.18)	0.023 (1.73)
Pseudo R-squared	0.24	0.27	0.27
No. of observations	67,945	10,191	11,669
Sample mean of $\ln(K/L)$	11.71	11.22	11.18
Sample mean of $\ln(\text{GVA}/L)$	10.80	10.88	10.87
Marginal impact of FEM on log of labour productivity at the sample mean\$	-0.964	-0.708	-0.717

Note: A number of controls are included such as two-digit industry dummies, state dummies and characteristics of the entrepreneur as indicated in the text.

\$ Marginal impact of FEM at the sample mean is given by $\Delta \ln(\text{GVA}/L) / \Delta \text{FEM}$, which is equal to $\hat{\gamma} + \hat{\delta} \left[\ln \left(\frac{K}{L} \right) \right]$, where $\left[\ln \left(\frac{K}{L} \right) \right]$ is the sample mean of log capital-labour ratio.

Source: Author's computation from unit-level data of ASUSE, 2023-24

One possible explanation for the greater negative impact in single-worker OAEs is that male owner-cum-workers⁸ are more likely to work full time, whereas female owner-cum-workers may work part time more often due to domestic responsibilities.⁹ However, data on full-time and part-time employment among male- and female-owned OAEs does not support this hypothesis as almost all workers are working full time (see Annexure-C), suggesting that the reason for the productivity gap lies elsewhere.

⁸ In female-headed single-worker manufacturing OAEs, about 94% are working owner and about 6% are unpaid family members. In the corresponding male-headed enterprises, about 77% are working owners and about 23% are unpaid family members.

⁹ Goldar et al. (2025) discuss the conflict between domestic work, care work and productive work, reviewing the relevant literature, and have carried out an econometric analysis of the trade-off between domestic work, care work and productive work for rural women in India using unit-level data of Time Use Survey, 2019 (NSSO).

Let us consider next the impact of an increase in $\ln(K/L)$ on $\ln(GVA/L)$, which is the elasticity of labour productivity with respect of capital intensity. This relation can be depicted by a line in a graph with $\ln(K/L)$ measured on the x-axis and $\ln(GVA/L)$ on the y-axis. For male-headed manufacturing sector OAEs with two workers, the slope of the line is 0.105. For female-headed manufacturing sector OAEs with two workers, the slope is 0.136 ($=0.105+0.031$). Thus, the line for female-headed manufacturing sector OAEs is steeper. The gap between the two lines represents a productivity gap. It follows that at higher levels of capital intensity (=half of capital stock since the number of workers is fixed at 2), the productivity gap narrows. The same conclusion holds for manufacturing sector OAEs employing 2 to 4 workers, as may be seen from the results presented in Table 2. However, for manufacturing sector OAEs with one worker, a fall in productivity gap at higher levels of capital stock does not occur, since the coefficient of the interaction term is statistically insignificant.

The finding that slope of the line representing production function is steeper for female-headed manufacturing sector OAEs probably reflects the importance of access to credit for the operational performance of female-owned enterprises. If a female entrepreneur could set up the enterprise with a large stock of fixed assets initially or increase the amount of capital invested in the enterprise over time with adequate access to institutional credit, the productivity gap between such an enterprise and a male-headed similar enterprise will become relatively less. This, however, does not occur in one-worker OAEs, going by the results obtained. The reason for this needs further exploration.

The fact that almost all own-account enterprises in manufacturing operate from home could be a factor constraining their performance (Bose, 2023). Unless there is separate place for business activities in the house, the productivity is likely to be affected. This factor will also constrain the possibility of making new investments in capital assets for increasing production and productivity.

Figure 4 shows that female-headed manufacturing OAEs operate from the household premises in over 90% cases. In contrast, male-headed OAEs operate from outside household premises with fixed premises and with permanent structure (hereafter called fixed premises and permanent structure outside home) in over 50% of cases. This could clearly be a major reason for the differences in the productivity levels. In Figure 5, the kernel density of log labour productivity for male- and female-headed OAEs in the five selected manufacturing industries, operating from

fixed premises and permanent structure outside home are provided. The same for enterprises operating from household premises are depicted in Figure 6. The results reveal that the productivity difference between male- and female-headed OAEs is much smaller in the former compared to enterprises operating from household premises. This might indicate that the dominance of female-headed OAEs operating from household premises could be an important reason for their relatively lower productivity.

