The penalty of work from home: gender gap in productivity of unorganised manufacturing firms in India

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Plain English Summary Almost 95% of female owned firms in the unorganised manufacturing sector in India operate from within the household premises, due to prevalent gendered social norms. These norms put the responsibility of unpaid household work solely on women and impose mobility restrictions. This paper examines whether restrictive social norms contribute towards the gender gap in firm productivity. I find that the location of these firms within the household restricts them from expanding, as well as contribute to the gender gap in productivity and incomes generated from proprietary firms operating in the unorganised manufacturing sector. Newer policies supporting women’s mobility and paid work that supplement conventional policies to improve entrepreneurship are required. However, as social norms involve coordinated actions and fear of sanction in case of noncompliance, these policies would work effectively if they are targeted towards both genders and entire neighbourhoods.

Abstract This study estimates the contribution of gendered social norms in explaining the gender gap in productivity of unorganised manufacturing firms. Restrictions on mobility and burden of household work mean that female firm-owners primarily operate from their household premises. Using data from unorganised firms operating in the manufacturing sector in India, this paper finds gender gap in firm productivity. The Blinder-Oaxaca decomposition at mean show that despite controlling for size of the firm, assets and other conventional factors, the location of a female proprietary firm within the household premises of the owner explains 19% of the observed gender gap in productivity. The RIF decomposition results show that at the different quartiles, this contribution varies from 19 to 36% of the composition effect. The evidence suggests that the persistence of the gender gap in firm productivity is associated with the persistence of gendered social norms.

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Plain English Summary

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1 Introduction

In India, traditional social norms impose restrictions on mobility of women. Societal expectations of women to perform the role of primary caregivers also impede their opportunities to seek outside work. Along with this, limiting a woman’s interactions with men outside the household to maintain her chastity adds to her mobility restrictions. Such social norms that impose restrictions on women’s behaviour have the potential to impact their economic outcomes. This paper explores whether there exists a gender gap in the productivity of proprietary firms in the unorganised manufacturing sector in India. Specifically, it analyses the question whether carrying out business from the household premises contribute towards lesser productivity of female entrepreneurs when compared to their male counterparts in the unorganised manufacturing sector.

The unorganised sector in India comprises of firms that employ less than 10 persons if they use power and employ less than 20 persons if there is no power. The unorganised manufacturing sector is a persistent phenomenon in India. NSSO 73rd Round data (2015–2016) estimates that there are 63.4 million unincorporated non-agricultural enterprises excluding construction. Out of these, 31% of the enterprises are engaged in manufacturing. While 20% firms in unorganised sector are owned by women, the share of female headed proprietary enterprises in the manufacturing sector is 45%. This figure is much higher than those engaged in trade and services. In terms of employment, the unorganised sector plays an important role, particularly for women. The PLFS data reported by NSO shows that for July 2017–June 2018 (National Statistical Office 2020), 57.7% of rural females and 34.7% urban females were self-employed. Among these women, 8.1% were engaged in manufacturing. Hence, the unorganised manufacturing sector in India plays an important role in employing women outside agriculture and allied activities. The productivity of these firms assumes significance in generating incomes for women entrepreneurs, empowering them and providing income support to their families.

However, women in rich and poor countries alike are less likely than men to succeed as entrepreneurs (De Mel et al., 2008). Analysing NSSO data from 2000–2001 to 2010–2011 on informal manufacturing sector in India, Raj and Sen (2016) find that for smaller firms which operate with less than six workers, productivity per unit of labour is higher for proprietary firms with male owners. Chaudhuri et al. (2020), De and Nagaraj (2014) too, find that firms owned by women under-perform in size and efficiency in comparison to those owned by men. Coad and Tamvada (2012), using firm-level data from the third census of registered small-scale firms in India, find that after controlling for other factors, firms headed by females grow slower. In the literature, various factors have been attributed to explain the underperformance of female entrepreneurs. These include disproportionate concentration of women in more competitive industries or in industries with lower productivity (Coleman, 2007), firm size and age of the firm (Gang et al., 2021), asymmetric access to capital and discriminatory access to finance (Chaudhuri et al., 2020) and lower initial start-up capital (Watson, 2002). The obstacles that women face may be systemic that stem from cultural norms and societal customs. However, in the Indian context, the role of gender norms specific to women in explaining gender gap in productivity has been an under-researched area.

Social norms are cognitive representations of what relevant others, often called a reference group, would typically think, feel or do in a given situation (Turner, 1991). Social norms are often sustained by multiple mechanisms, including a desire to coordinate, fear of being sanctioned, signalling membership in a group or simply following the lead of others. Often, they are so embedded in human thinking that they are followed

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1 Proprietary firms are those where an individual is the sole owner of the enterprise.
2 NSSO 73rd Round: Female Proprietorship firms in trade sector is 8.7% and in services, it is 7.4%
3 There may be self-selection of women into the labour force as well as self-selection of both men and women into self-employment in the manufacturing sector. This study does not account for these forms of self-selection. Even though the share of women in labour force participation in India is low, the pattern of employment among those in labour force is not very different from the men in labour force.
4 which people use as reference points to guide and assess their own thoughts, feelings and behavior.
unconsciously and consequently have implications for economic outcomes. Norms around gender stem from a society’s ideal values of what it means to be a woman or a man. Gender roles assign tasks associated with persons belonging to a particular gender. These norms pertaining to gender are deep rooted in India. Hence, often it is difficult to break away from these norms.

The traditional expectation in south Asia and in India is that men bear the primary responsibility for earning household income, while women have the responsibility of household management, child and elderly care. Indian households often require that women prioritize housework and may even explicitly constrain work by married women (Sudarshan, 2014). The findings from Time Use Survey (National Statistical Office 2020, published by NSO (National Statistical Office 2020), show that the burden of unpaid domestic services for household members and unpaid care-giving activities falls disproportionately on women. Even when women are engaged in outside employment, whether as self-employed or as wage earners, they are expected to carry out household chores, leading to a double burden of work. The findings of National Statistical Office (2020) confirm this phenomenon. As a result, women prefer part-time and potentially home-based work. NSSO 68th Round data shows that among the job-seeking unemployed women, 73% prefer regular part-time work while 22% prefer regular full-time work (Fletcher et al., 2019).

Persistent gender norms also mean that there has been little change in the belief that men are the main providers who are responsible for economic security of the household and women are responsible for household work. According to World Values Survey Wave 6 (Inglehart et al., 2014), over 75% of respondents in India said that children suffer if mother works for pay and 58.2% think that being a housewife is as fulfilling as working for pay. Social norms pertaining to household division of labour imply that women often have to prioritise household work and stay at home. These norms also restrict mobility of women and limit their access to public spaces.

