# Firm Responses To Sexual Harassment and Sexual Harassment Legislation

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**Abstract**

We model sexual harassment, incorporating it into the firm's optimization as a drag on female labour productivity. We show that sexual harassment risk emerges endogenously, incentivizing firms to segregate the workforce by gender. We calibrate the model on Indian firm data, and estimate the distortions in female employment share and productivity created by sexual harassment. We then extend the model to introduce a policy that makes firms responsible for preventing and redressing sexual harassment, endogenizing compliance as a further decision. India offers a good case study setting because, in 2013, it implemented such a policy. Leveraging a firm size discontinuity in policy coverage, we estimate that the policy in India led to an aggregate decrease in female worker share. However, beneath the average, we find sharp heterogeneity in response- firms that were male-intensive at baseline, become more so, while firms that were relatively female intensive increase their female worker share. We use our model to illuminate the underlying mechanisms. We use the reduced form estimates to set-identify the policy parameters, compliance rates and changes in sexual harassment, all of which are unobserved in our data. We conclude that compliers see a reduction in sexual harassment, which encourages the hiring of women, while non-compliers tend to hire fewer women (often no women) to minimize the risk of being fined. We discuss what we can learn from our analysis for other countries, including OECD countries, that have passed similar legislation.

**Keywords:** Prevention of workplace sexual harassment laws, Female employment, Gender based violence
**JEL Classification:** J16, J23, J28, K14, K42

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# 1 Introduction

Between a third and a half of all women report experiencing sexual harassment (henceforth, SH) at their workplace at some point in their careers (Fitzgerald & Cortina, 2018; Folke & Rickne, 2022), and these rates appear not to have changed very much since the 1980s notwithstanding the MeToo movement which has increased salience of the phenomenon (Dobbin & Kalev, 2022).[1] A vast literature documents that SH results in workers suffering mental health distress and reduced job satisfaction which, together, result in absenteeism, presenteeism and turnover, which are potentially costly for the firm (Vara-Horna *et al.*, 2023).[2] On the premise of these stylized facts, we develop a structural model of the firm in which sexual harassment enters the production function as a drag on female labour productivity. The production function contains two inputs, male and female labour, and the firm decides how many male and female workers to hire. We model SH as an interaction-driven process: the risk to the *individual* woman increases monotonically in the share of men in the workplace, consistent with evidence that women experience an elevated risk of SH in male-dominated environments (Gutek & Morasch, 1985; Folke & Rickne, 2022). We posit that *firm-level* risk, and thus the expected risk of liability, is bell-shaped in male worker share, peaking in gender-mixed workplaces and falling to zero when the workplace has either all men or all women.[3] Firms choose gender composition under imperfect substitution, facing a trade-off between production complementarities and harassment-induced productivity shocks.

The model delivers the following insights. First, the expected level of sexual harassment in the firm is an equilibrium outcome of firm choices over workforce size and gender composition. Second, in a world with SH relative to one without, firms have an incentive to gender segregate the workforce. Third, under plausible conditions on production function parameters, SH will tend to reduce aggregate female employment share. It will also lead to lower firm size (defined as worker counts) and hence total output. In our model, given the relative wage, SH can reduce the demand for female labour absent (statistical or taste-based) discrimination on the part of the employer. Most research on SH has focused upon the supply side, highlighting that it can cause persistent damage to women's careers and render them less likely to join and more likely to quit firms in which they perceive a relatively high risk of SH (Fitzgerald

[1] In this paper, we restrict our attention to sexual harassment committed by men towards women, acknowledging that this is not the only form of SH.

[2] In economics and organizational psychology, presenteeism is defined as the phenomenon of employees being at work but in fact unwell, stressed, or otherwise unable to function at full capacity. Recent work highlights that it can be as much as ten times as costly as absenteeism because present workers continue to incur overheads and, because, being present, they may distract co-workers.

[3] The bell shape emerges because firm-level risk aggregates individual risk over the number of women potentially exposed. While the former is increasing in male share, the latter is decreasing in male share.

& Cortina, 2018; Folke & Rickne, 2022; Batut *et al.*, 2021; Adams-Prassl *et al.*, 2024). Our focus on demand-side behaviour constitutes a sharp departure from existing work.

**Distortion associated with sexual harassment** We calibrate the model using establishment level data from India.[4] We set-identify establishment-specific production function parameters and industry-region specific female shares. Using the calibrated model we estimate the distortion in female employment shares and productivity loss caused by sexual harassment.

We find that, in the counterfactual economy with no SH (or, equivalent, no SH-related productivity loss), the average female share in manufacturing would roughly treble (from 10% to 31%), average firm size would increase by 7%, and profits would increase by 1%.[5] In their analysis of five decades of American history, Hsieh *et al.* (2019) estimate that (generic) barriers to hiring women and Black Americans (in certain occupations) led to a significant loss of national output. We provide micro-founded estimates of sexual harassment as one such important barrier.

**Introducing legislation in the baseline model** Having modeled the impact of SH on firm choices and estimated the size of the distortions it causes, we extend the baseline model to investigate the role of sexual harassment legislation that makes firms liable to prevent and redress SH. Whether legislation modifies SH-related distortions will depend upon how firms respond to legislation. Firms can choose whether or not to embrace the policy, a decision similar to technology adoption. We endogenize compliance as a discrete choice that firms make jointly with their decision on size and gender composition.[6]

Firms incur a fixed cost of compliance, which reduces expected penalties from non-compliance and, if effective, lowers harassment frictions, raising firm productivity.[7] Firms therefore respond along multiple margins: substituting across genders, adjusting employment

[4]We use observed data on total worker counts (size) and female employment shares at establishment level in the pre-policy period. The harassment environment (SH incidence and productivity loss due to SH) is anchored using survey data.

[5]The counterfactuals show that female share increases at both the extensive and intensive margin, and across most of the distribution but, consistent with our model in which SH promotes gender segregation, not at the top of the distribution. For firm size, however, the entire distribution shifts to the right.

[6]Firms *can* avert or directly violate legal mandates. For instance, recent labour audits and survey data document violations of minimum wage laws. The US Department of Labour estimates that 15 to 20 percent of low-wage workers are paid less than the minimum wage. In Europe, this figure is estimated by Eurofound at 7 percent. In our setting, we will not observe compliance, but estimate it using indirect inference. As a result, in our model, we can interpret compliance as *actually embracing* the policy rather than notionally adopting it.

[7]Compliance can reduce harassment risk by improving reporting channels, deterrence, and internal governance.

scale to avoid regulation, or complying and becoming safer and potentially more productive. The firm's choices are determined by the interaction of policy parameters (costs of compliance, fines associated with non-compliance) with three firm primitives. Whether a firm complies, substitutes away from women, or adjusts scale depends on the interaction of policy parameters with three firm primitives: the elasticity of gender substitution ($\sigma_i$), the female production weight ($\alpha_j$), and total factor productivity ($\gamma_i$).

Our model predicts that, on average, initially female-intensive firms (often low $\sigma_i$ and/or high $\alpha_j$) are likely to respond by complying. This can improve workplace climate, leading to reduced SH, an increase in the marginal product of female labor and, thus, incentives to hire more women. An increased share of women will reinforce the decrease in SH. In contrast, initially male-intensive firms are more likely to respond to the mandate by shedding women to reduce the chances of being discovered as non-compliant. Among non-complying firms that shed women, firm-level SH exposure falls but individual risk for remaining women can rise, a distinction our model identified. The model clarifies that there are two distinct mechanisms that determine how SH risk changes with the legislation: (i) improved workplace climate (or deterrence), and (ii) changes in female worker share (or exposure).

**Reduced form estimates of the impact of sexual harassment legislation** In 2013, India introduced the Prevention of Sexual Harassment Act (POSH) which made firms liable for prevention and redressal of SH. Leveraging a firm size discontinuity in coverage of the law, we identify impacts of the legislation on female employment shares and firm size using a difference-in-differences design. We find that, on average, after the policy, regulated firms with up to 25 workers reduce their female share of employment relative to unregulated firms, while showing no significant change in total employment.[8] Firms make additional adjustments along margins that are consistent with a reluctance to hire women: the share of contract workers rises, and men work longer shifts.

Importantly, the average decline in female worker share masks sharp heterogeneity by baseline gender composition. Among establishments with a low baseline female worker share, the policy leads to a *decrease* in female worker share of 0.43 percentage points (pp). In contrast, among establishments with a relatively high baseline female share, the policy *increases* female share by roughly 2 percentage points.[9] The observed heterogeneity in

[8]We corroborate these firm-level patterns with individual-level survey data, which also shows a decline in female relative to male wage employment in regulated firms. We observe a tendency for larger firms to increase female share but this is a) not precise and b) not cleanly identified as it involves comparison of small unregulated firms with large firms.

[9]In India, the aggregate share of women in manufacturing is 10%. For comparison, in the OECD it is 25%. Our finding of a sign reversal is not sensitive to where exactly we cut baseline female worker share. The mean and median share of women at the establishment level is zero, and 20% is the 75th percentile. The

policy response by baseline female share is consistent with firms acting to minimize SH risk (because it causes productivity loss) subject to establishment level risk which is bell shaped in female share. In the next step of the analysis we study the relevant mechanisms and look more carefully at heterogeneity in response. This could hold the key to understanding the conditions under which the policy might work as intended.

**Policy analysis using indirect inference** We use indirect inference to map the observed reduced form employment responses into implied changes in compliance and sexual harassment.[10] The identified parameter set implies economically meaningful compliance costs and nontrivial enforcement (fines), and a substantial reduction in harassment risk among compliers. We estimate compliance rates for firms with a $> 20\%$ baseline female share of 65-75%, alongside a compliance rate of less than 2% among firms with $< 20\%$ baseline female share. Given the predominance of male intensive firms in India (with about 75% of firms having no women), this implies a sector-wide compliance rate of 11-12.5%. In the small sample of regulated firms that, at baseline, are mixed gender and exhibit a distortion in female employment share, the effects of the policy are substantial. Among compliers, female employment share increases by approximately 8-12 percentage points, closing roughly 40–55% of the pre-policy harassment-induced distortion in female share. Expected harassment risk for the individual woman in these firms falls by approximately 55-98% (from $\rho = 0.29$ to $\rho(\text{board}) \in [0.006, 0.13]$), and expected firm-level harassment incidence declines by around 16% on average. Among non-compliers, female share falls by 2-5 percentage points, and while firm-level expected harassment cases decline (mechanically, through fewer women), individual risk for remaining women is unchanged or higher.

Our analysis contributes to research on non-compliance (Ashenfelter & Smith, 1979; Meghir *et al.*, 2015; Ulyssea, 2018; Karpoff *et al.*, 2005). It shows that harassment-prevention regulation can generate unintended demand-side effects that reduce women's wage employment in some firms. It shows that tightening enforcement (raising fines for non-compliance) does not necessarily motivate compliance - we identify conditions under which it can move firms toward non-compliance. A complement to enforcement would be to lower implementation costs (for instance by subsidising SH training) and strengthen internal governance so that compliance meaningfully reduces harassment risk.

results we report here are for female share below vs above 20%. The sign reversal is evident if, instead we cut at 30 or 40%.

[10] Similar to the case in many countries, we do not have data on compliance with the legislation, or data on sexual harassment. The structural model is used to fit the reduced-form coefficients and to interpret them through policy primitives: the fixed cost of compliance, the intensity of enforcement, and the extent to which compliance lowers harassment risk in practice. The fit targets the heterogeneity by baseline female share that the data highlights, in addition to the overall decline in female share.

**Labour supply responses** In this paper we focus on demand-side responses to sexual harassment. However, as workplace SH deters female labour supply (Folke & Rickne, 2022; Batut *et al.*, 2021), we may expect that legislation that makes the workplace safer for women increases labour supply. In our empirical setting, we observe an overall decrease in female employment share, consistent with demand-side responses dominating supply-side responses- and this motivates our focus on the demand side. However, it remains possible that a policy-induced increase in the relative labour supply of women contributes to the observed increase in female employment share in the subset of firms with a relatively high baseline share of women. Our post-policy analysis shuts down supply responses by conditioning upon the (baseline) industry-region relative wage.

**Contributions:** We contribute the first attempt to model a) The sexual harassment process at the workplace; b) The impact of SH on female relative to male productivity and, thereby, on the (constrained) optimization of employers choosing the size and gender composition of their workforce; c) Estimates of the size of the distortions in female employment share and productivity that flow from SH; d) The impact of SH legislation on firm's choices, identifying sources of heterogeneity; and d) We introduce a novel approach to indirect inference that, using identified reduced form coefficients, infers policy parameters, policy compliance and changes in sexual harassment.

Our formalization of the notion that SH operates as a tax on female labour productivity which influences the relative demand for female labour is a simple yet powerful notion that can be generalized to consider the productivity effects of other sorts of harassment or workplace frictions as long as these operate between two distinct production function inputs. For instance, frictions between individuals of two races or two castes could similarly be modeled as impairing the productivity of the victimized race or caste. Consistent with this is evidence that productivity is often lower in teams of mixed identity teams (Hamilton *et al.*, 2003; Hjort, 2014; Marx *et al.*, 2021; Bhalotra *et al.*, 2023).

Our model of the SH process at the firm level as being bell-shaped in female share has three key implications. First, it means that the level of SH in an establishment is endogenously determined by the firm's choice of gender composition and size. Second, it creates demand-side incentives for gender segregation at the workplace. Third, it means that SH and legislation targeting SH can motivate an increase or a decrease in female employment share, depending on baseline female share which, in turn, depends upon production function primitives. In contrast, maternity leave legislation for instance can only move the relative demand for female workers in one direction, which is downward.