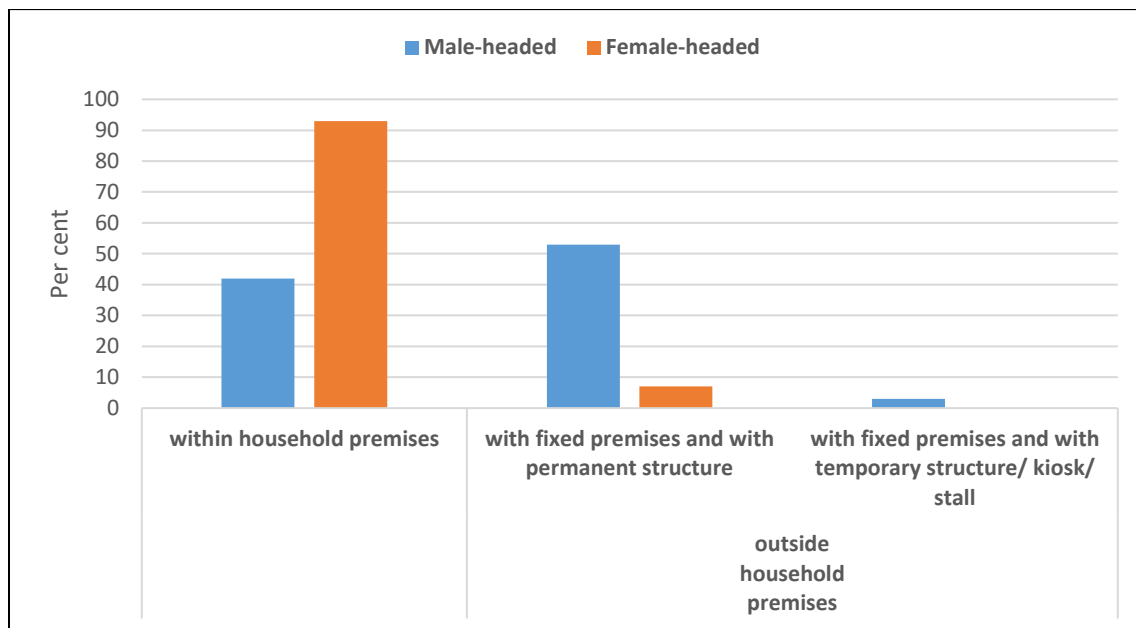


Fig 4: Distribution of OAEs (employing up to two workers) of select manufacturing industries according to the location of their establishment (place where business activity is done)