Restrictions on women’s physical mobility is another marker of gender segregation in which women must seek permission from family elders before venturing outside the home to visit health centres, friends’ homes or the local bazaar, and often must be accompanied. It is in part to reinforce the patriarchal norms and purity of women (Field et al, 2010) and also to prevent harassment and violence towards women in public spaces (Jayachandran, 2021). According to IHDS data (Subaiya & Vanneman, 2016), in 2011–2012, only 18% women did not need permission to go to the health centre, 27.8% did not need permission to go to relatives’ house and 41.3% women did not need permission to go to the local kirana (grocery) shop. But 71.7% women reported that they could go to the health centre alone, while 78.4% said that they could go to relatives’ house alone and 82% could go to the local kirana shop by themselves. These social norms therefore restrict a woman’s mobility outside the household.

Few studies explore the role of social norms and performance of female led firms in India. Field et al. (2010) explore how traditional religious and caste institutions in India that impose restrictions on women’s behaviour influence their business activity. They find that among the Hindu women, the upper castes who face greater restrictions benefitted more from business training, while Muslim women failed to benefit. They find that there exists a non-monotonic relationship between social restrictions and the ability to benefit from business training. Field et al. (2016) show that business training provided to women had positive impact on taking business loans and entrepreneurship. This impact was stronger among women from religion or caste groups with social norms that restrict mobility. However, these studies do not compare the performance of female entrepreneurs vis-à-vis male entrepreneurs.

This paper focuses on whether restrictive social norms contribute towards explaining the gender gap in productivity in the unorganised manufacturing sector. For this purpose, it uses data from the 73rd Round of NSSO collected on proprietary firms in the unorganised manufacturing data. To account for social norm, data on whether the firm operates from within the household premises is used. Since women are mostly confined to their houses due to social norms and restrictions of mobility, this variable captures the contribution of social norms. Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973) is applied to examine the productivity differences at mean. The analysis is extended to include decomposition of productivity differences between male and female proprietary firms at specific quintiles of the productivity distribution based on unconditional quintile regression (Firpo et al., 2009). Previous papers in this literature have mostly used the standard Oaxaca Blinder
decomposition method to analyse productivity differences of male and female proprietary firms at the mean. The results of Oaxaca-Blinder decomposition show that productivity of female proprietary firms is significantly less than male proprietary firms. Female proprietary firms almost universally operate from within their household premises. This is a source of significant disadvantage to the female proprietary firms, even after controlling other factors such as value of assets employed, labour employed and other managerial variables. Location of firms within household premises accounts between 19 and 36% of explained difference in the pure composition effect of productivity differences at different quantiles. The results show that in a country like India with persistent and deep-rooted traditional institutions, gendered social norms add to the disadvantage faced by women entrepreneurs operating in the unorganised manufacturing sector. Not only do they operate with fewer resources like less assets, operating from within their household premises too affect their productivity adversely.

This paper contributes to the existing literature on gender and entrepreneurship (Rijkers & Costa, 2012; Kiefer et al., 2020) specifically in the context of a developing country (Bernat et al., 2017; Gang et al., 2021). The findings from this paper highlight the importance of gendered social norms in perpetuating gender gap in firm productivity in the unorganised manufacturing sector. So, the paper takes forward the discussion on the contribution of specific factors such as credit (Chaudhuri et al., 2020), time-use (Arráiz, 2018) and assets (Watson, 2002), in explaining gender gap in firm productivity. Additionally, it also quantifies the disadvantage women entrepreneurs in Indian unorganised sector face due to work from home (Deshpande, 2020) even prior to the onset of COVID-19 pandemic.

The paper is organised as follows: Section 2 describes the data, Section 3 reports the OLS regression results, Section 4 discusses the decomposition results and Section 5 discusses the results and Section 6 concludes the paper.

2 Data and descriptive statistics

To address the research problem, I use data from the 73rd Round of National Sample Survey on Unincorporated Non-Agricultural Enterprises (excluding Construction) in India. The survey was conducted by NSSO during July 2015 to June 2016. According to NSSO, the unincorporated or unorganised firms are those which employ less than ten workers if power is used or less than 20 workers if power is not used in the manufacturing process. Even though NSSO collects data on firms operating in the manufacturing, trade and services sector, this analysis is based on firms operating in the manufacturing sector.\(^5\) To compare the gender gap in productivity of proprietary firms, I select the male and female proprietary firms and exclude other firms from the sample. First, I classify these firms on the basis of 2-digit NIC codes and include in the sample those sectors that have both male proprietary and female proprietary firms. I drop the states and union territories that have less than 1% firms in the sample. These states and union territories\(^6\) all together comprise of 4.7% of the manufacturing firms surveyed across India by NSSO. With these adjustments, the analysis is based on a sample of 76,922 firms representing 23 states and union territories in India.

The firms in the sample are grouped into male proprietary firms (58,841 firms) and female proprietary firms (18,801 firms). By applying sampling weights, the male proprietary firms account for about 54.39% firms and female proprietary firms account for 45.61% firms. I apply sampling weights throughout the analysis to estimate population averages and parameters.

NSSO provides data on gross value added (GVA) at the firm level. GVA is the difference of total receipts of firms and their operating expenses. Even though GVA measures only nominal productivity, it gives a measure of the surplus generated by the firm after meeting its operational costs. In this paper, I consider GVA per worker per hour as the main measure of firm productivity. A salient feature of firms in the informal sector is that most of them employ family labour. Some also employ part time workers. I follow NCEUS (2007) and consider

\(^5\) Includes firms which have manufacturing as either major or minor activity.

\(^6\) Observations from Chandigarh, Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Meghalaya, Daman and Diu, Goa, Lakshadweep, Puducherry and Andaman and Nicobar Islands are excluded.
Table 1  Summary statistics

|                             | Male proprietary firms      | Female proprietary firms      | All firms                  |
|-----------------------------|-----------------------------|-----------------------------|---------------------------|
|                             | Mean (Standard Deviation)   | Mean (Standard Deviation)   | Mean (Standard Deviation) |
| GVA per worker              | 7127.889 (6606.561)         | 2804.367 (3158.650)         | 5156.003 (5738.264)       |
| Log (GVA per worker)        | 8.515 (0.922)               | 7.568 (0.860)               | 8.083 (1.011)             |
| GVA per worker per hour     | 879.448 (780.749)           | 526.940 (611.232)           | 718.675 (729.915)         |
| Log (GVA per worker per hour)| 6.462 (0.856)               | 5.912 (0.826)               | 6.211 (0.886)             |
| Total assets                | 351,228.87 (1,372,823.80)   | 72,995.98 (240,539.80)      | 224,333.80 (1,034,745.00) |
| Age of the firm             | 11.80 (9.76)                | 8.77 (7.57)                 | 10.434 (8.956)            |
| Hours of operation          | 8.144 (2.323)               | 5.566 (1.911)               | 6.969 (2.500)             |
| Total workers               | 2.20 (3.27)                 | 1.12 (0.795)                | 1.709 (2.532)             |
| OAE                         | 0.753                       | 0.983                       | 0.858                     |
| Rural                       | 0.548                       | 0.620                       | 0.580                     |
| Firms located within households | 0.532                     | 0.951                       | 0.723                     |
| SC                          | 0.119                       | 0.148                       | 0.132                     |
| ST                          | 0.049                       | 0.035                       | 0.043                     |
| OBC                         | 0.557                       | 0.508                       | 0.534                     |
| Books of accounts not maintained | 0.914                     | 0.982                       | 0.945                     |
| Problems faced by the firm  | 0.510                       | 0.688                       | 0.591                     |
| Has not received assistance from government | 0.986 | 0.995 | 0.990 |
| Not registered with an authority | 0.754 | 0.969 | 0.852 |
| Does not undertake contract work | 0.805 | 0.547 | 0.687 |