A second notable distinction between legislative mandates pertaining to SH and mater-

nity is that the costs of maternity leave are largely funded by state social security, while governments that mandate workplace climate regulation typically do not subsidise these costs for employers. In this regard, SH legislation bears similarities with regulations on workplace safety. The important difference here is that SH arises from potential interaction of two types of workers (male and female), while safety risks are independent of workforce composition.

We highlight instrumental reasons for employers to address workplace SH. What legislation does it to prompt salience and to coordinate action across employers. Combining reduced form and structural estimation, our analysis of SH legislation demonstrates conditions under which legislation can correct distortions, and conditions under which it can have the unintended consequences of reducing female hiring and/or raising SH risk for women that remain employed. Whether sexual harassment leads to an *overall* reduction in female employment depends upon the gender shares of production and the elasticity of gender substitution within the firm.[11]

While the empirical results will not generalize to other countries, our formulation does, and our results for complying firms provide proof of concept, showing that SH legislation can be effective, while also demonstrating that the broader effectiveness of such policies will depend upon the size of compliance costs relative to non-compliance fines, and the distributions of production parameters. Future work can employ the theoretical framework and the structural estimation approach used in this paper to study harassment and legislation in other settings such as France.

**Related literature** The insights of existing research on workplace SH from the worker's (labour supply) perspective can be summarised as (i) showing that the careers of female workers who experience sexual harassment suffer a persistent decline (Adams-Prassl *et al.*, 2024; Fitzgerald & Cortina, 2018; McLaughlin *et al.*, 2017); and (ii) showing that women sort away from workplaces at which they perceive SH risk (Folke & Rickne, 2022; Batut *et al.*, 2021). In particular, since this risk is increasing in male share Folke & Rickne (2022) show that supply-side sorting contributes to gender segregation.[12] Our work extends the evidence on (i) by highlighting impacts of SH on firm productivity and, thereby, the demand for female workers and total output and, in relation to (ii), our work shows that demand-side incentives can, on their own, promote gender segregation.

[11] As long as the average female share of production is <0.5 (typical values in the literature are 0.4-0.45), and the gender elasticity is larger than 2, our setting predicts an aggregate reduction in female share. On the other hand, if the elasticity was low (¡1), then firms would need to hire both male and female workers and they would need to increase female share to counter the loss in productivity due to SH. In our calibrated economy of Indian establishments size 1-25, the average gender share is 0.45 and the modal mass of the elasticity lies between 4 and 10. Consistent with this our reduced form estimates show an overall decline in female employment.

[12] And since male-intensive firms tend to offer higher wages it contributes to gender pay inequality.

A small, primarily theoretical literature on SH has discussed ambiguous impacts of "forbidding SH" on female employment (Lindbeck & Snower, 1988; Chen & Sethi, 2018; Basu, 2003; Hersch, 2011). Our paper differs from these studies in many dimensions, most notably in modelling SH as a drag on female labour productivity and making it endogenous to the firm's decisions on its size and gender composition.[13]

**Broader relevance** Sexual violence outside the workplace, including rape and domestic violence, are criminal offences that offenders can be charged with. In contrast, workplace sexual harassment is a civil matter, and it is firms that are responsible for managing it. Most countries have in place laws that make firms liable to commiserate with or compensate employees who face SH, often with regulatory oversight provided by an agency such as the US Equal Employment Opportunities Commission or the UK Equality and Human Rights Commission. Some countries, similar to India, have additionally made firms legally responsible for the prevention of SH. The UK Worker Protection Act of October 2024 is similar in spirit to the Indian law, and similar laws exist, for instance, in France, the Phillipines and Pakistan.

Globally, only a small share of women report incidents of SH to their employers (Dahl & Knepper, 2026; Bhalotra & Ridley, 2026; Dobbin & Kalev, 2022).[14] Numerous studies document that reporting SH to the employer seldom results in the offender facing consequences, and that it often results in retaliation (Fitzgerald & Cortina, 2018, ; EEOC (2016)). Overall, it seems that employer-led SH policies have been ineffective (Bergman, 2019; Cortina & Magley, 2003; Fairchild *et al.*, 2018; Dobbin & Kelly, 2007; Dobbin & Kalev, 2019). The advantage of legislation similar to that passed in India is that it harmonizes policy across firms using an explicit and common definition of SH, facilitates confidential reporting, and that it involves monitoring and accountability to the state.

The layout of the paper follows the flow of the argument in the Introduction.

# 2 Modeling Firm Choice

This section presents our baseline framework for firm decision making under the risk of sexual harassment. It is a partial-equilibrium model of firm labor demand in which local male and female wage rates are taken as given and workplace sexual harassment acts as a gender-specific productivity wedge. The model is designed to answer three questions that

[13] In (Basu, 2003), the employer is the harasser and thus the employer gains utility from harassment. This is of course because the paper has a different purpose.

[14] When they do report, the modal outcome is that the women rather than the offender leave the firm, often with a non-disclosure agreement that leaves the offender free to offend again, whether in the same firm or another.

organize the rest of the paper: whether harassment can rationalize lower female employment and smaller firms even in the absence of taste-based discrimination, how much female talent is misallocated by that wedge, and what benchmark of 'no-harassment' our analysis of SH legislation in Section 6 should be evaluated against. We first specify a harassment diffusion process that links gender composition to harassment incidence. We then embed this process in a firm's profit-maximization problem with CES technology, showing how harassment distorts female employment and firm size relative to a harassment-free benchmark.

## 2.1 The harassment diffusion process

We begin with a reduced-form harassment hazard function, which is a parsimonious mapping from workplace composition into expected exposure, chosen to capture the two features that are central here: a woman's risk is higher in more male-dominated workplaces, and firm-level exposure is highest in mixed-gender workplaces. Let $\rho \in [0, 1]$ denote the baseline harassment environment. We interpret $\rho$ as capturing institutional, geographical, social, and cultural factors that influence harassment risk independently of a particular firm's hiring choices. We will refer changes in $\rho$ that flow from firm-led initiatives as changes in workplace climate. For a firm with $F^i$ women and $M^i$ men, we specify the probability that an individual woman is harassed as

$$P^i\left(F^i, M^i\,;\rho\right) = \rho \cdot \sqrt{\left(\frac{M^i}{M^i + F^i}\right)} \tag{1}$$

Individual risk increasing in the share of male workers is in consonance with sex-role spillover theory (Gutek & Morasch, 1985) which posits that, in male-dominated workplaces, traditional gender role expectations are more likely to spillover into workplace interactions, heightening the risk of SH. This is consistent with available evidence, see Antecol & Cobb-Clark (2004) and, in particular, Folke & Rickne (2022) who ratify this on population-level data. The square root captures the idea that cross-gender interactions attenuate as the workplace becomes increasingly male, which will also imply lower harassment incidence. This pattern is depicted in Figure 1, Panel (a).

Firm-level incidence is the aggregation of this individual risk over the number of women exposed. Let $H^i \in \{0, 1, \ldots, F^i\}$ denote the number of women in firm $i$ who are harassed in the period. Conditional on workplace composition, we assume

$$H^i \,\big|\, (F^i, M^i; \rho) \sim \text{Binomial}\big(F^i,\ P^i(F^i, M^i\,;\rho)\big)\,, \tag{2}$$

Two implications are immediate. First, the probability that the firm has no harassment case

is:

$$P(\phi^i = 0 \mid F^i, M^i; \rho) = P(H^i = 0 \mid F^i, M^i; \rho) = \left(1 - P^i(F^i, M^i\,; \rho)\right)^{F^i}. \tag{3}$$

Second, the expected share of women harassed is

$$\text{Define: } \phi^i \equiv \frac{H^i}{F^i} \in [0,1], \qquad \text{with the convention } \phi^i \equiv 0 \text{ if } F^i = 0.$$
$$\mathbb{E}[\phi^i \mid F^i, M^i; \rho] = \frac{\mathbb{E}[H^i \mid F^i, M^i; \rho]}{F^i} = P^i(F^i, M^i\,; \rho) \qquad (F^i > 0). \tag{4}$$

A key property of this structure is that while *individual* risk decreases monotonically in female share, *firm-level* expected harassment intensity ($F^i \cdot P^i$) is hump-shaped in female share, as illustrated in Figure 1, Panels (b) and (c). Intuitively, all-male and all-female firms face zero harassment risk, while mixed-gender firms bear the highest expected incidence. This creates an incentive for gender segregation at the firm level, the strength of which depends on production technology.

## 2.2 Harassment risk and firm behavior

The firm's decision variables are male and female employment, which jointly determine firm size and gender composition. We abstract from capital and model the firm as choosing labor inputs to maximize expected profit, taking wages as given. To define terms, we sketch a benchmark model without harassment. We then introduce sexual harassment risk as a drag on female productivity with spillover effects on male productivity. This aligns with various studies including the ICRW (2018) report which estimates that on average companies lose $22,500 per harassed individual. Since sexual harassment is a function of the gender composition of the workforce, it is determined endogenously.

Let $F^i$ and $M^i$ denote female and male labor in firm $i$, with wage rates $w^F$ and $w^M$. Assuming that firms are price takers, and setting the output price as the numeraire, we can write the profit maximization problem for firm $i$ as:

$$\max_{F,M} \left(g_i\left(F^i, M^i\right) - F^i \cdot w^F - M^i \cdot w^M\right) \tag{5}$$

Using the CES production function, we can write

$$g_i\left(F^i, M^i\right) = \gamma_i \cdot \left(\left(\alpha_j \cdot {F^i}^{\frac{\sigma_i - 1}{\sigma_i}} + (1 - \alpha_j) \cdot {M^i}^{\frac{\sigma_i - 1}{\sigma_i}}\right)^{\frac{\sigma_i}{\sigma_i - 1}}\right)^{\eta} \tag{6}$$

where $\gamma_i$ denotes total labour-factor productivity (TFP and non-labor inputs), $\sigma_i$ denotes the elasticity of substitution between male and female labor, $\alpha_j \in (0,1)$ is the female share parameter (varying at the industry-region level $j$), and $\eta \in (0,1)$ denotes the elasticity of output with respect to the labor aggregate.

Sexual harassment enters as a productivity wedge that lowers effective female labor input. Let $\phi^i \equiv H^i/F^i$ denote the realized share of women harassed in the firm. If $\lambda^F \in [0,1]$ is the productivity loss suffered by harassed women, then effective female labor is

$$g_i(\hat{F}^i, M^i) = g_i\left(\left(1 - \phi^i \cdot \lambda^F\right) \cdot F, M\right) \tag{7}$$

When $\lambda^F > 0$, harassment directly reduces female marginal productivity. When additionally $(\sigma_i - 1)/\sigma_i \neq 1$, imperfect substitutability generates a spillover: male productivity also falls. The combined direct and indirect effects are captured by the effective female share $\alpha_j \cdot (1 - \phi^i \cdot \lambda^F)^{(\sigma_i - 1)/\sigma_i}$.

Thus, the firm's profit maximization problem once SH is incorporated can be written compactly as expected profit under the binomial incidence process (for simplicity of notation, we henceforth drop the $i$ superscript from female, male labour, and SH process for a given firm):

$$\pi_i^{SH}(F, M) = \mathbb{E}\Big[g_i\big((1 - \lambda^F \phi)F,\ M\big) \,\Big|\, F, M; \rho\Big] - \left(F \cdot w^F + M \cdot w^M\right), \tag{8}$$

where $\phi = H/F$ is defined in (**??**) and $H$ follows (2). Writing out the expectation explicitly,

$$\begin{aligned}\pi_i^{SH}(F, M) = &\left[\sum_{h=0}^{F} \binom{F}{h} \left(P^i(F, M; \rho)\right)^h \left(1 - P^i(F, M; \rho)\right)^{F-h} g_i\left(\left(1 - \lambda^F \frac{h}{F}\right) F,\ M\right)\right] \\ &- \left(F \cdot w^F + M \cdot w^M\right).\end{aligned} \tag{9}$$

This decomposes usefully into the no-harassment state and the positive-incidence states:

$$\begin{aligned}\pi_i^{SH}(F, M) = &\underbrace{P(\phi = 0 \mid F, M; \rho) \cdot g_i(F, M)}_{\text{No harassment}} + \underbrace{\sum_{h=1}^{F} P(H = h \mid F, M; \rho) \cdot g_i\left(\left(1 - \lambda^F \frac{h}{F}\right) F,\ M\right)}_{\text{Harassment states}} \\ &- \left(F \cdot w^F + M \cdot w^M\right),\end{aligned}$$

The firm faces certainty in wage costs but uncertainty in the returns to labor, since the distribution of harassment risk is endogenously determined by its employment choices. Since harassment has a disproportionate impact on female productivity, it reduces the relative

demand for female labor and, through scale effects, overall firm size. The magnitude of these distortions depends on three firm-level primitives:

1. *Elasticity of substitution* ($\sigma_i$). When $\sigma_i$ is large, the firm can cheaply substitute male for female labor in response to harassment risk. This generates aggressive compositional adjustment through sharp reductions in female share, but modest losses in profit and output. When $\sigma_i$ is small, substitution is costly: the firm absorbs the productivity loss with limited compositional adjustment but larger profit and output declines.

2. *Total factor productivity* ($\gamma_i$). Higher-TFP firms are larger and employ more women in levels, so the absolute distortion in female employment is larger. However, the distortion in female share depends on the interaction of $\gamma_i$ with $\sigma_i$ and $\alpha_j$.

3. *Female share parameter* ($\alpha_j$). Firms in industries where women are a larger share of the production technology face higher absolute exposure to harassment risk, but also face higher costs of substituting away from female labor.