Source: Authors' computations from unit-level data of ASUSE, 2023-24

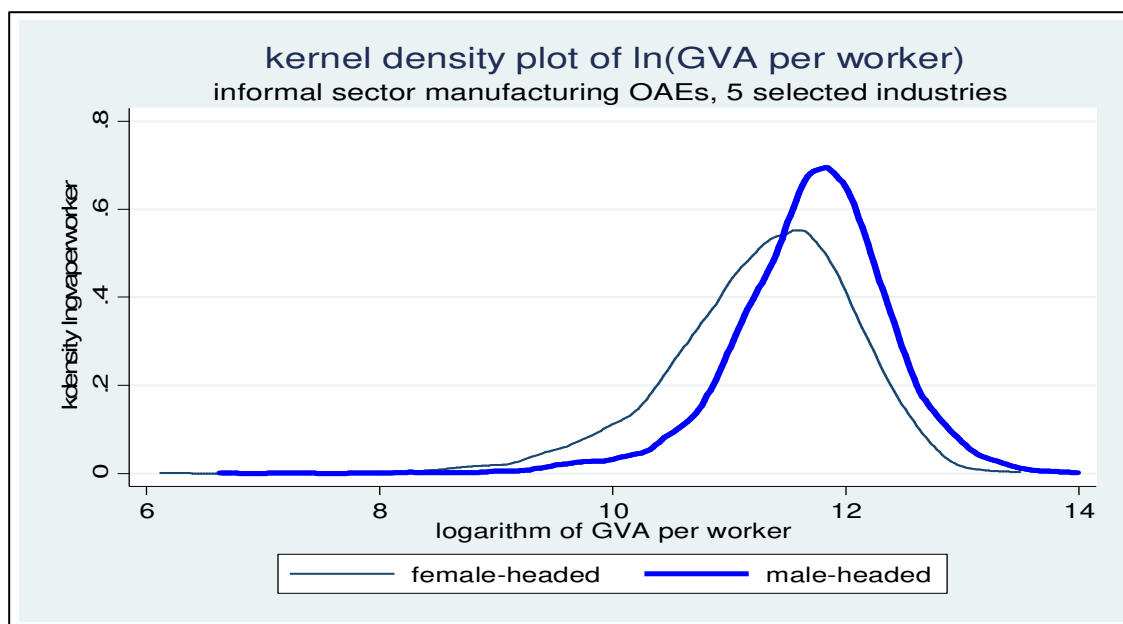


Fig 5: Kernel density function, log of labour productivity, comparison between women-headed and men-headed manufacturing OAEs in five selected industries, operating from fixed premises and permanent structure outside home, 2023-24

Source: Authors' computations from unit-level data of ASUSE, 2023-24

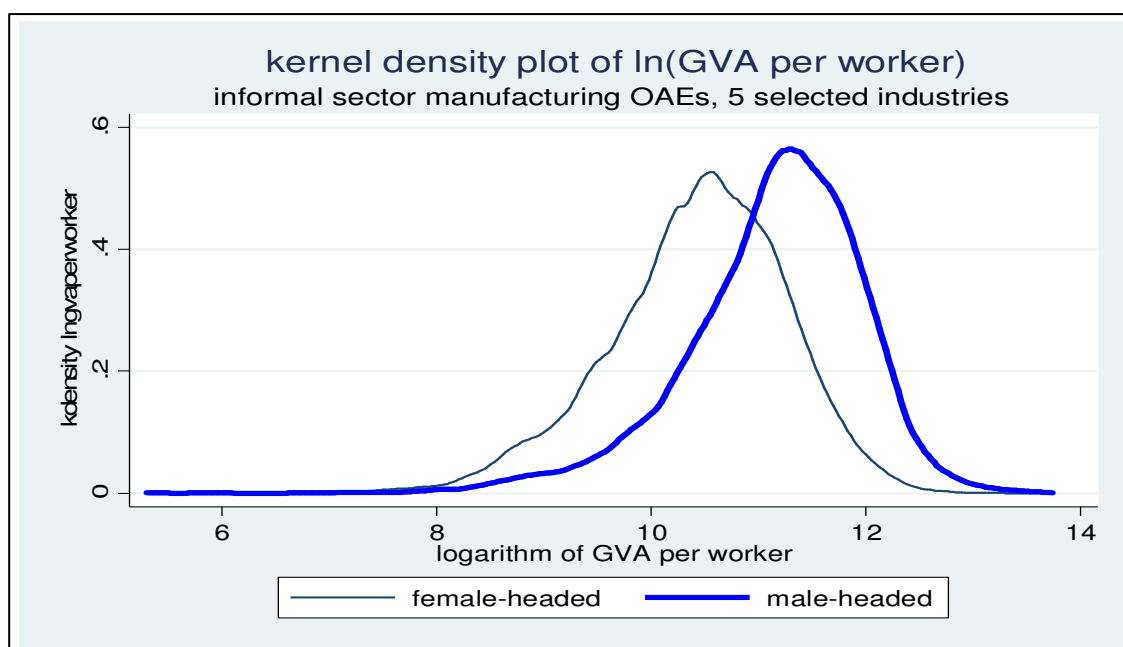


Fig 7: Kernel density function, log of labour productivity, comparison between women-headed and men-headed manufacturing OAEs in five selected industries, operating from household premises, 2023-24