Fig. 1  Distribution of productivity of male and female firms measured by log(GVA per worker)
two-part time workers as one and calculate the full-time equivalent workers. By dividing GVA by full-time equivalent workers, I get GVA per worker. NSSO also provides data on the number of hours the firms operate. Since there is variation in the number of hours firms operate, I divide GVA per worker by the number of hours operated to get GVA per worker per hour.\(^7\)

Table 1 reports the summary statistics.\(^8\) We find that the average GVA per worker is lower for the female proprietary firms. It may seem obvious as female proprietary firms operate for fewer hours. However, the average GVA per worker per hour too is lower for female proprietary firms. Figures 1 and 2 give the distribution of logarithmic values of GVA per worker and GVA per worker per hour respectively for firms belonging to the two groups. For both the measures, the productivity gap exists across the distribution.

The explanatory variable of our primary interest is whether the firm operates from within the household premises. Table 1 shows that 95.1% of female proprietary firms operate from within the household premises. This figure is only 53.2% for male proprietary firms. This variable captures the effect of gendered social norms in India that imposes restrictions on the mobility on women. While NSSO data does not provide data specifically on mobility of proprietors or social norms, the fact that female proprietary firms operate from their household premises and for fewer hours on average, compared to their male counterparts, is indicative of the mobility restrictions and the disproportionate burden of domestic responsibilities faced by women entrepreneurs. Operating from within the household may prove disadvantageous in several ways. It restricts the owners’ access to the markets, information and credit. It may also mean that female owners have to multi-task and perform household chores along with running the business. Hence, the variable whether the firm operates from within the household premises to capture the role of social norms imposed on women is used.

Alternative, GVA per worker could also be considered a measure of firm productivity. I report the corresponding decomposition results in Section B of the online appendix.

A detailed table on the all variables and their definitions based on the questions of the NSSO is provided in Table A1 of the online appendix.

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**Fig. 2** Distribution of productivity of male and female firms measured by \(\log(GVA\text{ per worker per hour})\)
firm undertakes work under sub-contracts. Table 1 shows that on average, the male proprietary firms are older, and the size of their asset is also larger than the female proprietary firms. To account for firm size, whether the firm is an Own Account Establishment (OAE) or an Establishment is considered. OAEs do not employ any hired worker on a regular basis while establishments employ at least one hired worker on a regular basis. Among the male firms, less than half are OAEs, but this figure is much higher for the female proprietary firms. Among the female proprietary firms close to 90% are OAEs. The absence of any hired worker may be disadvantageous as it reduces the scope scaling up production of a firm. NSSO also reports information on whether a firm faces problems like power shortage, credit constraints while running its business. A larger proportion of male firms have reported to have faced problems, but a larger proportion of female proprietary firms undertake work on contract.

In the performance of a firm, managerial practices play an important role. To account for these, I include the following variables: whether the firm maintains books of account and whether the firm is registered with an authority. Firms that maintain books of accounts are expected to be better organised and can manage its resources better. Registration with an authority provides formal recognition from government agencies and may enable firms to access resources including credit easily. I also include the variable whether the firm has received any assistance from the government. A higher proportion of male firms maintain books of accounts, are registered with authority and have received assistance from the government. The location of a firm within an urban area may prove advantageous as it may provide easier access to markets and other facilities and this variable too is included in the analysis. Along with these, I also control for the social group of the firm owner.

3 Regression analysis

In this section, I estimate the parameters of the following regression specification by using OLS method:

$$\log(y_i) = \beta_0 + \beta_1 F + \beta_2 WH + \beta_3 (F \times W) + \theta X_i + \varepsilon_i$$

(1)

where $y_i$ is the productivity of the firm, $F$ is the dummy variable that equals 1 if the firm is owned by a female proprietary firm and zero otherwise, $WH$ is the dummy variable that equals 1 if the firm operates from within the household premises and zero otherwise. For the interaction term $(F \times W)$, the reference group includes male proprietary firms and female proprietary firms operating outside household. We are interested in the signs of $\beta_1$, $\beta_2$ and $\beta_3$. However, these coefficients are correlations. Here, I report the results for both GVA per worker and GVA per worker per hour.

Table 2 reports the estimated coefficients corresponding to Eq. (1). We find that the ownership of firms by female proprietors is negatively associated with firm productivity. Similarly, location of firms within household premises is also associated with lower productivity. When we consider the firm productivity by GVA per worker, we find that female firms operating from household premises have significantly lower productivity than the other firms. However, we find that female firms operating from household premises do not have significantly lower productivity compared to the other firms. This implies that the association between productivity of female firms operating from within household is not significantly different from that of the male proprietary firms and the female proprietary firms operating from outside the household. Since a small proportion of female proprietary firms operate from outside the household, the interaction term probably does not capture the difference in productivity between female-owned firms operating within households and all other firms. Instead, gender and location of the firm by themselves become significant in determining the productivity ($\log$ (GVA per worker per hour)) of the firms. Another explanation of the non-significance of the interaction term could be that after accounting for the lower operating hours for the female proprietary firms in the measure of productivity, the disadvantage faced by female proprietary firms vis-à-vis their male counterparts due to the location of the firm is not significantly different. The disadvantage that women entrepreneurs face due to location of the firm stems from the fewer hours of operation and mobility constraints that are imposed by gendered social norms. The decomposition results reported in Section 4.2 confirm this. Given that female proprietary firms almost universally operate from within household premises, to what extent does their location
contribute to their lower productivity? I address this question in the next section.