**Comparative statics.** Figure 2 demonstrates these dynamics. Fixing $\alpha = 0.39$, we vary TFP at two levels of the female productivity loss ($\lambda = 0$ and $\lambda = 0.28$) and two levels of the elasticity of substitution ($\sigma = 0.5$ and $\sigma = 5.5$). Harassment-induced productivity losses cause firms to reduce both firm size and female employment. Size reductions are larger for low-$\sigma$ firms that cannot easily substitute away from female labor. Female share declines more steeply at higher TFP levels, and firms with high $\sigma$ adjust their gender composition more aggressively. Figure A.1 complements this by fixing TFP at $\gamma = 30$ and varying the female share parameter $\alpha$ across three levels of productivity loss ($\lambda = 0$, 0.24, 0.43). The key finding is that the direction of the female-share response to harassment depends on both $\sigma$ and $\alpha$: at low baseline female shares and low $\sigma$, the female share can *increase* with harassment intensity, because these firms cannot easily substitute away from female labor. At high baseline female shares, the female share declines as $\lambda$ rises.

As long as the firm internalizes the potential risks from SH, we would observe the above effects. The core tension is that harassment acts as an endogenous tax on female employment whose incidence varies across firms with different production technologies, generating the cross-sectional dispersion in firm size and gender composition from a common harassment environment.

# 3 Model Calibration

We calibrate the pre-policy model in two steps. First, we pin down the harassment process parameters ($\rho$, $\lambda^F$) using external survey evidence and existing literature. Second, we recover firm-specific production parameters ($\gamma_i$, $\sigma_i$, $\alpha_j$) by requiring that each firm's observed labor choices are rationalized as optimal under the calibrated harassment environment. The calibrated economy then serves as the platform for quantifying harassment-induced distortions and, subsequently, for evaluating sexual harassment legislation.

## 3.1 Calibration of harassment process parameters

Two parameters govern the harassment diffusion process: the baseline interaction-level harassment risk $\rho$ and the productivity loss per harassed worker $\lambda^F$.

**Harassment risk ($\rho$).** We use data from a workplace harassment survey that we conducted in July 2024 among 206 working professionals (100 male, 106 female, aged 18–50) in urban India. For each female respondent, the survey records the range of harassment incidents across five categories of workplace sexual harassment.[15] We convert career-level incidents to an annual rate using imputed work experience and obtain a mean annual harassment incidence risk of 27.4%. We calibrate $\rho$ by grid search over $[0, 1]$ with step size 0.01, applied to the pre-policy ASI firm universe (firms with $N \leq 50$). For each candidate $\rho$, the model generates predicted individual risk via Equation (1), and we select the value minimizing the deviation from the 27% empirical target. This yields $\rho = 0.29$.

**Productivity loss ($\lambda^F$).** We draw on two sources of direct estimates. Vara-Horna *et al.* (2023) estimate a 43% decline in labor productivity among harassment victims, while the U.S. MSPB (2018) reports a 22% self-reported decline. Indirect channels reinforce these effects: counterproductive workplace behaviors increase by 40% (Vara-Horna *et al.*, 2023), absenteeism rises by 36% (Andersen & Christensen, 2022), and motivation declines by roughly 20% (U.S. MSPB 2018). Averaging across these direct and indirect estimates, we set $\lambda^F = 0.30$ as our central value. The next version of this paper will investigate sensitivity of our results to varying these inputted parameters.

[15] For each category, respondents select from: never, 1–2 times, 3–4 times, 5–6 times, or more than 6 times in their career. We assign midpoints (0, 1.5, 3.5, 5.5, 7) and, since categories may overlap, approximate total career incidents as the maximum across categories. Details of the survey instrument are in Appendix **??**.

## 3.2 Calibration of the firm's production parameters

Conditional on $(\rho, \lambda^F)$, we recover the firm-side primitives that rationalize observed pre-policy labor choices. These are firm productivity $\gamma_i$, the elasticity of substitution $\sigma_i$, and the female production weight $\alpha_j$. The identification strategy is as follows: given local wages and the calibrated harassment block, variation in observed $(F_i, M_i)$ choices disciplines the scale and substitution primitives needed to make those choices optimal for each firm, while $\alpha_j$ captures industry-region differences in the production value of female labor.

### 3.2.1 Data for calibration

We calibrate the model using establishment-level data from the Annual Survey of Industries (ASI), a nationally representative survey of registered manufacturing establishments in India conducted annually by the National Sample Survey Office (NSSO). We use the terms *firm* and *establishment* interchangeably, since more than 95% of large firms in India are single-establishment entities (Chakrabarti & Tomar, 2024).[16]

For the calibration, we require three types of establishment-level information from the pre-POSH period (latest available year in 2009–12): employment counts by gender, wages by gender, and output. The ASI records gender-disaggregated employment for manufacturing workers, including gender-specific mandays and wages.[17] Since manufacturing workers account for about 72% of all permanent employees, these data cover a substantial share of the firm's workforce. We use the counts of female $(F_i)$ and male $(M_i)$ manufacturing workers as the firm's observed labor choices.

The female (male) wage rate is calculated as wages paid to female (male) manufacturing workers divided by female (male) worker person-days, aggregated at the industry-zone level since we model firms as price takers in local labor markets.[18] Output is defined as the real value of output produced by the establishment.[19]

Anticipating the reduced form estimates of the impact of SH legislation which show policy response is concentrated among establishments under the size of 25, we use establishments

[16]This share is likely even higher among micro and small firms, which constitute our main analysis sample.

[17]Workers are employees engaged in manufacturing activities. Supervisors do not perform manufacturing work directly but oversee operations and manage production.

[18]States are divided into six zones – Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands).

[19]Consumer Price Index is used to deflate wages while 2-digit industry-specific Wholesale Price Index (WPI) is used to deflate output. Both have base year of 2004.

with 1-25 permanent employees observed in the latest pre-POSH year (within 2009–12).[20] Because the ASI primarily covers registered establishments, the recovered distribution of firm primitives $(\gamma_i, \sigma_i)$ may under-represent very small, low-productivity firms. In the next iteration of this paper, we will improve this by supplementing the ASI data with data from a cross-sectional survey of unregistered firms in India, we discuss this and ASI's coverage in detail in Section 5.1. The next iteration will also calibrate the model for larger firms.

### 3.2.2 Calibration of production parameters

The production-side calibration asks a revealed-preference question: given local wages and the calibrated harassment block, which combinations of $(\gamma_i, \sigma_i, \alpha_j)$ rationalize the observed pair $(F_i, M_i)$ as the solution to the firm's labor-demand problem? For a given value of $\alpha_j$, each observed labor choice maps into a set of $(\gamma_i, \sigma_i)$ values that satisfy this condition. Recovering the distribution of firm types then amounts to aggregating across these rationalizing sets.

Since the variation in female share and wages is primarily observed across industry and geographical regions in India, we consider: (a) female share of production at industry-region $(j)$ level - $\alpha_j$, allowing it to assume a maximum of two different values (further elaborated later) and (b) female and male wages at industry-region level - $w_{fj}$ and $w_{mj}$. Therefore, given $\rho$ and $\sigma$, from the observed firm-level labor choices $(F_i, M_i)$, industry-region level wages $(w_{fj}, w_{mj})$ and female share $(\alpha_j)$, we define the following set of feasible pairs of $(\gamma, \sigma)$ that rationalizes $(F_i, M_i)$ as the optimal labor choice under the model:

$$\Omega(F, M\ ;\ \alpha) = \left\{(\gamma, \sigma) \in \mathbb{R}^2_+ \mid (F, M) =_{F\in\mathbb{N}, M\in\mathbb{N}} \pi\left(F, M\ ;\ \gamma, \sigma, \alpha, \rho, \lambda, w_f, w_m\right)\right\} \tag{10}$$

We construct the overall joint distribution of parameters $F(\gamma, \sigma; \alpha)$ that rationalizes observed joint distribution of $(F, M)$ under the model, aggregating across all firms assigning equal weight to all $(\gamma, \sigma) \in \Omega(F, M; \alpha)$.

$$P(\gamma, \sigma) = \sum_i \frac{P(F_i, M_i)}{N\{\Omega(F_i, M_i)\}} \cdot 1\left\{(\gamma, \sigma) \in \Omega(F_i, M_i\ ;\ \alpha_j)\right\} \tag{11}$$

Further, to match the firm size support from empirical data, we restrict the joint distribution to firms with $(F_i + M_i) \leq \hat{N}$, where $\hat{N}$ is the largest firm size observed in the data and hence, construct the following conditional joint distribution of $(\gamma, \sigma)$:

$$P(\gamma, \sigma \mid N \leq \hat{N}) = \sum_i \frac{P(F_i, M_i \mid F + M \leq \hat{N})}{N\{\Omega(F_i, M_i)\}} \cdot 1\left\{(\gamma, \sigma) \in \Omega(F_i, M_i\ ;\ \alpha_j)\right\} \tag{12}$$

[20] We plan to remove this restriction in future versions of the analyses.

One challenge this process faces is that a single value of $\alpha_j$ per industry-region cell is not flexible enough to generate the right tail of the female-share distribution. For example, when wages are equal and $\alpha_j < 0.5$, the model cannot rationalize firms with female shares above one half, while about 8.6 percent of firms in the data fall into that range. These firms are qualitatively important by being the few firms with more equal or female-intensive gender composition. We therefore allow each industry-region cell to have up to two production weights, ($\alpha_{j,\text{low}}$ for firms with low female shares (which forms the majority of Indian fims),$\alpha_{j,\text{high}}$) for firms with high female shares (e.g. women-owned firms),[21] and choose the pair that minimizes the gap between the model-implied and observed output-wage ratio in that cell. Industry-region cells that do not require this additional flexibility are simply special cases in which the two values coincide.

The pair is selected to minimize the deviation between model-predicted and observed output-wage ratios [22]:

$$
\begin{aligned}
&(\alpha_{j-low}, \alpha_{j-high}) = \\
&argmin_{\alpha_l,\alpha_h \in [0,1]} \Bigg| \left( \int \frac{g(\gamma, \sigma \mid \alpha_l, \alpha_h)}{w_F \cdot F(\gamma, \sigma \mid \alpha_l, \alpha_h) + w_M \cdot M(\gamma, \sigma \mid \alpha_l, \alpha_h)} dF_j(\gamma, \sigma \mid \alpha_l, \alpha_h) \right) \\
&\qquad - \overline{Output_Wage_Ratio}_j(ASI) \Bigg|
\end{aligned}
\tag{13}
$$

This procedure achieves a 100% match rate on observed $(F_i, M_i)$ pairs across all industry-region cells.

### 3.2.3 Results of the matching procedure

Figure A.2 summarizes the implied parameter distributions. The TFP distribution is approximately log-normal and aligns with the empirical firm-size distribution. The implied gender elasticity $\sigma$ is concentrated below 10, with modal mass between 4 and 10, indicating that male and female labor are reasonably substitutable for most firms (production technologies lying between Cobb-Douglas and linear).

Figure A.3 documents the $\alpha$ values. The two-$\alpha$ structure is essential for rationalizing the

[21] Unfortunately, ASI does not capture the gender of the owner, but other data, like the Economic Census, show that female-owned enterprises on average hire 60-70% women. However, the Economic Census does not capture firm output or wages and hence restricts us on those fronts. The latest economic census is also only available for 2013, when POSH was not enforced.

[22] We use output and wages as their definition in the data most closely aligns with our model. With sequential choices of labour and capital, choosing labour with capital pre-determined, akin to profit maximization.

right tail of the female-share distribution while preserving parsimony: in most industry-region cells, $\alpha_{j,\text{low}} = \alpha_{j,\text{high}}$, as shown by the 45-degree clustering in the scatterplot. Figure A.4 shows that regions with stronger gender norms (North-Eastern and Southern states) are associated with higher $\alpha$ values, consistent with greater female participation in manufacturing in these areas.

## 3.3 Distortions associated with sexual harassment

The calibrated pre-policy economy allows us to quantify how much of the observed allocation is attributable to the harassment wedge. We do so by comparing the calibrated pre-policy allocation to a counterfactual in which harassment no longer reduces effective female labor input. Concretely, we set $\lambda^F = 0$ while holding fixed the recovered firm primitives $(\gamma_i, \sigma_i, \alpha_j)$ and local wages. The counterfactual is not necessarily first-best in a full general-equilibrium sense, but it serves as a simple partial-equilibrium analysis for isolating the distortion attributable to harassment and establishes the benchmark against which the policy is subsequently evaluated.

**Firm size and productivity:** Figure A.7 shows that harassment shifts mass toward smaller establishments. In the data, the mean firm size is 8.5 workers. In the no-harassment counterfactual, the model predicts an average of roughly 9.1 workers, implying that harassment reduces average firm size by about 6.6 percent. The entire distribution shifts left under harassment, increasing the mass of firms below the 10-worker threshold, which is harmful for workers as they are exposed to increased informality and fewer worker protections.

The aggregate effects on output are smaller but still economically meaningful. Figure A.7 also shows that average production and profit are about 1 percent lower in the presence of harassment. There is substantial heterogeneity across firms, as the firms that lose little are typically those that can re-optimize strongly along the gender-composition margin.

**Gender composition:** The distortion in female employment is substantial. The no-harassment counterfactual implies a mean female share of 31%, roughly three times the observed average of 10%. The prevalence of zero-female firms ($F = 0$) increases by nearly 50% under harassment, while the right tail of the female-share distribution (80–100% female) is relatively stable, consistent with technologically female-dependent firms being unable to substitute away from women. Decomposing adjustment margins, 36.3% of firms do not change total or female employment, 23.4% adjust only $F$ holding $N$ fixed, and 39.2% adjust both.