Source: Authors' computations from unit-level data of ASUSE, 2023-24

5. Conclusion

The gender productivity gap – where female-owned firms exhibit lower productivity than their male counterparts – is well-established in the literature. In the context of India, studies using data from unincorporated enterprise surveys have consistently shown that labour productivity in female-owned informal sector (non-agricultural) enterprises is significantly lower than in male-owned enterprises. This productivity gap, observed both in aggregate and across broad sectors such as manufacturing, trade, and other services, persists over time. However, these aggregate findings may conceal potential differences in the gender productivity gap once various compositional factors within the informal sector are taken into account.

This short paper examines the gender gap in labour productivity in India's informal manufacturing sector, distinguishing between enterprises that do not hire workers (own-account enterprises, or OAEs) and those that do (manufacturing establishments, or MEs). MEs are further classified into non-directory MEs (employing fewer than six workers) and directory MEs (employing six or more workers). Similarly, the analysis of OAEs is further refined by distinguishing between single-worker enterprises (typically owner-operated), two-worker enterprises, and those with two or more workers. To ensure a meaningful comparison, the analysis of OAEs is confined to industries in which they dominate. This approach enables a more valid, 'apples-to-apples' comparison of the gender productivity gap.

Our results indicate that the gender productivity gap is primarily concentrated among OAEs, rather than MEs. Moreover, the gap narrows further within MEs when focusing on enterprises that own a capital stock of one million rupees or more, suggesting that financial constraints may play a significant role in limiting productivity gains for female-owned firms. The findings also show no substantial productivity difference between male- and female-owned DMEs.

Basic econometric analysis reveals heterogeneity in the gender productivity gap even within OAEs: female-owned enterprises with 2 or more workers exhibit a smaller gap than the single-worker enterprises. This disparity does not appear to be attributable to the nature of work (e.g., a higher prevalence of full-time jobs in male single-owner enterprises versus more part-time jobs in female-owned enterprises). Rather, financial constraints and the location of enterprise operations may be influential factors. Notably, a greater proportion of female-headed OAEs operate from household premises than their male-owned counterparts, possibly contributing to

their relatively lower productivity compared to those operating outside the household. These factors warrant further investigation in future research.