4 Decomposition analysis

4.1 Methodology

To address the research question and analyse the differences in productivity between male and female proprietary firms, I use the Blinder-Oaxaca decomposition method. The standard Blinder-Oaxaca decomposition method decomposes the differences in the dependent variable (firm productivity in this case) across two groups at group means. In this instance, the groups are given by $G = \{M, F\}$ where $M$ represents male proprietary firms and $F$ represents female proprietary firms. The dependent variables (productivity of firms) for the two groups are denoted by $Y_M$ and $Y_F$. $X_{Gk}$ is the k-th explanatory variable for group $G = \{M, F\}$. At mean, this decomposition is given by:

$$E(Y_M) - E(Y_F) = \left[\sum_{k=1}^K (E(X_{Mk}) - E(X_{Fk}))\right]\beta_{Mk} + (\beta_{0M} - \beta_{0F}) + \sum_{k=1}^K E(X_{Fk})(\beta_{MK} - \beta_{FK})$$

(2)

where, $E(Y_M) - E(Y_F)$ gives the difference in productivity between the male and female proprietary firms. This difference can be decomposed into the explained part and the unexplained part. The expression $[\sum_{k=1}^K (E(X_{Mk}) - E(X_{Fk}))]$ gives the explained part of the productivity difference. More specifically, it accounts for the productivity differences that arises due to the differences in the average characteristics of the firms belonging to the two groups and is also known as the composition effect. The expression $(\beta_{0M} - \beta_{0F}) + \sum_{k=1}^K E(X_{Fk})(\beta_{MK} - \beta_{FK})$ gives the unexplained part of the productivity differences and is

| Table 2 Determinants of firm productivity: OLS estimates | Log GVA per worker | Coefficient (robust standard error) | Log GVA per worker per hour | Coefficient (robust standard error) |
|----------------------------------------------------------|-------------------|------------------------------------|----------------------------|-----------------------------------|
| Firms located within households                          | -0.237*** (0.028) | -0.213*** (0.030)                  | -0.134*** (0.029)          | -0.130*** (0.031)                |
| Female proprietor                                         | -0.532*** (0.034) | -0.389*** (0.056)                  | -0.257*** (0.034)          | -0.229*** (0.059)                |
| Firms located within households with female proprietor    |                   | -0.163*** (0.062)                  |                            | -0.032 (0.065)                   |
| Log (total assets)                                        | 0.149*** (0.010)  | 0.149*** (0.010)                   | 0.103*** (0.010)           | 0.103*** (0.010)                 |
| OAE                                                      | -0.131*** (0.019) | -0.133*** (0.019)                  | -0.035* (0.020)            | -0.035* (0.020)                  |
| Age of the firm                                           | -0.001 (0.001)    | -0.001 (0.001)                     | -0.003* (0.001)            | -0.003* (0.001)                  |
| Rural area                                               | -0.142*** (0.022) | -0.143*** (0.022)                  | -0.100*** (0.023)          | -0.100*** (0.023)                |
| ST proprietor                                            | -0.385*** (0.077) | -0.388*** (0.076)                  | -0.374*** (0.072)          | -0.374*** (0.072)                |
| SC proprietor                                            | -0.202*** (0.039) | -0.203*** (0.039)                  | -0.236*** (0.039)          | -0.237*** (0.039)                |
| OBC proprietor                                           | -0.126*** (0.037) | -0.126** (0.037)                   | -0.163*** (0.036)          | -0.163*** (0.036)                |
| Books of accounts not maintained                         | -0.113*** (0.028) | -0.113*** (0.029)                  | -0.074** (0.030)           | -0.074** (0.030)                 |
| Problems faced by the firm                               | -0.096*** (0.021) | -0.097*** (0.021)                  | -0.095*** (0.022)          | -0.095*** (0.021)                |
| Has not received assistance from government              | -0.061 (0.054)    | -0.059 (0.054)                     | -0.041 (0.051)             | -0.041 (0.051)                   |
| Not registered with an authority                         | -0.189*** (0.022) | -0.190*** (0.022)                  | -0.152*** (0.024)          | -0.152*** (0.024)                |
| Does not undertake contract work                         | 0.049 (0.036)     | 0.047 (0.036)                      | 0.075 (0.036)              | 0.075* (0.036)                   |
| Industry fixed effects                                   | Yes               | Yes                                 | Yes                        | Yes                               |
| State fixed effects                                      | Yes               | Yes                                 | Yes                        | Yes                               |
| Observations                                             | 76,922            | 76,922                              | 76,922                     | 76,922                           |
| F-statistic                                              | 182.66            | 178.61                              | 97.98                      | 96.66                            |
| df = (69, 76,852)                                        | df = (70, 76,851) | df = (69, 76,852)                   | df = (70, 76,851)          |                                   |
| $R^2$                                                    | 0.491             | 0.492                               | 0.365                      | 0.367                            |

*p < 0.1; **p < 0.05; ***p < 0.01
attributed to unobserved factors. It gives the contribution of the coefficient effect or how the returns to the observed characteristics vary across the male and female proprietary firms. The unexplained difference can be attributed to the “discrimination” faced by female proprietary firms. The expression $\sum_{k=1}^{K} E(X_{Fk})(\beta_{Mk})$ is the counterfactual, that is, it gives the average productivity of group $F$ if the returns were same as group $M$. It gives the productivity of female proprietary firms under the hypothetical situation if the returns of their characteristics were same as the male proprietary firms.

To examine the productivity differences across of the productivity distribution, that is, at specific quintiles of the productivity distribution, so, I use a two-stage method to perform the Blinder-Oaxaca decomposition at the specific quintiles. In the first stage, the distributional statistic, i.e., respective quintiles, is decomposed into the explained and unexplained components using a reweighting method. In the second stage, the contribution of individual covariates in the explained and unexplained parts are estimated.

From the observed data, we can identify the following density functions for the variable $Y$ in groups $M$ and $F$:

$$f(Y|G = M) = \int g(Y|X, G = M)h(X|G = M)dX \quad (3)$$

$$f(Y|G = F) = \int g(Y|X, G = F)h(X|G = F)dX \quad (4)$$

where $h(X|G = M)$ refers to the density of characteristics of firms in the group $M$, that is, endowments of firms in group $M$. $g(Y|X, G = M)$ refers to the density of $Y$ when the characteristics of the firm are given by $X$ and the firm belongs to group $M$. It gives the returns to the endowments. Analogously, $h(X|G = F)$ refers to the density of characteristics of firms in group $F$ and $g(Y|X, G = F)$ refers to the density of $Y$ when the characteristics of the firm are given by $X$ and the firm belongs to group $F$.

To decompose the productivity gap into the explained and unexplained parts, we need to construct a counterfactual. But the problem with identifying the counterfactual scenario is that the distribution of outcomes and characteristics that the counterfactual distribution implies is not observed directly. This is because when linearity does not hold, as in the case of distributional statistics, the counterfactual mean productivity is not equal to $\sum_{k=1}^{K} E(X_{Fk})(\beta_{Mk})$. However, with the help of reweighting method (DiNardo et al., 1996), counterfactual productivity distribution can be produced. This counterfactual represents the distribution of the productivity of male proprietary firms if they had the same distribution of characteristics as female proprietary firms. The counterfactual of our interest is the density of $Y$ that would have prevailed for group $M$ if they had the same characteristics as group $F$. The counterfactual is given by:

$$f_Y^M(Y) = \int g(Y|X, G = M)h(X|G = F)dX$$

$$= \int g(Y|X, G = M)h(X|G = M)\frac{h(X|G = F)}{h(X|G = M)}dX \quad (5)$$

$$= \int g(Y|X, G = M)h(X|G = M)\omega(X)dX$$

$\omega(X)$ is the reweighting factor. It is defined as $\omega(X) = \frac{1-P_{\beta(Y)}}{P_{\beta(Y)}}$ where $P$ is the proportion of male proprietary firms and $P(X)$ is the conditional probability of a firm with characteristics $X$ being a male proprietary firm.