**Heterogeneity by baseline female share:** Size reductions from harassment are larger for firms with low initial female shares (7.3% vs. 4.0%), consistent with greater scope to substitute away from $F$ when women constitute a small fraction of the labor input. Conversely, production and profit losses are more severe for female-intensive firms: average percentage differences are $-2.47\%$ (production) and $-2.89\%$ (profit) for the $\geq 20\%$ group, versus $-0.72\%$ and $-0.58\%$ for the $< 20\%$ group. This asymmetry reflects the fact that firms for whom women are technologically important suffer larger output losses even though they adjust employment less.

**Heterogeneity by gender elasticity.** Firms with high substitutability ($\sigma \geq 10$) re-optimize aggressively away from female labor, generating a large mass of all-male firms and more downsizing toward $n < 10$. Low-substitutability firms ($\sigma < 10$) adjust employment modestly but experience larger losses in profit ($-2.25\%$) and production ($-2.14\%$), compared with $-0.74\%$ and $+0.8\%$ for high-$\sigma$ firms. The substitution channel is thus the primary driver of gender segregation, while the profit channel falls disproportionately on firms that cannot segregate.

# 4 Modeling Firm Response to Policy

We extend the pre-policy model to incorporate firm responses to SH legislation. We first describe the institutional setting in India, our case study, and then we formalize the firm's post-policy optimization problem, in which compliance with the Act becomes an endogenous choice governed by the trade-off between fixed setup costs, expected non-compliance penalties, and the productivity gains from reduced harassment.

## 4.1 Policy background

In 2013, the Sexual Harassment of Women at the Workplace (Prevention, Prohibition, and Redressal) Act (POSH) codified the Vishaka guidelines and made employers legally accountable.[23] Passed in February 2013 and effective from December 2013, POSH created a time-bound internal redressal process, with penalties for non-compliance, for establishments with at least 10 employees. Its central compliance requirement is the formation of an Internal Complaints Committee (ICC or board). The ICC be chaired by a senior woman employee. It must also include two employee members and one paid external member, typically drawn

[23]See the Act here. Women in establishments with fewer than 10 employees may file complaints with a district-level Local Complaints Committee (LCC), but such firms need not create internal mechanisms.

from an NGO. If the establishment has no female employee, the chair may be nominated from another establishment or employer and the external member must be female. The ICC can hear complaints only from women and must follow a time-bound procedure.[24]

POSH also requires employers to conduct training, support the ICC, disclose complaints in annual reports, and assist complainants pursuing criminal action. Non-compliance attracts a statutory fine of about $600 for a first violation, with higher penalties for repeat violations, including possible license cancellation or non-renewal of business registration. In practice, costs can be much higher once cases reach court, because compensatory damages may be imposed in addition to statutory fines (media reports indicate $30,000 to $180,000).[25] Evidence on compliance remains limited with small surveys and anecdotal evidence suggesting higher compliance among larger firms, while smaller firms often fall short (fewer than half complying).[26]

More broadly, many countries have adopted employer-mandated sexual-harassment regimes with three features central to our framework: prevention and reporting obligations, firm-size thresholds that create discontinuities in regulatory burden, and fines that raise the expected costs of non-compliance (Table B.1).

## 4.2 Model predictions for firm's responses to the POSH Act

The POSH Act, designed to encourage reporting and redressal of workplace sexual harassment against women, requires regulated firms, i.e., those with at least 10 ($= \psi$, say) workers, to set up an internal complaints committee (ICC) to receive and investigate the sexual harassment complaints. As discussed, the ICC also requires that firms train their workers to recognize different forms of sexual harassment and make them aware of the penal consequences of perpetration. Compliance is monitored by the labour inspectors, who can conduct random checks on firms, and who can be alerted by victims if they are not satisfied with the firm's handling of the issues.

Legislation can impose significant compliance costs on regulated firms, especially small-sized regulated firms, leading to a decrease in the hiring of the very individuals the act specifically targets to protect (Acemoglu & Angrist, 2001). On the one hand the POSH Act can deter SH and thus reduce firm-level SH risk. On the other hand, by encouraging reporting and empowering victims, it exposes the firm to increased risk of reputational damage if cases

[24]Complaints must be filed within three months, inquiries completed within 90 days, and recommendations submitted within 10 days. Where allegations are substantiated, the ICC may recommend sanctions ranging from compensation and apologies to reprimands, counseling, withholding promotions or increments, or termination; malicious complaints may also be sanctioned.

[25]See: POSH at Work and CAP India.

[26]See: The Times of India, The Economic Times, and Forbes.

reach the point of litigation (Borelli-Kjaer *et al.*, 2021).

Rates of reporting SH are not relevant in a baseline world with no legislation - what matters there is incidence that harms productivity. However, once legislation is introduced, employer responses to legislation will depend on reported cases, which can change in either direction if reporting increases but incidence decreases. In general, there SH is severely under-reported due to stigma, beliefs about other's willingess to report, normalization, fear of retaliation and weak outside options (Rosenthal *et al.*, 2016; Cortina & Wasti, 2005; Ilies *et al.*, 2003; Cheng & Hsiaw, 2022; Dahl & Knepper, 2021). Also see US EEOC Select Task Force Report (2016) also notes that while more than 85% of harassment victims never file a formal legal charge, approximately 70% of the employees do not even complain internally. A 2014 EU-wide survey by the EU Agency for Fundamental Rights also finds that less than 10% of SH victims formally reported their incident. In 2017, a survey by the Indian National Bar Association found that approximately 70% of victims of sexual harassment at workplace do not report to management, and they identified fear, embarrassment and social stigma as reasons. For the calibration, we use the SH reporting rate of 11% in the US Merit Systems Protection Board (MSPB) 2018 report, which discloses sexual harassment statistics in federal workplaces and covers employees across 23 federal departments and agencies.

Firms now face a third decision, which is whether to comply with the law or not. This choice is governed by three policy parameters:

1. **Compliance costs ($\Theta$):** the fixed cost of ICC setup, training, documentation, and procedural operation, incurred if $C = 1$. Henceforth we refer to all of this as "board cost"

2. **Expected fine ($\Delta$):** this is th expected monetary penalty for non-compliance conditional on a harassment case being reported and enforcement being triggered. This encompasses statutory fines, court-imposed compensatory damages, and reputational costs.[27]

3. **Policy-induced reduction in SH risk:** if the firm establishes an ICC ($C = 1$), workplace governance reduces the harassment-risk parameter from $\rho$ to $\rho(\text{board}) \equiv (1-\kappa)\rho$, where $\kappa \in [0, 1]$ captures the effectiveness of governance in reducing harassment incidence.

Let $C \in \{0, 1\}$ be the decision to set up the ICC or not. The probability of at least one case and the intensity or the number of cases of harassment falls when the ICC is set up, or

[27]We normalize both $\Theta$ and $\Delta$ by the annual male wage at the industry-region level, so values are interpretable as fractions or multiples of an annual wage.

$C = 1$:

$$P(\phi = 0; F, M, C = 1) \geq P(\phi = 0; F, M, C = 0) \tag{14}$$

$$F(\phi \leq \hat{\phi}; F, M, C = 1) \geq F(\phi \leq \hat{\phi}; F, M, C = 0) \tag{15}$$

Therefore, we can rewrite the expected revenue of the firm including the possible expected per-worker productivity gains from the set-up of ICC i.e., $C = 1$:

$$\begin{aligned} \text{ExpRev} = & \underbrace{P(\phi = 0 \,;\, F, M, C \,;\, \rho) \cdot g_i(F, M)}_{\text{Exp. revenue, no harassment}} \\ & \underbrace{+ \left(1 - P\left(\phi = 0 \,;\, F, M, C \,;\, \rho\right)\right) \cdot \int_0^1 g_i(\hat{F}, M) \cdot f\left(\phi \,;\, F, M, C \,;\, \rho\right) \, d\phi}_{\text{Exp. revenue with harassment}} \end{aligned} \tag{16}$$

where $\rho_C = \rho(\text{board})$ if $C = 1$ and $\rho_C = \rho$ if $C = 0$. ICC adoption ($C = 1$) shifts this distribution toward fewer incidents in the sense of first-order stochastic dominance, as specified above, so that expected output is weakly higher for a given $(F, M)$ when the ICC is in place.

The expected cost to the firm will now contains a certain component which is the wage bill and an uncertain component which is the risk of a fine in the case of non-compliance. Thus, we can rewrite the expected cost of the firm as follows:

$$\begin{aligned} \text{ExpCost} = & \underbrace{\left(1 - P(\phi = 0 \,;\, F, M, C \,;\, \rho)\right) \cdot R}_{\substack{\text{(Chance of any harassment)} \\ \times\text{(Reporting Probability)}}} \cdot \left( \begin{array}{c} \overbrace{\Delta \cdot (1 - C) \cdot \mathbf{1}\{F + M \geq \Psi\}}^{\substack{\text{Pay } \Delta \text{ fine if:} \\ (1)\ C{=}0\text{, no ICC} \\ (2)\ F{+}M{\geq}\Psi\text{, above size requirement}}} \\ + \ \underbrace{\Phi \cdot E\left(\phi \mid F, M, C \,;\, \rho\right) \cdot F \cdot C}_{\substack{\text{Pay } \Phi \text{ expected harassment-reporting cost} \\ (1)\text{ per } E\left(\phi | F,M,C;\rho^{h,c}\right) \cdot F\text{, expected case} \\ (2)\text{ if } C{=}1\text{, has ICC}}} \end{array} \right) \\ & + \ \underbrace{C \cdot \Theta + F \cdot w_F + M \cdot w_M}_{\text{harassment-realization invariant costs}} \end{aligned} \tag{17}$$

Combining the terms in (16) and (17), we can rewrite the firm's optimization problem in

the post-POSH scenario as follows:

$$\max_{F\in\mathbb{R}_+, M\in\mathbb{R}_+, C\in\{0,1\}} \left( \begin{array}{c} (P(\phi=0\,;\,F,M,C\,;\,\rho)\cdot g_i(F,M)+ \\ (1-P(\phi=0\,;\,F,M,C\,;\,\rho))\cdot \left( \begin{array}{c} \int_0^1 g_i(\hat{F},M)\cdot f(\phi\,;\,F,M,C\,;\,\rho)\,d\phi \\ -R\cdot \left( \begin{array}{c} \Delta\cdot(1-C)\cdot \mathbf{1}\{F+M\geq\Psi\}x' \\ +\Phi\cdot E\left(\phi\mid F,M,C\,;\,\rho\right)\cdot F\cdot \end{array} \right) \end{array} \right) \\ -(C\cdot\Theta+F\cdot w_F+M\cdot w_M) \end{array} \right) \tag{18}$$

This problem generates four margins of adjustment:

- *Governance (compliance):* the firm pays $\Theta$, eliminates the fine risk, and benefits from lower $\rho$. This raises effective female productivity and can increase female employment. Compliance is more attractive when the firm has high baseline female share (large gains from risk reduction), low $\sigma$ (substitution away from women is costly), and high $\gamma$ (larger scale over which to amortize the fixed cost).
- *Avoidance via composition:* a non-compliant firm reduces $F$ to lower both expected harassment and expected fine exposure. This margin is more attractive when $\sigma$ is high (cheap to substitute) and $\alpha$ is low (women are a small input share).
- *Avoidance via downsizing:* a firm near the threshold reduces total employment below $\Psi$ to escape regulation. This generates bunching just below the 10-worker cutoff, a classic response to size-contingent regulation (Garicano *et al.*, 2016).
- *Inaction:* firms at corner solutions (all-male, all-female, or unregulated) do not adjust.

**Comparative statics:** Figure A.8 illustrates the post-POSH response, fixing $\lambda = 0.28$ and varying TFP at two elasticity levels ($\sigma = 0.5$ and $\sigma = 5.5$). Low-TFP firms, typically small and highly sensitive to fixed compliance costs, contract in both size and female share. At higher TFP, the contraction attenuates and can reverse: sufficiently productive firms expand firm size as governance raises effective female productivity. Low-$\sigma$ firms increase their female share because they cannot easily replace women, while high-$\sigma$ firms reduce female share sharply. The core prediction is that the same policy can simultaneously increase female employment in firms for whom women are productive and hard to replace, and decrease it in firms for whom women are easily substitutable, rationalizing the sign reversal in treatment effects that we document empirically.

# 5 Reduced Form Evidence: Impacts of Sexual Harassment Legislation

India provides a good natural laboratory for our analysis given that it has low rates of female labor force participation (overall, and in manufacturing), high rates of sexual harassment, and considerable baseline variation across firms in gender composition.

## 5.1 Data for empirical analysis

**ASI panel, 2009-2016:** Our main empirical analysis uses the ASI panel described in Section 3.2.1, now spanning the full 2009-2016 period to capture both pre- and post-POSH outcomes. The ASI is a balanced panel for establishments with at least 100 employees but an unbalanced panel for smaller establishments, which are typically surveyed once every two to three years.[28]

**Coverage and representativeness:** The ASI captures only a subset of unregistered manufacturing enterprises. Figure B.1, panel (a), shows that about 30% of firms in the ASI have fewer than 10 permanent employees, compared with 93% of all manufacturing enterprises in the Economic Census (2013). This is because registration under the Factories Act is required only for firms with at least 10 employees (with power) or 20 employees (without power). The unregulated firms observed in the ASI are therefore likely more upwardly mobile, and hence closer to regulated firms around the cutoff, than the broader population of unregulated enterprises.[29] Using the ASI data we are likely to obtain conservative estimates of the policy's impact: the unregulated firms in our sample are probably closer to regulated firms than the broader population of unregulated enterprises, attenuating the estimated treatment-control contrast.

**Treatment assignment:** We use total permanent employees (workers + supervisors + other staff) of the establishment, in the latest year for which it is observed during 2009-12, to

[28] Panel identifiers for 1998-2009 are publicly available, while identifiers for 2010–2019 were obtained from the Ministry of Statistics and Programme Implementation. District identifiers are available only for 1998-2009. Establishments employing more than 100 workers, as well as all establishments located in the six least-developed states, are surveyed every year; establishments with fewer than 100 workers are sampled annually using stratified sampling.