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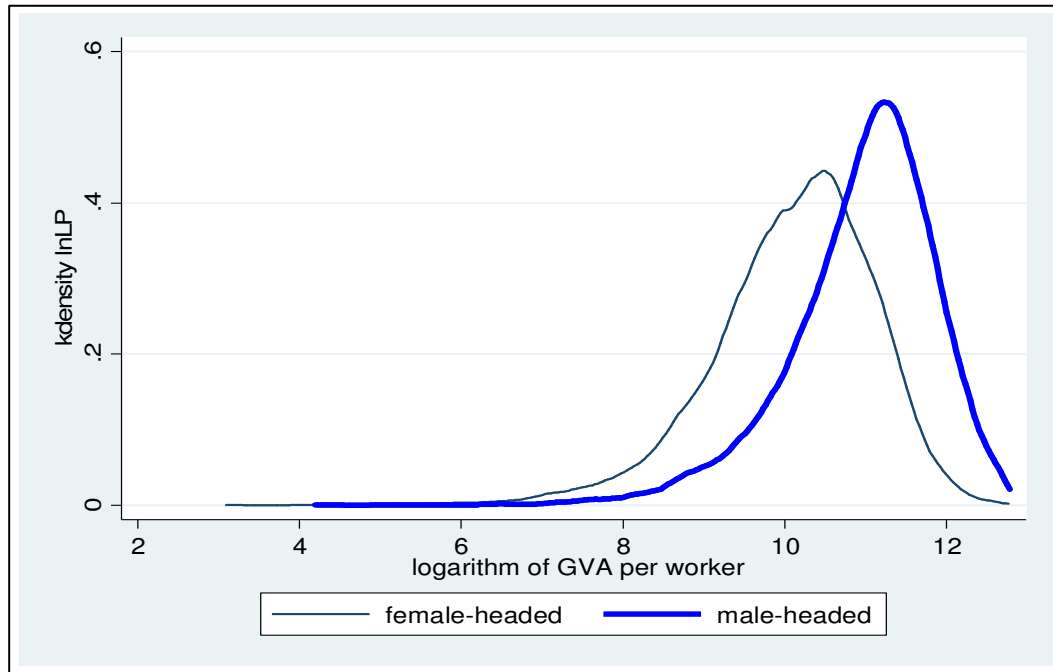
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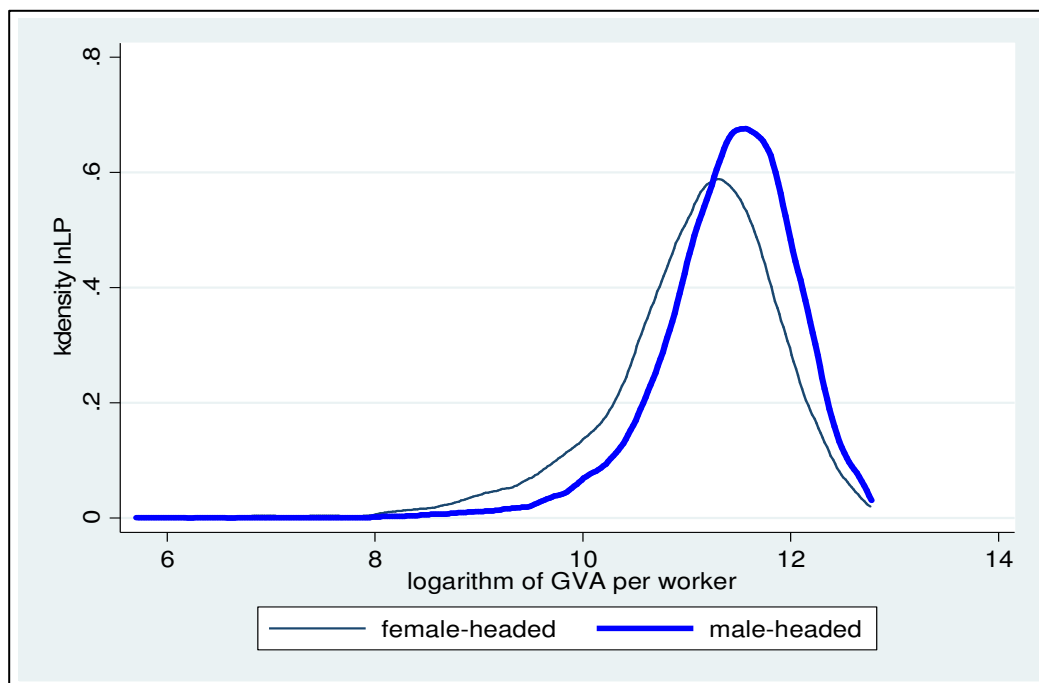
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Annexure-A: Kernel density plot, logarithm of GVA per worker, informal sector manufacturing enterprises, 2015-16 and 2022-23