By this method, an approximation of the counterfactual can be obtained by multiplying the distribution characteristics $g(Y|X, G = M)h(X|G = M)$ with $\omega(X)$ such that it resembles: $g(Y|X, G = M)h(X|G = F)$

I estimate the reweighting factors using logit model in which the dependent variable is dummy variable of the gender of the proprietor.\footnote{The explanatory variables include whether the firm is OAE, age of the firm, located in rural area, social group of the owner, whether the firm maintains books of account, whether the firm is registered with an authority, whether the firm has received any assistance from the government, whether firm faced any problem and whether it undertakes any work under contract. The results are reported in Table A2 in the appendix.}

In the next stage, I estimate the RIF for each distributional statistic and then regress the estimated RIF on the individual covariates. The RIF is a measure of the influence of each productivity level on the target statistic (i.e., quartiles in our case). The RIF is defined as the sum of the original statistic and the influence function.

$$RIF(Y, F_Y) = v(F_Y) + I(Y, F_Y) \quad (6)$$

where $Y$ is the measure of firm productivity, $F_Y$ is the cdf, $I(Y, F_Y)$ is the influence function which measures the influence of each observation on the target.
The Blinder-Oaxaca decomposition results for male and female proprietary firms, the focus is on the specification or the RIF approximation. Since the focus of our results is to find whether social norms contribute towards explaining productivity differences between male and female proprietary firms, the focus is on depicting the productivity difference at different quantiles across the distribution. This figure is calculated by dividing the total explained difference by the total difference and then taking the percentage. The explained difference ranges from 35.76 to 59.30% of the total difference. However, the pure composition effect contributes 72.83 to 162.55% of the total explained difference in log(GVApersonperhour). The difference between the total explained difference and the pure composition effect is the specification error. The specification error assesses the importance of departure from linearity in the RIF approximation. In our results, the specification error is not significant for the RIF decomposition at quantiles 10 and 30.

10 The OLS regression coefficients for men, women and the counterfactual distribution for Blinder Oaxaca decompositions at mean are given in Table A3 in the online appendix.

11 The OLS regression coefficients for men, women and the counterfactual distribution for Blinder Oaxaca decomposition at quantiles are given in Table A4 in the online appendix.
Table 3 Blinder-Oaxaca and RIF decomposition of productivity differences between male and female proprietary firms (dependent variable: log(GVAperworkerperhour))

|                                    | Standard Blinder-Oaxaca decomposition at mean | RIF decomposition |
|------------------------------------|---------------------------------------------|------------------|
|                                    | Quantiles                                   | Mean             |
|                                    | 10  | 30  | 50  | 70  | 90  |      |
| Predicted productivity: male       | 6.695*** (0.003)                            | 5.329*** (0.045) |
| proprietary firms                  |     |     |     |     |     | 6.129*** (0.015) |
|                                    |     |     |     |     |     | 6.556*** (0.011) |
| Predicted productivity: female      | 6.152*** (0.006)                            | 4.920*** (0.035) |
| proprietary firms                  |     |     |     |     |     | 5.498*** (0.025) |
|                                    |     |     |     |     |     | 5.886*** (0.022) |
| Total difference                   | 0.543*** (0.007)                            | 0.409*** (0.035) |
|                                    |     |     |     |     |     | 0.632*** (0.030) |
|                                    |     |     |     |     |     | 0.669*** (0.025) |
| Explained difference               | 0.306*** (0.005)                            | 0.181*** (0.051) |
|                                    |     |     |     |     |     | 0.226*** (0.036) |
|                                    |     |     |     |     |     | 0.333*** (0.034) |
| Composition effect                 | 0.197*** (0.041)                            | 0.187*** (0.033) |
|                                    |     |     |     |     |     | 0.271*** (0.032) |
| Specification error                | − 0.017 (0.057)                             | 0.039 (0.043)    |
|                                    |     |     |     |     |     | 0.068* (0.041)   |
|                                    |     |     |     |     |     | 0.097** (0.046)  |
| Unexplained difference             | 0.237*** (0.008)                            | 0.228*** (0.038) |
|                                    |     |     |     |     |     | 0.406*** (0.030) |
|                                    |     |     |     |     |     | 0.331*** (0.029) |
| Reweighting error                  | − 0.039 (0.080)                             | − 0.018 (0.048)  |
|                                    |     |     |     |     |     | 0.065 (0.049)    |
|                                    |     |     |     |     |     | 0.141*** (0.050) |
| Coefficient effect                 | 0.267*** (0.095)                            | 0.424*** (0.049) |
|                                    |     |     |     |     |     | 0.226*** (0.046) |
|                                    |     |     |     |     |     | 0.104* (0.056)   |
|                                    | 56.416                                     | 44.254           |
| Percentage of explained difference | 43.584                                     | 108.840          |
| in total difference                |                                            | 82.743           |
|                                    |                                            | 81.381           |
| Percentage of composition effect   |                                            | 72.829           |
| in total explained difference      |                                            | 162.547          |
|                                    |                                            | 99.63            |

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Robust standard errors reported in the parenthesis
Even though it is significant\(^\text{12}\) for RIF decompositions at quartiles 50, 70 and 90 respectively, its magnitude is small compared to the total explained difference. Hence, the linear specification of the model estimated here is reasonably justified. Moreover, the reweighting error is not significant for most cases (except quartile 70 for log GVA per worker per hour).\(^\text{13}\) The results show that the productivity differences are lower for female proprietary firms because of their characteristics as well as due to unobservable factors given by the unexplained difference. The unexplained component gives the contribution of the coefficient effect or how the returns to the characteristics vary across the male and female proprietary firms differ. The productivity of the female proprietary firms is less than that of the male proprietary firms because of the difference in returns to their characteristics, and also due to the difference in the average characteristics of firms belonging to the two groups. However, the contribution of the explained difference increases at the higher quantiles.

From Table 3, we find that the explained and unexplained components of the standard Blinder-Oaxaca decomposition at mean differs from the results of RIF decomposition at the quantiles. This is because the dependent variable for the RIF decomposition is the corresponding RIF for the distributional statistic of interest, that is, the respective quantiles (defined by Eq. 7), whereas the dependent variable for the standard Blinder-Oaxaca decomposition is the group mean.\(^\text{14}\) The second reason for the departure of RIF decomposition results is due to the linear approximation of non-linear functionals such as quantiles. Hence, the RIF decomposition results at mean (column 7 in Table 3),\(^\text{15}\) namely the total difference, the explained difference and unexplained difference, differ marginally in magnitude from the results of the standard Blinder-Oaxaca decomposition. Even though the specification error and reweighting error are not significant for the RIF decomposition at the mean, the magnitudes of pure composition effect and coefficient effect are unequal to the explained and unexplained differences of the standard Blinder-Oaxaca decomposition at mean respectively. However, the direction of coefficients and their significance is the same for both.