[29] ASI includes some unregistered firms for two reasons. First, firms that were once registered but subsequently fell below the employment cutoff may remain on the roster if they do not formally deregister (Chatterjee & Kanbur, 2015; Bedi & Banerjee, 2007). Second, discussions with officials suggest that some establishments voluntarily register under the Factories Act even when not legally required to do so. Table B.2 shows summary statistics for the entire ASI data.

determine its pre-POSH firm size. Firms with at least 10 permanent employees are classified as *regulated*; those with 1-9 as *unregulated*. Using pre-period size avoids contamination by post-policy employment responses, thus our estimates reflect Intent-to-Treat (ITT) effects.[30]

**Sample and outcomes:** For our main analyses, we use establishments with pre-POSH firm size between 1-25, ensuring greater comparability between treated and control establishments. The primary outcomes are female worker share, number of female workers, number of male workers, and an indicator for employing at least one female worker. We also examine mandays, wages, contract worker shares, and output and profit per worker as secondary outcomes.

**Sample period:** While more recent ASI data are available through 2022, we restrict the main analysis to 2009-2016 because the Maternity Benefits Amendment Act (MBAA) of 2017 required firms with at least 10 employees to provide six months of fully paid maternity leave, confounding the POSH treatment at the same threshold.

**Summary statistics:** Table 1 shows summary statistics by regulation status, measured in the latest pre-period year. The share of female workers is slightly higher in regulated (10.9%) than unregulated (10.1%) firms. Total male and female manufacturing workers average 4.4 and 11.2 in unregulated and regulated firms, respectively. Average permanent employees are 6 and 16. Real wage rates, profits, and output per employee are slightly higher in regulated firms. The gender wage gap (female-to-male wage ratio) is similar across groups.

**Supplementary data sources:** We supplement the ASI panel with two additional datasets. First, to address the ASI's limited coverage of unregistered establishments, we pool ASI with the NSSO's Unincorporated Non-Agricultural Enterprise Surveys (UNES), which cover the largely informal, unregistered sector in repeated cross-sections (Section B.2). Second, we use nationally representative individual-level data from the NSS Employment-Unemployment rounds to triangulate the results at the individual-worker level and verify the results also hold true there (Section B.3).

[30]Under the POSH Act, employer responsibility for complaints involving contract workers (hired via vendors) is often ambiguous and can vary by firm policy; some firms place responsibility on the contracting agency. For example, SBI's POSH policy states that incidents involving third-party contract workers against other contract workers are not covered (Report). Legal discussions also note that firms often exclude contract workers from the '10-worker' threshold. Accordingly, we define eligibility using total permanent employees (excluding contract workers), as this measure is less susceptible to manipulation.

## 5.2 Empirical strategy

We implement a difference-in-differences design that compares outcomes for firms having 10–25 permanent employees in the pre-period (*regulated*) to firms with fewer than 10 permanent employees (*unregulated*), before and after the implementation of the POSH Act, using the below specification:[31]

$$Y_{ist} = \pi_1\big(Regulated\ Firm_i \times Post_t\big) + \delta_i + \delta_{st} + \epsilon_{ist}. \tag{19}$$

where $Y_{ist} \in$ {female worker share, number of female workers, number of male workers, any female worker} are outcomes for firm $i$ in state $s$ and year $t$. The extensive-margin indicator equals one if the establishment employs at least one female worker. $Regulated\ Firm_i$ equals one if the firm has 10–25 permanent employees in the pre-period and zero otherwise. $Post_t$ equals one for years 2013 onward and zero otherwise. The coefficient $\pi_1$ captures the differential change in outcomes for regulated relative to unregulated firms. We include establishment fixed effects ($\delta_i$) to control for unobserved heterogeneity at the establishment level and state-by-year fixed effects ($\delta_{st}$) to absorb time-varying state-level shocks and policies (district identifiers are not available in the ASI).[32] Standard errors are clustered at the firm level.

Our identification strategy requires that, absent the POSH Act, outcomes in regulated and unregulated firms would have followed parallel trends. We assess this using an event-study specification:

$$Y_{ist} = \sum_{\tau=-3,\ \tau\neq 0}^{4} \pi_\tau\big(Regulated\ Firm_i \times Year_\tau\big) + \delta_i + \delta_{st} + \epsilon_{ist}, \tag{20}$$

where $Year_\tau$ indexes event time relative to the baseline year 2012 ($\tau = 0$). Coefficients $\pi_\tau$ trace dynamic effects and allow a direct test of pre-trends. We use 2012 as the baseline because

[31] Given the size threshold at 10, an RDD may appear attractive. However, several concerns make RDD less suitable here: (i) other regulations (e.g., the Factories Act) also bind at 10; (ii) regulated and unregulated firms differ in baseline outcomes even within the 1–25 window (Table 1); and (iii) firms have incentives to manipulate employment post-POSH, violating the no-manipulation assumption. Using pre-POSH data, the McCrary test shows no statistically significant discontinuity at 10, though the p-value is 0.2 (Appendix Figure B.4). However, strategic adjustment after POSH remains plausible. Nonetheless, as an additional check, we estimate a difference-in-discontinuity specification, which controls for firm-level unobservables while exploiting changes in outcomes around the cutoff and find similar results as our main specification (discussed later).

[32] During this time period, states were adjusting the firm size thresholds for applicability of the Factories Act (1948) and Industrial Disputes Act (IDA), and hence the second specification which accounts for effects due to state specific policy changes over time is our preferred one. Chakraborty & Mahajan (2025) discusses the details of these changes. Some states also amended the night shift rules, allowing women to work in these shifts. These could have affected female employment through other channels. Including state-by-year fixed effects allows one to control for the effects of other legislative changes at the state level on female employment.

ASI records financial-year outcomes (April–March); the 2012 round spans April 2012–March 2013, and since the Act was passed in February 2013, we do not expect measurable effects on female employment for that financial year.

## 5.3 Female employment share

Table 2 reports the DiD estimates from Equation 19. Our preferred specification, which includes establishment, year, and state × year fixed effects, shows that the POSH Act reduced the share of female workers in regulated relative to unregulated establishments by 0.43 percentage points (column 2), or 4.6% of the pre-POSH mean of 9.38. We find no significant change in the number of female workers, but a significant increase in the number of male workers (columns 4 and 6), implying that the decline in female share was driven by faster growth in male employment rather than by female exits. Consistent with this, the effect on the probability of employing any female worker is close to zero and insignificant (column 8), indicating that the adjustment operates on the intensive rather than extensive margin.

Figure 11 presents the event-study estimates for the baseline specification. Female employment shares in regulated and unregulated establishments follow similar pre-trends, but diverge after 2013, with regulated firms experiencing a decline in female share through 2015 and a slight recovery in 2016. There is no evidence of differential pre-trends in female or male employment levels, but male employment rises after the Act in regulated firms. we find similar results for female mandays (Table B.12, Figure B.13). Together, these results suggest that the decline in female share reflects slower hiring of women relative to men as regulated establishments expand, rather than greater firing or quitting by women.

Table 4 shows substantial heterogeneity by baseline female share. This heterogeneity is economically central: it isolates settings in which employing women is either marginal (male-intensive firms) or core to production (female-intensive firms), and therefore changes the relative return to compliance versus avoidance. Among establishments with female share below 20%, regulation reduces the female share by 0.43 percentage points (Panel A), a large proportional decline relative to a mean of about 1%. In contrast, among establishments with female share of at least 20%, regulation increases the female share by about 2 percentage points (Panel B). This pattern suggests that firms in which women are already an important input respond differently to regulation, a distinction we exploit in the policy calibration.[33]

[33] A 20% female share represents the 75th percentile of baseline female share; we also find similar patterns with other cuts (30%, 40%, 50%). A positive DiD estimate for female share is mathematically consistent with a negative DiD estimate for female workers and a zero or imprecise DiD estimate for male workers. The female-share coefficient captures the relative change in workforce composition in treated versus control firms, not absolute female employment growth. For example, even if treated firms lose more female workers than

**Robustness:** Our findings are robust to a wide range of alternative specifications and samples. First, the decline in the female share remains negative across alternative bandwidths around the size cutoff, though precision falls in very narrow windows, consistent with firms just below the threshold partially adjusting to avoid regulation (Figure 12). Second, estimates become slightly larger in donut specifications that exclude firms close to the cutoff, suggesting that strategic sorting and treatment misclassification near the threshold, if anything, attenuate the baseline estimates (Table 3, Figure B.2). Specifically, near-threshold untreated firms partially "shadow" treated-firm behavior, plausibly because small expansions could bring them under the Act (Figure B.3). Third, a fractional probit yields a similar decline in the female share (columns (4)–(5) of Table 3) showing that the result is not driven by the linear specification choice, while specifications that exclude states with contemporaneous labor-policy changes also remain close to the baseline (Table B.3). Fourth, extending the sample through 2018–19 shows a continued decline in female share, despite potential confounding from the Maternity Benefit (Amendment) Act, 2017 (Figure B.5). Fifth, placebo thresholds (Figure B.10) and explicit spillover tests for possible violation of SUTVA show no evidence that the results are driven by spurious threshold effects or reallocation of women from regulated to unregulated firms (Table B.5). Sixth, since the ASI firm-level data have incomplete coverage of unregulated firms, we merge in data from an independently gathered survey of all unregulated firms. We show that estimates on this augmented data file are larger and more precise than on the base data. Finally, we run the entire analysis using individual survey data rather than firm level data. Again, the aggregate decline in female share is larger in magnitude and more robust.[34]

Taken together, these checks support our interpretation that the main estimates reflect a real change in female employment composition around POSH applicability rather than specification choice or sample construction. The details of these tests are discussed in Appendix Section B.1.

## 5.4 Firm size

We examine whether establishments strategically adjust firm size to avoid POSH regulation. First, we test for differential changes in permanent employment in regulated versus unregulated establishments and find no statistically significant effect (Appendix Table B.6, column 1).

controls, female share can still rise relative to controls if male employment contracts by a similar amount and the treated group's composition becomes relatively more female. Thus, the positive share estimate should be interpreted as a compositional effect rather than an increase in female employment levels.

[34]We also estimate difference-in-discontinuity estimates using size 10 as the cutoff and bandwidth 1-25, and find similar results (Table B.4). But as discussed earlier, this is not a preferred strategy due to possible size manipulation by firms post-POSH.

Second, it is possible that while on average regulated and unregulated firms exhibit similar changes in firm size, there is a shift in the overall distribution with an increase in density just before 10. Within our main DiD sample (pre-POSH size 1–25), we compare pre- (2009–12) and post-POSH (2013–16) firm-size densities (Appendix Figure B.6) and observe a modest increase in mass just below 10 in the post period.

Third, using the full ASI sample to examine the entire size distribution, Appendix Figure B.7 shows that the post-POSH distribution (2013–16) shifts slightly leftward around the cutoff (both log–log and linear scales) when compared to pre-POSH distribution (2009-2012). Finally, Appendix Figure B.8 plots estimates of changes in the size-density distribution relative to 2012. The pre-POSH comparison (2012 vs. 2009) shows no notable change around 10 (panel a), whereas the post-POSH comparison (2016 vs. 2012) shows a decline in density at and just above 10 alongside continued positive changes below 10 (panel b). Overall, while ASI covers only registered manufacturing establishments, these patterns provide suggestive evidence of avoidance behavior: POSH appears to reduce the probability of observing firms at sizes at or just above the regulatory threshold.

## 5.5 Mechansims: insights from heterogeneity in policy effects

The model delivers two direct heterogeneity predictions and some additional reduced-form implications, which we now examine.

First, if the fixed cost of compliance is large relative to firm surplus, responses should be stronger among smaller, less productive, and less profitable firms; consistent with this compliance-cost channel, we find little response among larger regulated firms (Figure 14), but substantially larger declines in female share among firms with lower baseline profits and especially lower labor productivity (Figure 15; Table B.9).

Second, if firms can more easily substitute men for women, or if women are less central to production, the decline should be concentrated where baseline female intensity is low; consistent with this, the decline is concentrated in firms with baseline female share below 20% (Figure 15; Figure B.11), in low-female share occupations (Figures C.5-C.6), and in sectors with lower baseline female intensity (Table C.8; Figure C.7).

We then examine additional proxies that are suggestive of the model's broader environment. If the baseline harassment environment or reporting risk is higher, the effective cost of employing women may rise more after POSH. Consistent with this, the individual data show larger declines in high-crime states and for younger women[35], though education gradients are

[35]For example, Dam & Sitniski (2025) finds through a survey in India of women working in corporate that women with 2–5 years of work experience were 14 pp more likely to face harassment than recent joiners or women with 5+ years of experience.

imprecise and firm-level crime heterogeneity is weak (Figures 15-C.5). Likewise, if enforcement frictions raise the effective burden of compliance, responses may be stronger in more corrupt settings; this pattern appears weakly in the individual data but not cleanly in firm-level female-share estimates (Figures 15-C.5).

Finally, if substituting toward men is easier where male labor is more readily available, effects should be larger in slack male labor markets; we find somewhat larger declines in districts with higher overall and male unemployment in both datasets (Figures 15-C.5). By contrast, the model gives no sharp prediction for social norms. On one hand these conservative gender norms can increase the risk of SH but can also decrease the probability of SH reporting. Empirically we find no meaningful heterogeneity along this margin. Overall, the heterogeneity results point most strongly to compliance costs and the ease with which firms can substitute away from women, while the patterns by crime, age, corruption, and local unemployment can be interpreted as reduced-form proxies for the harassment environment, enforcement frictions, and the effective ease of substitution rather than as direct tests of model predictions.