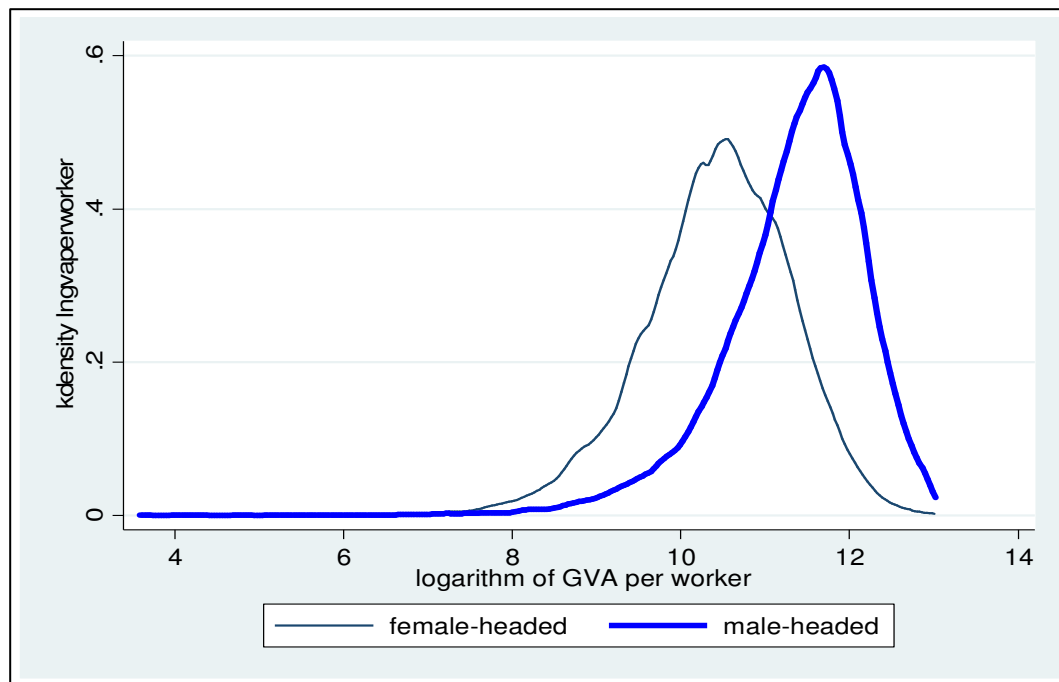
Panel A: Year 2015-16, Own-Account Enterprises



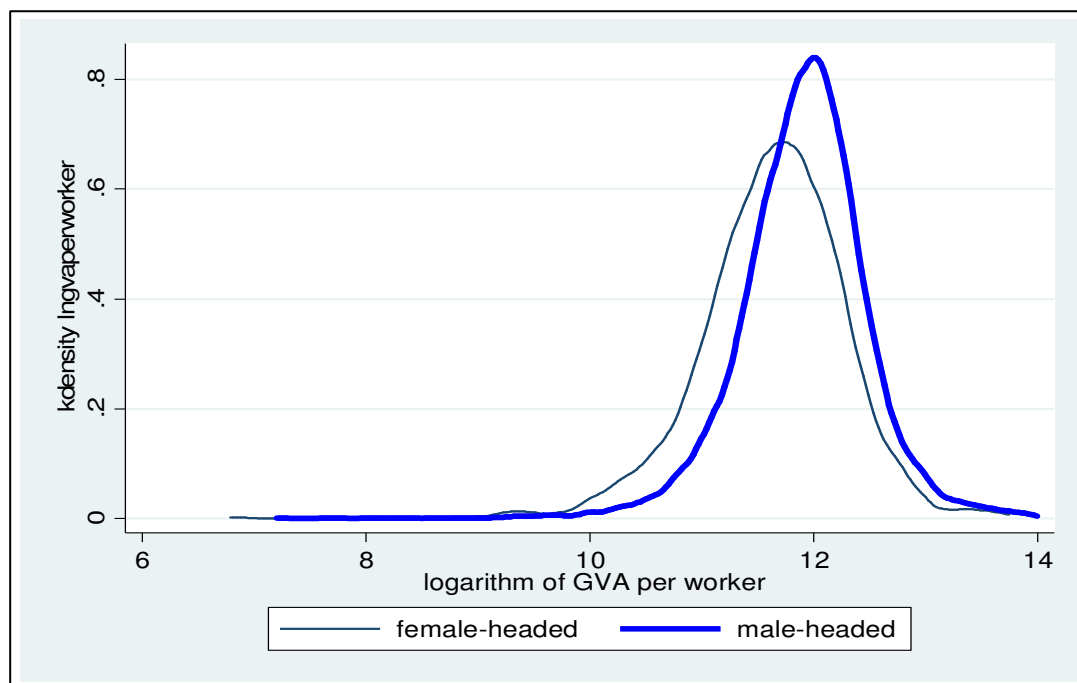
Panel B: Year 2015-16, Enterprises with at least one hired worker (establishments)