The decomposition results give the overall picture of the productivity differences. From Table 3, we find that the pure composition effect comprises the majority share of the explained productivity differences. To ascertain the importance of various determinants, particularly the role of location of the firm within household in explaining productivity difference, we focus on the pure explained difference. The contribution of the differences in average characteristics (given by the explanatory variables) in the productivity gap is explained by the pure composition effect. The percentage of composition effect in the total explained differences ranges from 72.83 to 162.55% across the quantiles. However, the objective in this paper is to find out whether social norms contribute towards the gap in productivity between firms of the two groups. For this, we look at the contribution of the characteristics to the explained productivity gaps.

Table 4 reports the detailed contribution of each observed characteristic in the composition effect for log\(\text{GVA per worker per hour}\). Since the productivity of male proprietary firms is higher than the productivity of female proprietary firms, a positive coefficient implies that the characteristic adds to the productivity difference. The percentage contribution of each characteristic is calculated by dividing the coefficient of the characteristic by the total composition effect for each quantile. Hence, the percentage contribution of “location of firm within household premises” for the 10th quantile is obtained by dividing the value of the coefficient (0.056) by the total pure composition effect for the 10th quantile (0.197) and then taking

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\(^{12}\) A significant specification error implies that the RIF model might be mis-specified. However, specification error may arise due to linear approximation. Since the reweighting errors are not significant, the linear specification does not affect the overall estimates of the composition and coefficient effects. Additionally, the problem of specification error can be reduced by including variables of higher order polynomials. However, since most variables in the RIF estimation are categorical variables, including higher order polynomials would lead to a difficulty of interpretation of the coefficients.

\(^{13}\) A significant reweighting error has implications about the quality of reweighting strategy. Since in our case, it is not significant at most quartiles, I am reasonably confident about the reweighting strategy.

\(^{14}\) The functional statistic at mean is \(\mu_y = \int ydF(y)\) and the corresponding RIF is \(y\).

\(^{15}\) The OLS regression results for men, women and counterfactual groups are reported in Table A6 in the appendix.
Table 4  Blinder-Oaxaca RIF decomposition of productivity differences between male and female proprietary firms: contribution of explanatory variables in the pure composition effect (dependent variable: $\log(GVA_{perworkerperhour})$)

| Variables                        | Standard Blinder-Oaxaca decomposition at mean | RIF decomposition | Mean |
|----------------------------------|---------------------------------------------|-------------------|------|
|                                 | Coefficient (Std. error) | Coefficient (Std. error) | Coefficient (Std. error) | Coefficient (Std. error) | Coefficient (Std. error) | Coefficient (Std. error) |
| Firms located within households  | 0.061*** (0.003) | 0.056*** (0.021) | 0.049*** (0.021) | 0.052** (0.028) | 0.095*** (0.028) | 0.105*** (0.044) | 0.064*** (0.020) |
|                                 | 19.933 | 28.623 | 26.358 | 19.045 | 36.624 | 24.127 | 23.704 |
| Log(total assets)                | 0.125*** (0.003) | 0.053* (0.028) | 0.071*** (0.020) | 0.017 (0.017) | 0.040** (0.018) | 0.065** (0.023) | 0.060*** (0.014) |
|                                 | 40.898 | 27.086 | 37.943 | 6.100 | 15.340 | 14.868 | 22.222 |
| OAE                             | 0.000 (0.002) | 0.014 (0.030) | −0.004 (0.033) | 0.052*** (0.029) | 0.091*** (0.031) | 0.100*** (0.054) | 0.053* (0.028) |
|                                 | 0.025 | 7.352 | −1.931 | 19.167 | 34.971 | 23.027 | 19.630 |
| Age of the firm                  | −0.007*** (0.001) | 0.018 (0.016) | −0.005 (0.015) | 0.001 (0.012) | −0.007 (0.011) | 0.023*** (0.011) | 0.006 (0.007) |
|                                 | −2.162 | 9.131 | −2.783 | 0.465 | −2.678 | 5.335 | 2.222 |
| Rural                           | 0.001* (0.000) | −0.005 (0.009) | 0.000 (0.007) | 0.015** (0.007) | 0.019** (0.008) | 0.020*** (0.008) | 0.007 (0.005) |
|                                 | 0.259 | −2.710 | −0.242 | 5.550 | 7.159 | 4.601 | 2.592 |
| ST                              | 0.002*** (0.000) | 0.002 (0.001) | −0.003** (0.001) | −0.001 (0.001) | −0.002 (0.001) | −0.002** (0.001) | −0.002* (0.001) |
|                                 | 0.610 | −1.103 | −1.481 | −0.513 | −0.629 | −0.514 | −0.741 |
| SC                              | 0.004*** (0.000) | 0.004** (0.002) | 0.004** (0.002) | 0.004** (0.001) | 0.004 (0.001) | 0.004*** (0.002) | 0.004*** (0.001) |
|                                 | 1.278 | 1.902 | 1.965 | 1.061 | 1.650 | 1.029 | 1.481 |
| OBC                             | −0.001*** (0.000) | −0.012** (0.005) | −0.008*** (0.003) | −0.008*** (0.003) | −0.011*** (0.003) | −0.009*** (0.006) | −0.009*** (0.003) |
|                                 | −0.169 | −5.911 | −4.207 | −2.829 | −4.284 | −2.188 | 3.333 |
| Books of accounts not maintained | 0.011*** (0.001) | 0.038** (0.011) | −0.004 (0.023) | 0.013 (0.020) | 0.018 (0.026) | 0.018 (0.020) | 0.011 (0.013) |
|                                 | 3.651 | 19.316 | −1.983 | 4.891 | 6.862 | 2.210 | 4.074 |
| Problems faced by the firm       | −0.014*** (0.001) | 0.032* (0.017) | 0.003 (0.013) | −0.010 (0.011) | −0.023* (0.008) | −0.017* (0.010) | −0.011 (0.008) |
|                                 | −4.649 | 16.305 | 1.600 | −3.600 | −8.681 | −3.994 | −4.074 |
| Has not received assistance from government | 0.000** (0.000) | 0.008*** (0.002) | 0.009*** (0.003) | −0.002 (0.006) | −0.001 (0.004) | −0.003 (0.006) | 0.002 (0.002) |
|                                 | 0.101 | 4.173 | 4.955 | −0.763 | −0.412 | −0.576 | 0.740 |
The percentage of it. The figures in bold give these percentages.