## 5.6 Other margins of adjustment exhibited by firms

The model implies that POSH can affect firms not only through female employment shares, but also through profitability and other margins of adjustment. In the model, regulated firms face a fixed compliance cost and an expected non-compliance burden; depending on whether they comply or instead substitute away from women, profits may fall while productivity effects remain ambiguous. Consistent with this, wage cost per worker rises, output per worker changes little, and profit per worker falls (Appendix Table B.11), suggesting that higher labor and compliance costs dominate any productivity gains from safer workplaces on average.

The model does not explicitly include an intensive labor margin or a permanent-versus-contract choice, but both are natural reduced-form adjustment channels if firms seek to expand while limiting regular headcount or compliance exposure. In line with this, regulated firms increase mandays per worker and shift toward contract labor after POSH (Tables B.12 and B.6; Figure B.14).

Although wages are taken as given in the baseline model, if POSH increases the relative demand for male workers in regulated firms, the immediate implication is a decline in female employment share. In an equilibrium setting with upward-sloping male labor supply, this substitution would also raise male wages. The observed rise in male wages (Appendix Table B.10; Appendix Figure B.12) is consistent with an equilibrium extension in which POSH increases the relative demand for male labor in regulated firms. However, a decline in relative demand for women after POSH need not imply lower observed female wages. Firms

may adjust primarily through hiring rather than wages, especially if incumbent wages are downward rigid. In addition, the female-wage estimates are identified only among firms that continue to employ women in both periods, so the observed average wage may reflect positive selection of surviving female jobs.

Lastly, while our firm-level results identify changes in women's relative employment in regulated firms, but these do not capture the effect on overall female employment i.e., whether affected women leave non-farm work or reallocate to other forms of employment like self-employment from wage-employment. To capture this, we use district-level variation in exposure to regulated firms. Appendix Table C.9 shows no decline in overall female non-farm employment, but a 1.7 percentage point fall in female non-farm wage employment offset by a roughly similar rise in female self-employment in regions having more regulated firms. We interpret this as broader labor-market adjustment consistent with displacement from regulated wage jobs into fallback self-employment, rather than as evidence of a decline in women's overall non-farm employment.

# 6 Policy Calibration

The reduced-form evidence establishes two facts: the POSH Act reduced female employment share on average among regulated firms, but this average conceals a sign reversal: firms with higher baseline female shares *increased* female employment, while those with lower baseline shares decreased it. This section uses the structural model to better understand these facts and the policy mechanisms that rationalize them. We calibrate the calibrated economy from pre-POSH data to the reduced-form moments to study consequences of the policy that the reduced-form estimates cannot identify: implied compliance, implied changes in harassment incidence, the composition of adjustment margins, and the distortions that remain after policy.

**Policy parameters.** The post-policy environment is governed by three objects:

- $\Theta$: the fixed cost of policy implementation (ICC or board setup, training, external member, documentation), normalized by the annual male wage.
- $\Delta$: the expected non-compliance burden (statutory fines, court damages, reputational costs), normalized by the annual male wage.
- $\rho(\text{board}) \equiv (1-\kappa)\rho$: harassment risk under compliance, where $\kappa \in [0, 1]$ measures the proportional risk reduction from a functioning ICC.

The economic distinction is between external (state) enforcement which raises the expected cost of remaining unprotected on the regulated margin, and internal (employer) governance which lowers harassment risk and raises the return to employing women.

## 6.1 Why average effects are insufficient

Consider first a benchmark with no governance effect ($\rho(\text{board}) = \rho$). POSH is then a pure compliance cost imposed on regulated firms. Only the regulated mixed-gender (RMG) subset of firms with $n \geq 10$ and $0 < f < n$ has a meaningful response margin. A back-of-the-envelope rescaling shows the implied adjustment:

$$\widehat{\text{DiD}}^{\text{RMG}} \approx \frac{\widehat{\text{DiD}}^{\text{overall}}}{\Pr(\text{RMG} \mid \text{regulated})}. \tag{21}$$

In this benchmark, a downward-sloping locus of $(\Delta, \Theta)$ pairs shown in Figure 4 can match the average negative DiD, but it cannot explain the positive response among female-intensive firms. If compliance does not improve workplace safety, compliant firms have no reason to expand female employment. The sign reversal requires $\rho(\text{board}) < \rho$, which is also the primary objective of the policy: to reduce harassment risk. Figure 4 shows a negative relationship between fine cost and board cost. If board costs reduce, it induces higher adoption, which allows more firms to maintain their pre-policy composition. Consequently, the fine costs must be higher in order to induce more non-compliant firms to reduce female share, and match the overall DiD figure.

## 6.2 Identification from heterogeneous effects

We split firms at a baseline female share of 20% (≈75th percentile) and target two moments:

$$\widehat{\text{DiD}}^{\geq 20} \qquad \text{and} \qquad \widehat{\text{DiD}}^{<20}.$$

The *negative* response among male-intensive firms (<20%) is informative about enforcement: conditional on $(\Theta, \rho(\text{board}))$, these firms respond to $\Delta$ by cutting female employment or downsizing. The *positive* response among female-intensive firms (≥20%) is informative about governance: conditional on $(\Theta, \Delta)$, these firms expand female employment only if ICC adoption sufficiently reduces harassment risk. Male-intensive firms identify the deterrence margin and female-intensive firms identify the safety margin.

We treat $(\Theta, \Delta, \rho(\text{board}))$ as set-identified. Define

$$d(\Theta, \Delta, \rho(\text{board})) \equiv \left\| \widehat{\mathbf{m}} - \mathbf{m}(\Theta, \Delta, \rho(\text{board})) \right\|_2, \tag{22}$$

where $\widehat{\mathbf{m}} = (\widehat{\text{DiD}}^{\geq 20}, \widehat{\text{DiD}}^{<20})'$ and $\mathbf{m}(\cdot)$ are model-implied moments. The identified set at tolerance $\tau$ collects all tuples with $d \leq \tau$. We evaluate them on a fine grid and retain the tuples that minimize (22) or fall within a small tolerance band.

## 6.3 Main calibration results

**Identified ranges.** Figure 5 displays the identified set. The implied ranges are:

$$\Theta \in [0.21,\ 0.39], \quad \Delta \in [1.92,\ 2.49], \quad \rho(\text{board}) \in [0.006,\ 0.13], \tag{23}$$

against a baseline $\rho = 0.29$. Three features stand out.

First, compliance costs are economically meaningful, falling between one-fifth and two-fifths of the annual male wage. For a firm near the 10-worker threshold paying a male worker approximately INR 100,000 per year, this translates to INR 21,000-39,000 in ICC-related fixed costs, a non-trivial burden for small establishments.

Second, the expected non-compliance burden is large: 1.9-2.5 times annual male wages. This is consistent with court evidence on POSH-related damages in India, where compensatory awards have reached INR 2.5-16.8 million in publicly documented cases.

Third, and most importantly, compliance must reduce harassment risk by at least half to rationalize the positive employment response among female-intensive firms. The ratio $\rho(\text{board})/\rho$ ranges from 0.02 to 0.45 across the identified set. This is a strong implication that for the policy to generate the observed pattern, ICC adoption must substantially change the workplace environment.

**Compliance along the identified set.** Figure A.9 shows that equilibrium ICC adoption falls monotonically with $\Theta$. In the benchmark tuple, adoption is approximately 14% among regulated mixed-gender firms with baseline female share below 20%, and 71% among those above 20%. This five-fold differential reflects the interaction between production primitives and the compliance decision: female-intensive firms have more to gain from reduced harassment risk because women are a larger share of their labor input and harder to replace.

Enforcement and governance are substitutes in matching the same average employment moment: higher $\Delta$ with lower compliance shifts firms toward avoidance, while lower $\Theta$ shifts them toward governance. This matches the pattern observed in the analysis in 6.1 where we

did not allow for reductions in $\rho$(board).

## 6.4 Harassment outcomes and mechanisms

The reduced-form targets are changes in female employment, but the calibrated model decomposes these into two economically distinct mechanisms.

Under *governance*, a firm adopts the ICC, harassment risk falls from $\rho$ to $\rho$(board), and the workplace becomes safer. The productivity gain raises the return to employing women, and female employment rises alongside reduced harassment. This is the channel through which compliance fulfills the law's intended purpose.

Under *avoidance*, a non-compliant firm reduces its expected fine exposure by employing fewer women or by staying below the threshold. Expected harassment cases fall, but only because there are fewer women in the workplace, not because the workplace is safer. For the women who remain, individual risk may actually rise as they become more isolated in increasingly male-dominated establishments.

Figure 6 makes this decomposition concrete. Among female-intensive firms, the decline in expected harassment exposure is accompanied by higher female employment, consistent with the governance channel. Among male-intensive firms, part of the decline in expected exposure is mechanical, driven by reduced female headcount rather than reduced risk. To quantify: in one of the tuples, compliers among female-intensive firms ($\geq 20\%$ baseline female share) see expected individual harassment risk fall from a pre-policy mean of approximately $P^i \approx 0.22$ to $P^i \approx 0.04$–$0.10$ (a decline of 55-82%), while their female employment share rises by roughly 8-12 percentage points. In contrast, among male-intensive non-compliers ($< 20\%$ baseline female share), female share falls by 2-5 percentage points, reducing expected firm-level harassment cases by 10-20% purely through the composition channel. Individual risk for remaining women, however, rises by approximately 3-8% as the workplace becomes even more male-dominated.

Figure 7 shows the distributional implications for a given parameter tuple.[36] Compliers exhibit a broad leftward shift in harassment risk, reflecting the direct effect of $\rho$(board) $\ll \rho$. Non-compliers show no comparable improvement: some reduce expected cases only by shrinking $F$, and the women who remain face equal or higher individual risk. A decline in measured harassment exposure is therefore not, by itself, evidence of safer workplaces. The calibration exercise allows us to identify this distinction.

[36]The patterns are largely similar across all tuples, with minor differences. We choose one here to demonstrate the patterns.

## 6.5 Distortion analysis

We assess whether the POSH Act corrects or preserves the pre-existing distortions from harassment by comparing three allocations: $A$ (no POSH, calibrated to the pre-policy data), $B$ (calibrated POSH), and $C$ (no harassment, the first-best benchmark). For outcome $x$: pre-policy distortion is $x_C - x_A$, post-policy distortion is $x_C - x_B$, and distortion reduction is $x_B - x_A$.

**Firm taxonomy.** We classify firms by pre-policy gender composition and post-policy compliance:

- $F1$: no women under $A$. In the benchmark tuple, this is 77.1% of weighted firm mass.
- $F2$: all women (1.4%).
- $F3$: mixed-gender, unregulated (10.4%).
- $F4$: regulated mixed-gender (11.0%), decomposed as:
  - $F4A$: compliers, no pre-policy distortion (29.3% of $F4$).
  - $F4B$: non-compliers, no pre-policy distortion (7.4%).
  - $F4C$: compliers, positive pre-policy distortion (35.8%). These are the firms where the law works as intended.
  - $F4D$: non-compliers, positive pre-policy distortion (27.5%). These are the firms where the law's unintended consequences are concentrated.

The policy-relevant margin sits inside $F4$ which accounts for only 11% of weighted firm mass, but is the only set where the compliance decision actually matters.

**Selection into compliance is systematic.** Figure 8 classifies eligible firms by distortion status and compliance. Positive-distortion non-compliers ($F4D$) account for 55.5% of weighted eligible mass among the regulated mixed-gender firms; positive-distortion compliers ($F4C$) account for only 10.5%. Among positive-distortion firms, compliers have higher TFP and lower $\sigma$, consistent with compliance being more attractive when women are harder to replace and governance generates larger productivity gains. This selection is economically intuitive: the firms that benefit most from a safer workplace are the ones that invest in creating one.

**Heterogeneous distortion outcomes.** Figure 9 shows how the calibrated policy affects female share and firm size across categories. In the benchmark tuple, the pre-policy harassment distortion in female share ($x_C - x_A$) averages approximately 21 percentage points across all firms (from an observed mean of 10% under $A$ to 31% under $C$). The post-policy distortion ($x_C - x_B$) remains large in aggregate because the policy only operates on $F4$ firms (11% of mass). Within $F4C$ firms (compliers with positive pre-policy distortion), distortion reduction ($x_B - x_A$) in female share is approximately 8-12 percentage points, closing 40-55% of the gap toward the first-best. These firms also see firm size increase by roughly 0.5-1.0 workers on average. In contrast, $F4D$ firms (non-compliers with positive pre-policy distortion) see female share fall by 2-5 percentage points, *increasing* the distortion relative to the first-best. Losses concentrate in $F4D$ firms, which do not comply and preserve or intensify pre-existing distortions. The aggregate effect is modest because the policy doesn't affect most firms' decisions, and within the firms where it applies, the law simultaneously generates governance and avoidance.

**Threshold bunching persists.** Figure 10 shows that the calibrated policy slightly worsens bunching near the 10-worker cutoff. In the benchmark tuple, weighted mass at size 9 rises from 6.6% under $A$ to 8.5% under $B$, while mass at size 10 falls from 6.6% to 5.3%. Avoidance through downsizing remains active even after accounting for governance. The right panel confirms that reductions in expected harassment are concentrated among complier categories.

**The compliance-distortion frontier.** Figure A.10 brings together the within-tuple and across-tuple results. Among firms on the policy-relevant margin, compliers close 40-55% of the pre-policy female-share distortion and 25-40% of the firm-size distortion, while non-compliers on average widen the female-share distortion by 10-25% and show little change in firm size. Across the identified set, the median complier reduces expected harassment incidence by approximately 60-80%, while the median non-complier reduces it by only 10-20%, driven entirely by the composition channel.