Panel C: Year 2022-23, Own-Account Enterprises

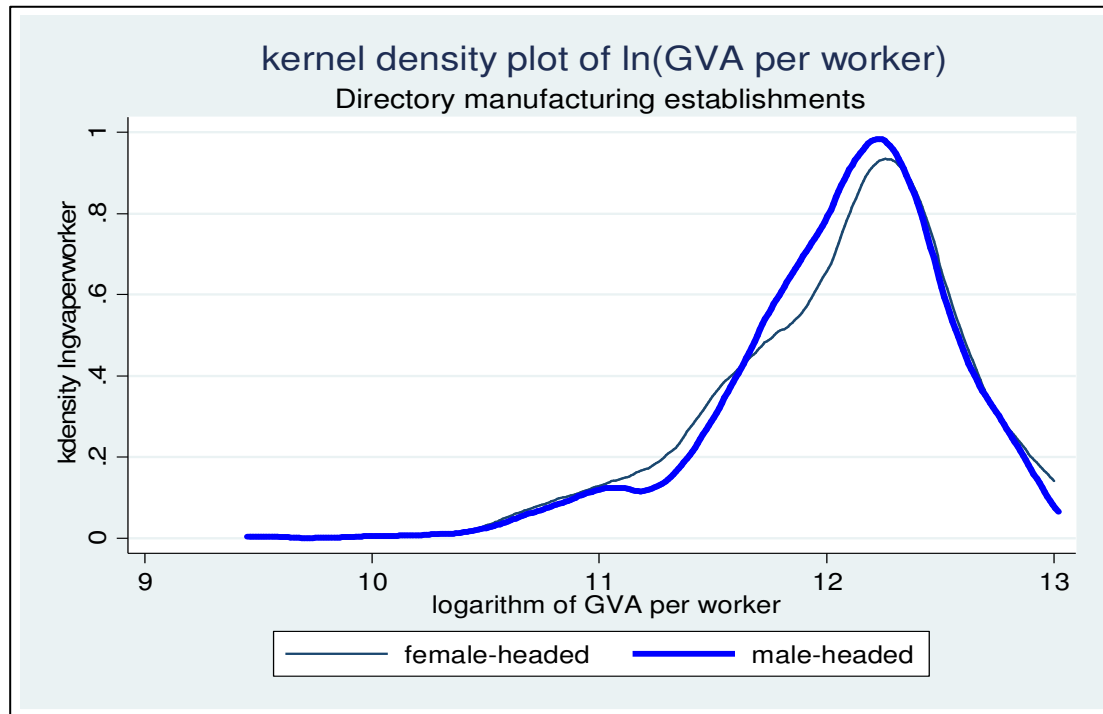


Panel D: Year 2022-23, Enterprises with at least one hired worker (establishments)



Source: Authors' computations using NSS 73rd round and ASUSE, 2022-23, unit-level data.

Annexure B: Kernel density plot of log labour productivity for male- and female-headed DMEs, taking a cut-off of Rs one million in the value of entrepreneur's own capital stock



Note: See Figure 4. This figure is similar to Figure 3 except that the cut-off level for the value of entrepreneur's own capital stock has been raised to Rs one million. The test statistic for the Kolmogorov-Smirnov test for equality of distribution functions is statistically insignificant (with a probability value of 0.39).

Source: Authors' computations using unit-level data of ASUSE, 2023-24.

Annexure-C: Composition of workers employed in manufacturing OAEs, 2023-24

Table C.1: Distribution of employment (%) in OAEs, 2023-24

Type of workers	OAE employing a single worker		OAE employing one or two workers	
	Male-headed	Female-headed	Male-headed	Female-headed
Full time male	99.3	0	84.5	1.0
Full time female	0	97.4	6.9	93.7
Part time male	0.7	0	4.1	1.4
Part time female	0	2.6	4.6	3.9
All	100	100	100	100

Source: Authors' computations using ASUSE, 2023-24, unit-level data.