The primary variable of our interest is “location of firm within household premises”. The result shows that across the productivity distribution, the variable “location of firm within household premises” contributes significantly towards the productivity difference between the male and female proprietary firms. At the mean, its contribution is 19% and at different quantiles, the percentage of its contribution ranges from 19.045 to 28.62%. Even though the other characteristics are controlled for, including the industry and state, the location of household contributes significantly towards the productivity gap. These results show that the location of firms within household premises proves to be a significant source of disadvantage for the female proprietary firms. The coefficients of the determinants of productivity (Table A4) too, confirm this. The coefficient of location of firm within household premises is smaller for female proprietary firms for all the quantiles.

The fact that the size of the firm measured by log(totalassets) is significant at the quantiles is expected as it measures the scale of production. Since female proprietary firms, on average, employ less assets, it contributes towards the productivity gap. Its contribution in pure composition effect ranges from 6.10 to 37.94%. Among the other characteristics, the assets employed by the firm and whether the firm is an OAE (for 50th, 70th and 90th quantiles) contribute significantly towards the productivity differences. The contribution of other characteristics of the firm in explaining the productivity gaps is limited. Not being registered with an authority too contributes significantly towards explaining the productivity differences of firms located at the lower and upper end of the productivity distribution. This is understandable as registration with an authority enables a firm to access benefits such as credit and assistance from various sources, which may become vital as the firm grows in terms of productivity.

Among the unexplained components, the coefficient effect dominates (except for 70th quantile for RIF decomposition of log(GVApagerworkerperhour)). Since we are interested in the effect of location of the firm within household premises, I report its contribution in the coefficient effect in Table 5. From the results, we find that the contribution of location of the firm in pure unexplained differences is limited. The

| Variables                         | RIF decomposition at mean | Standard Blinder-Oaxaca decomposition at mean | Quantiles 10 | Quantiles 30 | Quantiles 50 | Quantiles 70 | Quantiles 90 |
|----------------------------------|--------------------------|---------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Not registered with an authority | Coefficient (Std. error) | 0.026*** (0.002)                            | -           | -           | -           | -           | -           |
| Does not undertake contract work | Coefficient (Std. error) | 0.005*** (0.001)                            | 8.452        | 11.274       | 11.393       | -11.274      | -11.393      |
| Industry fixed effects           | Coefficient (Std. error) | 0.012 (0.009)                               | 0.009 (0.027) | 0.009 (0.027) | 0.012 (0.009) | 0.012 (0.009) | 0.012 (0.009) |
| State fixed effects              | Coefficient (Std. error) | 1.476                                       | 4.848        | 5.091        | 7.058        | 1.852        | 1.852        |

The figures in bold give the percentage of total explained difference accounted by the variable. *p < 0.1; **p < 0.05; ***p < 0.01.

The figures in bold give the percentage of total explained difference accounted by the variable.
Table 5: Blinder-Oaxaca and RIF decomposition of productivity differences between male and female proprietary firms: contribution of explanatory variables in the pure coefficient effect (dependent variable: log(GVAperworkerperhour))

| Variables                        | Standard Blinder-Oaxaca decomposition at mean | RIF decomposition | Mean |
|----------------------------------|--------------------------------------------|------------------|------|
|                                  | Coefficient (Std. error)                   | Coefficient (Std. error) | Coefficient (Std. error) | Coefficient (Std. error) | Coefficient (Std. error) | Coefficient (Std. error) |
| Firms located within households  | 0.004 (0.015)                              | 0.048 (0.081)     | -0.059 (0.052)           | 0.098* (0.052)           | 0.191*** (0.060)          | 0.030 (0.054)            | 0.053 (0.037)           |
|                                  | -1.885                                     | 17.994            | -13.967                   | 43.463                   | 183.721                   | 13.733                   | 21.102                  |
| log (total assets)               | -0.209*** (0.068)                          | 1.886*** (0.587)  | 0.475 (0.293)             | 0.233 (0.259)            | -0.381 (0.302)            | -0.829*** (0.313)        | 0.390* (0.213)           |
|                                  | -88.151                                    | 706.324           | 112.087                   | 103.283                  | -366.334                  | -381.902                 | 155.538                 |
| OAE                              | 0.024 (0.018)                              | -0.001 (0.014)    | 0.053 (0.077)             | 0.109 (0.070)            | 0.093 (0.073)             | 0.079 (0.071)            | 0.078 (0.053)           |
|                                  | 10.127                                     | -0.258            | 12.592                    | 48.429                   | 89.802                    | 36.611                   | 30.916                  |
| Age of the firm                  | -0.051*** (0.007)                          | -0.130* (0.075)   | 0.023 (0.042)             | 0.030 (0.034)            | -0.040 (0.039)            | -0.017 (0.042)           | -0.034 (0.024)           |
|                                  | -21.352                                    | 48.831            | 5.445                     | 13.483                   | -38.107                   | -7.919                   | -13.667                 |
| Rural                            | -0.016*** (0.007)                          | -0.183*** (0.063) | -0.086** (0.035)          | -0.037 (0.052)           | -0.003 (0.038)            | -0.068** (0.035)         | -0.066 (0.023)           |
|                                  | -6.631                                     | -68.370           | -20.294                   | -16.397                  | -2.851                    | -31.323                  | -26.454                 |
| ST                               | -0.003 (0.002)                             | -0.041** (0.019)  | -0.008 (0.007)            | -0.006 (0.010)           | -0.002* (0.006)           | 0.010 (0.006)            | -0.006 (0.005)           |
|                                  | -1.074                                     | -15.349           | -1.825                    | -2.452                   | -2.200                    | 4.577                    | -2.576                  |
| SC                               | 0.004 (0.003)                              | -0.027 (0.024)    | 0.010 (0.013)             | 0.000** (0.037)          | -0.024 (0.016)            | 0.015 (0.013)            | -0.001 (0.008)           |
|                                  | 1.870                                      | -10.015           | 2.422                     | -0.104                   | -22.684                   | 6.805                    | -0.566                  |
| OBC                              | 0.021** (0.008)                            | -0.062 (0.087)    | 0.054 (0.039)             | 0.077 (0.091)            | -0.009 (0.046)            | -0.019 (0.053)           | 0.030 (0.034)           |
|                                  | 8.753                                      | -23.222           | 12.697                    | 33.916                   | -8.689                    | -8.675                   | 11.767                  |
| Books of accounts not maintained | 0.071** (0.031)                            | 0.268*** (0.097)  | 0.043 (0.073)             | 0.070** (0.028)          | 0.103 (0.120)             | 0.026 (0.134)            | 0.087 (0.060)           |
|                                  | 29.752                                     | 100.227           | 10.242                    | 31.117                   | 98.670                    | 11.776                   | 34.486                  |
| Problems faced by the firm       | -0.002 (0.005)                             | -0.034 (0.049)    | -0.044 (0.030)            | -0.064 (0.028)           | -0.031 (0.030)            | 0.000 (0.032)            | -0.028 (0.019)           |
|                                  | -0.781                                     | -12.644           | -10.487                   | -28.140                  | -30.188                   | 0.085                    | -11.174                 |
| Has not received assistance from government | 0.071 (0.057) | -0.205 (0.147) | 0.252 (0.200) | -0.209 (0.235) | 0.034 (0.225) | -0.281 (0.197) | -0.034 (0.108) |
|                                  | 29.833                                     | -76.607           | 59.464                    | -92.362                  | 32.487                    | -129.302                 | -13.660                 |
| Not registered with an authority | 0.009 (0.021)                              | -0.105 (0.127)    | -0.047 (0.074)            | -0.059 (0.082)           | -0.111 (0.068)            | -0.159** (0.070)         | -0.075 (0.049)           |
|                                  | 3.718                                      | -39.362           | -11.150                   | -26.043                  | -106.522                  | -73.061                  | -29.837                 |
| Does not undertake contract work | -0.080*** (0.018)                          | 0.194 (0.169)     | 0.024 (0.078)             | -0.075 (0.065)           | -0.062 (0.067)            | 0.009 (0.054)            | 0.011 (0.053)           |
|                                  | -33.743                                    | 72.527            | 5.713                     | -33.068                  | -59.180                   | 4.331                    | 4.412                   |
| Industry fixed effects           | Yes                                        | Yes              | Yes                       | Yes                      | Yes                       | Yes                      | Yes                     |
location of the firm adds to the pure unexplained difference for the 70th quantile. This implies that had the returns to the observed characteristic been the same, the productivity difference would have been less by 183% at the 70th quantile. However, since the coefficient effect is due to unobservable factors, it is difficult to ascertain what drives this result. But overall, these findings confirm that social norms affect the productivity of women led firms though unpaid household work and mobility restriction channels.\textsuperscript{16} It is the observed characteristics that significantly contribute towards the gender gap in productivity. The non-significance of the coefficient effect associated with the location of the firms confirms that the difference in returns to the observed characteristic with respect to location of the firm does not add to the discrimination faced by women entrepreneurs. Location of the firm contributes towards the gender gap in productivity through the pure composition effect.