## 6.6 Policy upshots

Our results demonstrate that, increasing compliance costs (what we have called "governance" for now) is a substitute for increasing the penalty for non-compliance in terms of how firms behave. However, the welfare implications are very different.

To be more precise, in the model, a given average change in female employment share can be generated either by (i) stronger enforcement (higher $\Delta$) with limited compliance, which induces firms to adjust on avoidance margins (segregation/downsizing), or by (ii) lower

compliance costs (lower $\Theta$) and effective governance (lower $\rho$(board)), which shifts adjustment toward productivity-driven inclusion. These regimes are observationally similar if one only tracks aggregate female shares, but they are not welfare-equivalent: the avoidance regime reduces exposure to SH largely by reducing women's employment, while the governance regime reduces exposure by lowering harassment risk conditional on employment and it additionally increases women's employment rates. A narrow focus on increasing penalties without easing implementation constraints (especially for small to medium sized firms) therefore risks pushing marginal non-compliers toward avoidance rather than toward productive compliance, amplifying workplace segregation even if measured SH exposure falls.

Because the calibrated $\Theta$ is sizable, a policymaker has an actionable margin: reduce fixed implementation costs through subsidising training or the appointment of the external committee member. Equally important is monitoring *functionality*: in the model, the gains from compliance depend on whether governance is effective in practice (whether $\rho$(board) actually falls). Policies that combine enforcement with implementation support and monitoring can shift firm responses away from avoidance and toward safer and more inclusive workplaces, consistent with the intended objective of sexual harassment regulation.

More broadly, the analysis illustrates a general principle for size-contingent workplace regulation: when compliance costs are fixed and firms are heterogeneous, focusing solely on enforcement generates perverse compositional responses among the firms least able to absorb the compliance burden. Complementing enforcement with implementation support shifts the equilibrium from one in which marginal firms avoid the regulation to one in which they invest in the governance infrastructure the regulation was designed to create. The tension between these margins, avoidance and governance, arises whenever a threshold-based mandate imposes fixed costs on heterogeneous firms that can adjust on multiple margins.

# 7 Conclusions

This paper provides the first attempt to integrate workplace sexual harassment into a model of firm decision making. It formalizes the notion that sexual harassment reduces productivity, a notion for which publications outside economics provide ample support. A key insight is that, by virtue of deciding how many men and women to hire, a firm influences the chances that sexual harassment occurs in its workplace.

We model the sexual harassment process, arguing that while individual risk increases monotonically in female worker share, firm level risk is bell-shaped in this share. Thus, firms that wish to avoid sexual harassment will pursue gender segregation. In aggregate, we estimate that sexual harassment reduces mean female employment share from a counterfactual

of 31% to the observed 10% (a 21 percentage point distortion), reduces average firm size by 6.6%, and lowers average profits by approximately 1%.

Exploiting the size-contingent nature of a policy in India that made firms responsible for preventing sexual harassment, we estimate an aggregate decline in female employment after the policy. However beneath the aggregate lies a telling heterogeneity. Firms with a relatively high share of women at baseline show a significant increase in female worker share, even as the majority of firms - those with a high baseline share of men- show a decrease.

We investigate this further using our model calibrated to the Indian firm data. Using the reduced form estimates as match targets, we estimate compliance rates of 65-75% among female-intensive firms and less than 2% among male intensive firms. Although we have no data on sexual harassment (or compliance), we use the calibrated model to estimate these effects. Among compliers with pre-policy distortions, female employment share rises by 8–12 percentage points and expected harassment risk falls by 55–98%. However, non-compliers, who constitute the majority, reduce female share by 2–5 percentage points to minimize the risk of being caught for non-compliance, leaving individual harassment risk unchanged or higher for remaining women.

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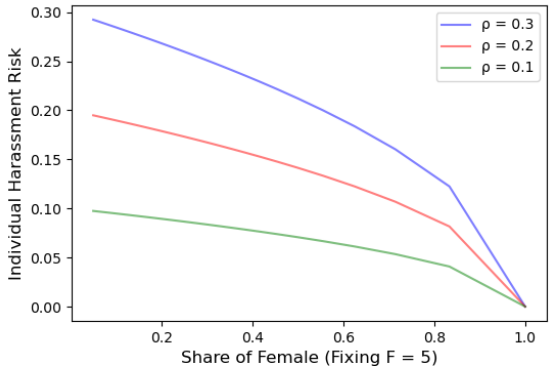
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Figure 1: SH risk parameters

(a) Individual harassment risk




(b) Firm-level harassment risk

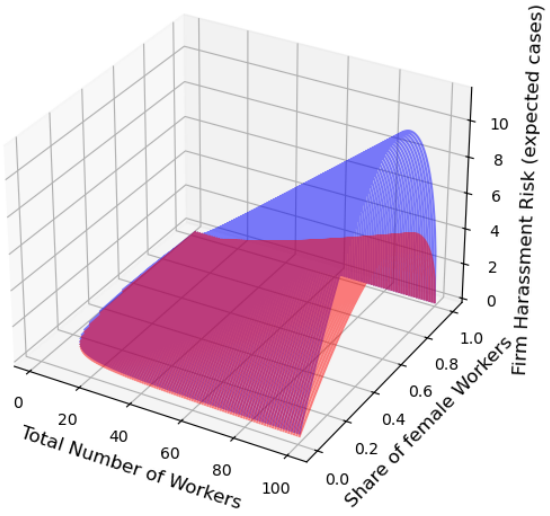
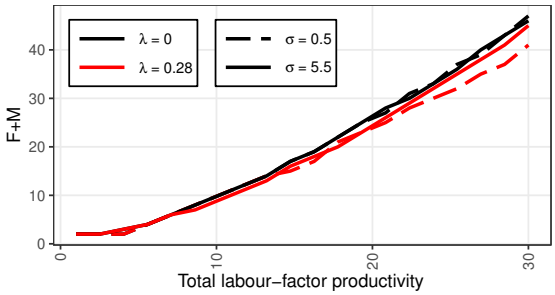
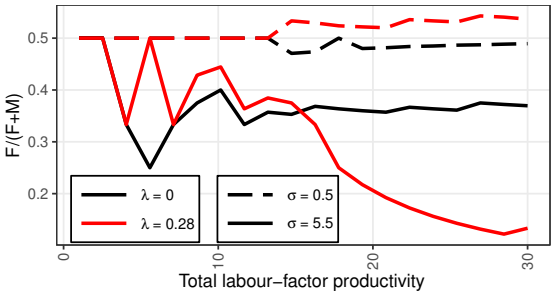


Figure 2: Firm behavior varying with TFP in response to SH

(a) Firm size




(b) Female share




(c) Female workers

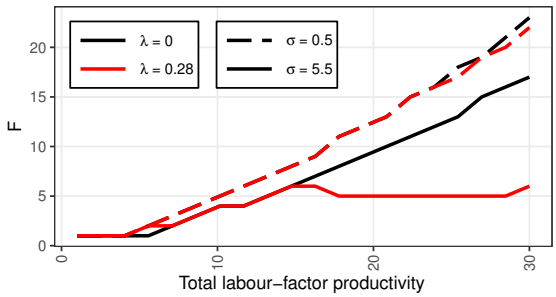
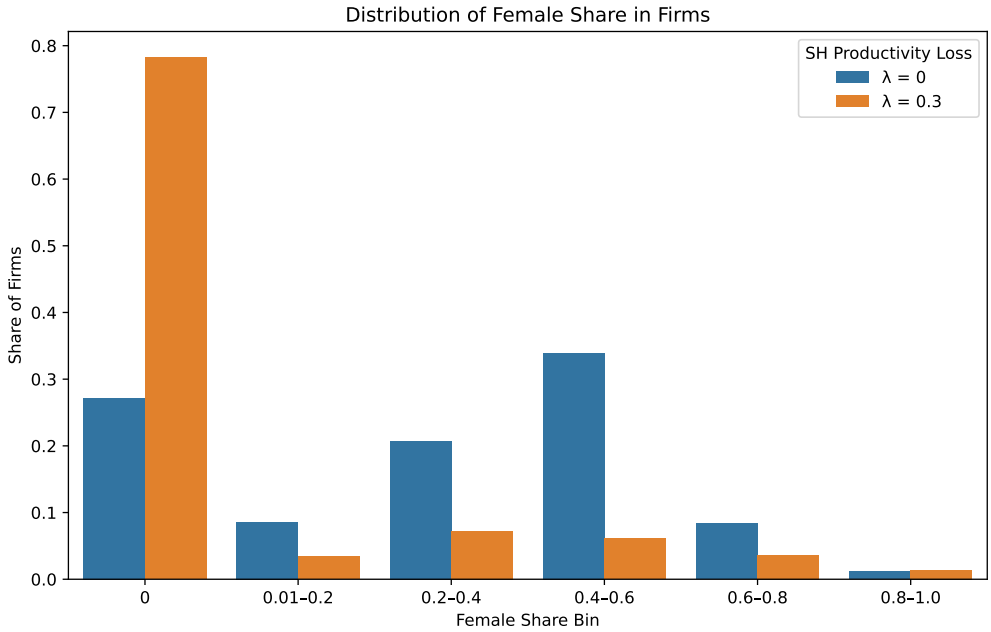


Figure 3: Effect of Harassment on Female Employment Share in a Firm

(a) Female Share Bins




(b) Female Share Distribution

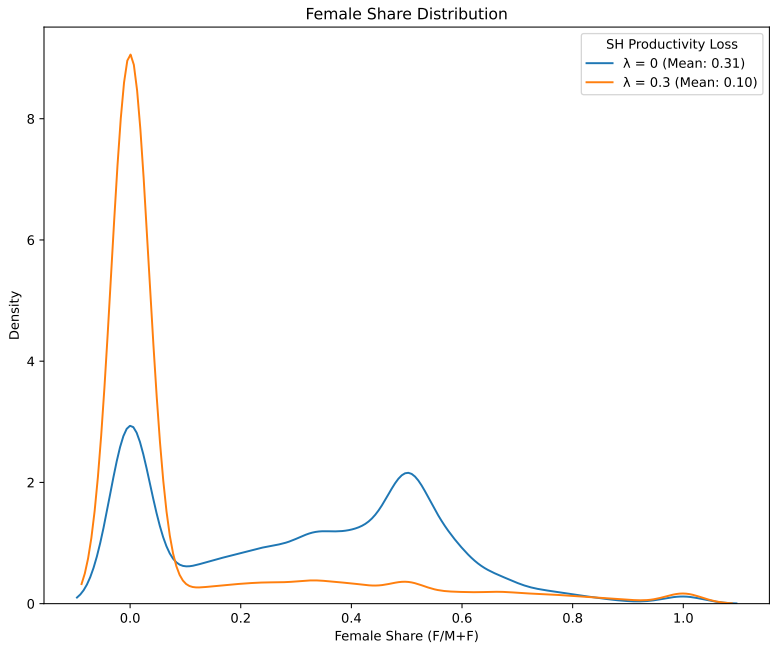


Figure 4: Calibrated parameters for overall DiD with no change in SH risk

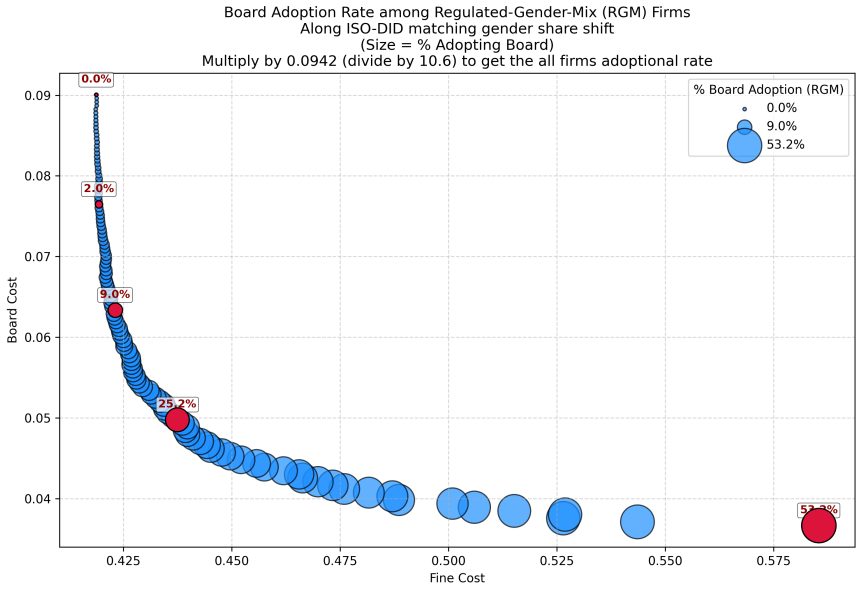



Figure 5: Calibrated parameters consistent with heterogeneous DiD moments (identified set summary)

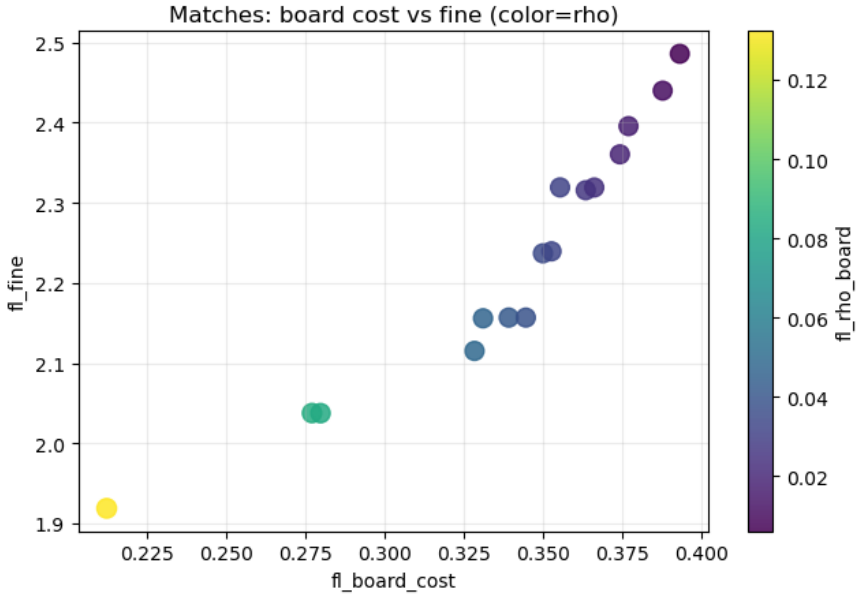


Figure 6: Changes in female share and expected harassment exposure by firm group and compliance status