5 Discussion of results

The results in this paper show that restrictive social norms that confine women within their households adversely affect earning abilities even when they are self-employed. Lack of capital and barriers to credit may make it convenient for small family firm owners to operate their businesses from the confines of their homes. But the location of the firm within the household significantly contributes towards the reduced productivity of female proprietary firms. Working from home can impede women in several ways. These include lack of access to markets, credit and information. But it also includes the additional burden of household work. Successive governments in India have encouraged entrepreneurship, especially among the women through the formation of Self-Help Groups (SHG) as well as several government schemes. These schemes cover areas such as skill development,\textsuperscript{17} easy access to credit,\textsuperscript{18} etc. However, less focus has been directed towards gendered social norms and its role in

\textsuperscript{16} The coefficients of “Firms located within households” reported in Table A4 support this explanation.

\textsuperscript{17} Pradhan Mantri Kaushal Vikas Yojana under Ministry of Skill Development and Entrepreneurship to impart relevant skills to youth.

\textsuperscript{18} Mudra Loan, Stree Shakti Yojana, etc.
limiting female-owned firms. Gendered social norms are sticky in the sense that they hardly change over time or change very slowly. In fact, data from TUS 1998 report that women on average spend 296 min in a week for productive but unpaid household work and National Statistical Office 2020 reports this figure to be 286 min. For men, these figures are 31 min and 40 min respectively. Due to the prevalent norms, which impose mobility restrictions on women and also put the primary responsibility of household work on them, women face barriers to employment outside their homes. The burden of household work combined with restrictions on mobility impedes the functioning of women-owned firms more than their male counterparts. Often women have to multi-task and manage domestic chores along with managing the operations of the firm. While operations of the firm from within the household may allow women to be a part of the labour force, it does contribute towards less productivity for the female proprietary firms, when compared to male proprietary firms. The OLS regression results reported in Tables A3, A4 and B5 in the online appendix support this argument. As men spend less time in household chores than women, operating from within households contributes to larger negative coefficients for women. This factor contributes to the productivity gap primarily through composition effect, and not through the coefficient effect.

6 Conclusion

The study presents evidence on the role of gendered social norms in causing disadvantage for women entrepreneurs. Using unit level data from the 73rd Round of National Sample Survey on Unincorporated Non-Agricultural Enterprises (excluding Construction) in India carried out during July 2015 to June 2016, the results in this paper highlight that operating firms from household premises contributes significantly to the gender gap in productivity of unorganised manufacturing firms. Operation of the firm from household premises potentially constrains the access to markets, credit and information. As primary caregivers, women also have to prioritize household work which may contribute towards the gender gap in productivity. The results in this paper show that despite controlling for size of the firm and assets, the location of a female proprietary firm within the household premises explains 19% of the observed gender gap in productivity. The RIF decomposition results show that at the different quartiles, this contribution varies from 19 to 36% of the composition effect. The results reported in this paper are, however, not causal.

The findings in this paper show that the productivity of female proprietary firms is also less than male proprietary firms because of their characteristics such as assets and whether the firm employs hired workers. However, merely bridging the gender gaps in access to these characteristics will not be sufficient to reduce the productivity gap between them. It is expected that factors such as use of digital devices and information and communication technology reduce the disadvantage women proprietary firms face due to lack of mobility. However, results from Barboni et al. (2018) show that there exist significant gender gaps in mobile phone usage in India, and the use of mobile phones too is correlated with social norms. Instead, policy makers also need to focus on gendered social norms to improve earnings of female entrepreneurs. One of the channels that has been explored is empowering women through Self Help Groups (SHG). However, evidence on its effectiveness has been mixed (Deshpande and Khanna, 2021). Kumar et al. (2021) highlight the ineffectiveness of SHGs in reversing deep rooted gendered social norms. However, since social norms are sticky and people tend to follow them en bloc, other factors such as peer effects can be utilised to encourage mobility of women outside their households. In the context of domestic violence against women in India, Mookerjee et al. (2021) establish the role of neighbourhood level behaviour on intra-household choice. Due to spillover effects through neighbourhood level social interactions, the benefits from policies targeted towards bringing behavioural change at the household level is expected to be magnified at the community level. Hence, to improve incomes from entrepreneurship, policies should be designed to promote favourable attitudes towards women’s paid work, mobility outside home, along with addressing issues like women’s safety. Information campaigns to create more egalitarian gender roles inside the household could also be initiated. However, as social norms involve coordinated actions and fear of sanction in case of non-compliance, these policies would work more
effectively if they are targeted towards both men and women and entire neighbourhoods instead of individual households.

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Data availability Publicly available.

Code availability Codes available upon request.

Declarations

Conflict of interest The author declares no competing interests.

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