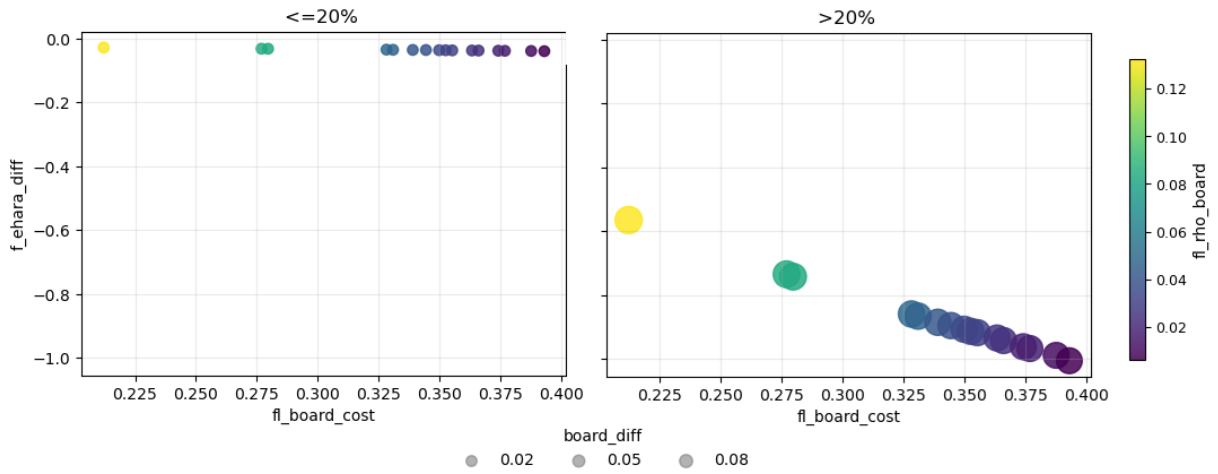



Figure 7: Distribution of changes in harassment risk by compliance status (one calibrated parameter triple)

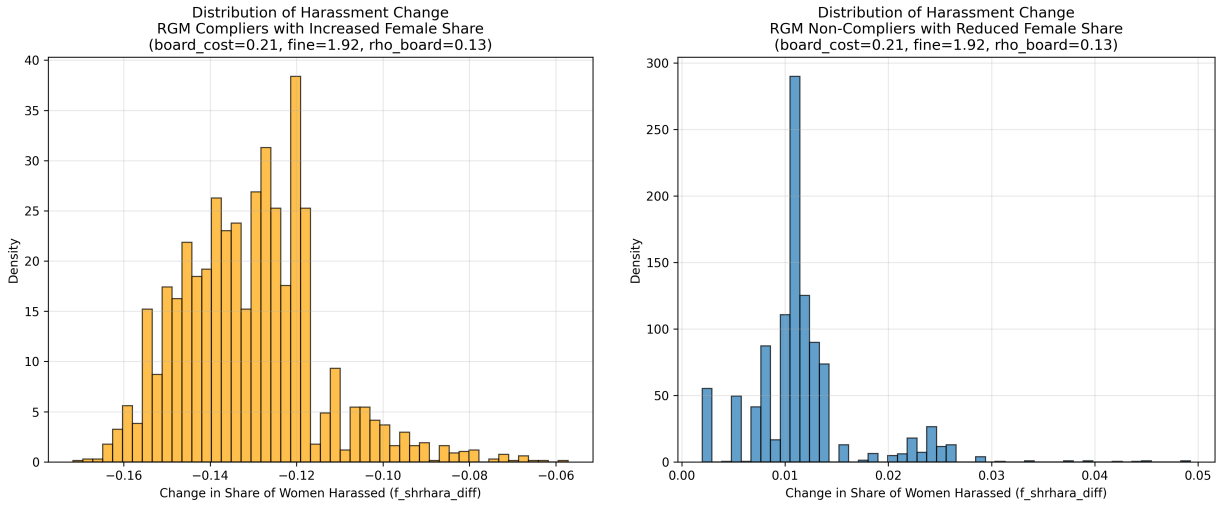


Figure 8: Firm characteristics by distortion-compliance alignment (one calibrated parameter triple)

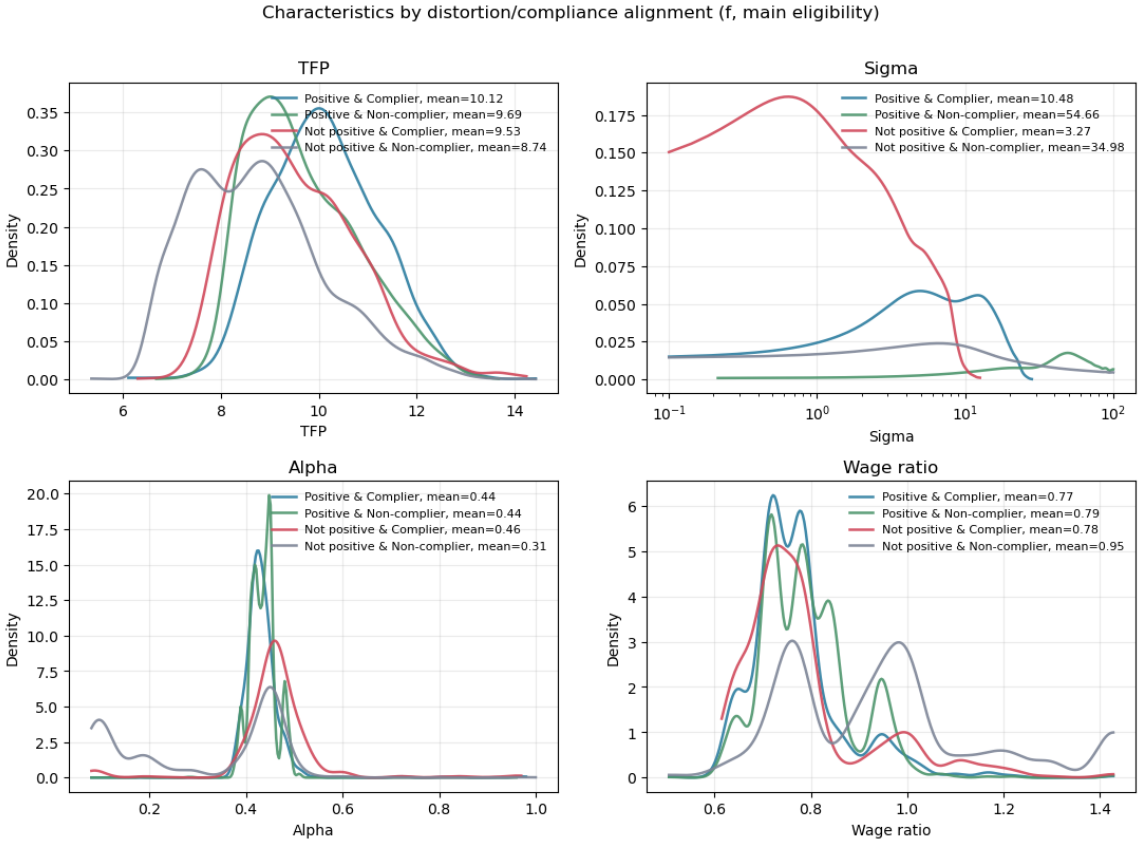
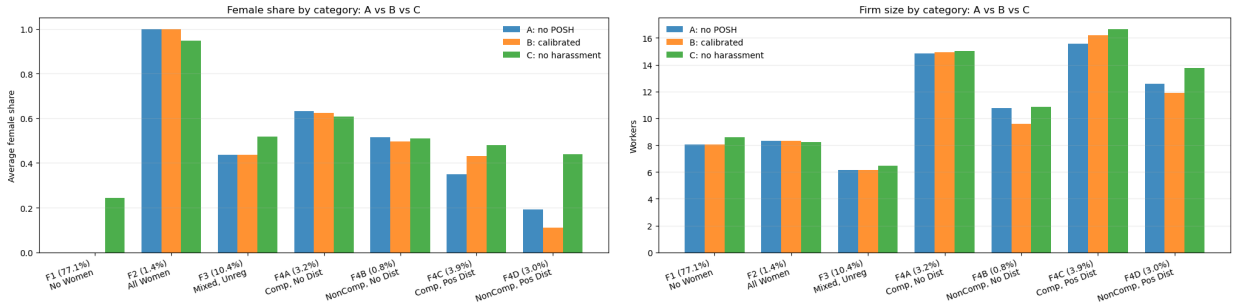


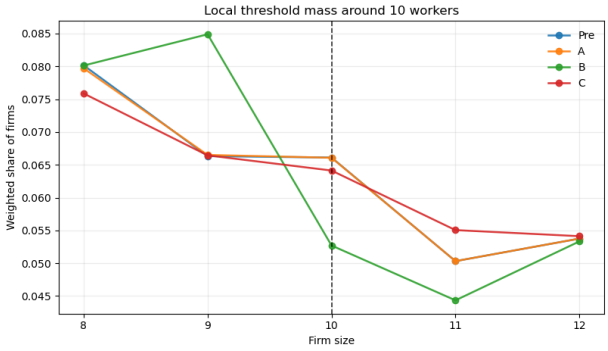

Figure 9: Outcomes under no POSH ($A$), calibrated POSH ($B$), and no harassment ($C$) (one calibrated parameter triple)



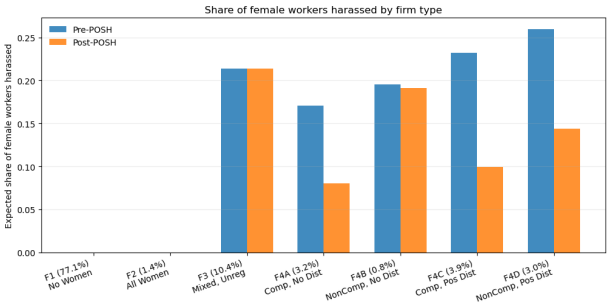

(a) Female share by category

(b) Firm size by category

Figure 10: Threshold bunching and harassment risk by category (one calibrated parameter triple)



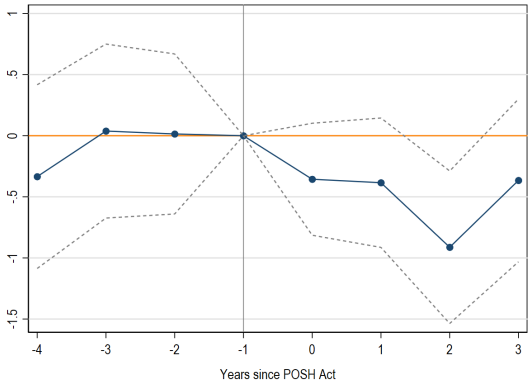

(a) Size distribution near threshold



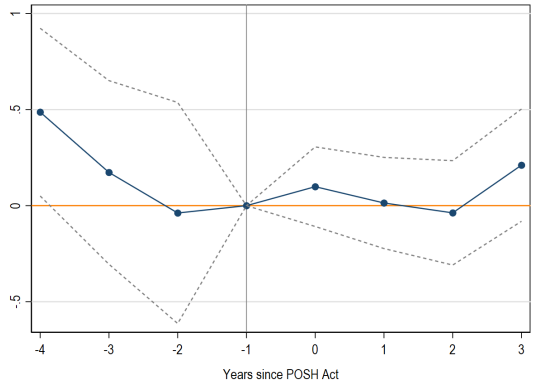

(b) Expected harassment by category

Figure 11: Impact of POSH Act on employment in manufacturing firms (Bandwidth of 1-25)

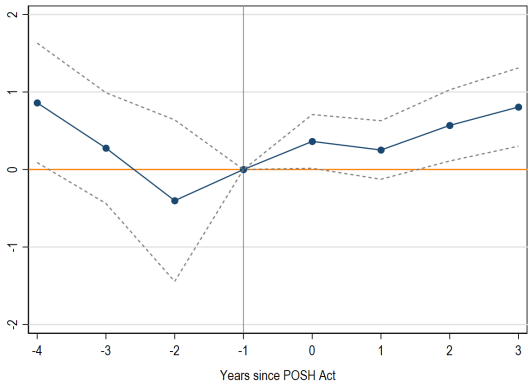
(a) Percent female workers



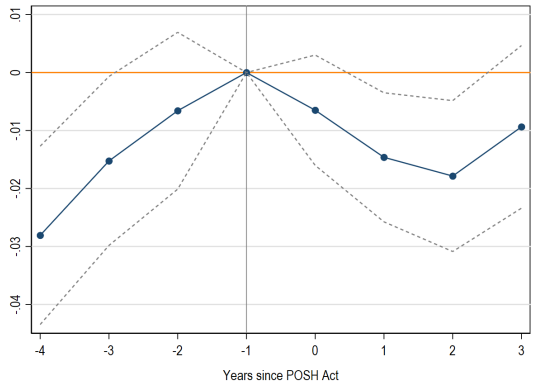

(b) Number of female workers




(c) Number of male workers



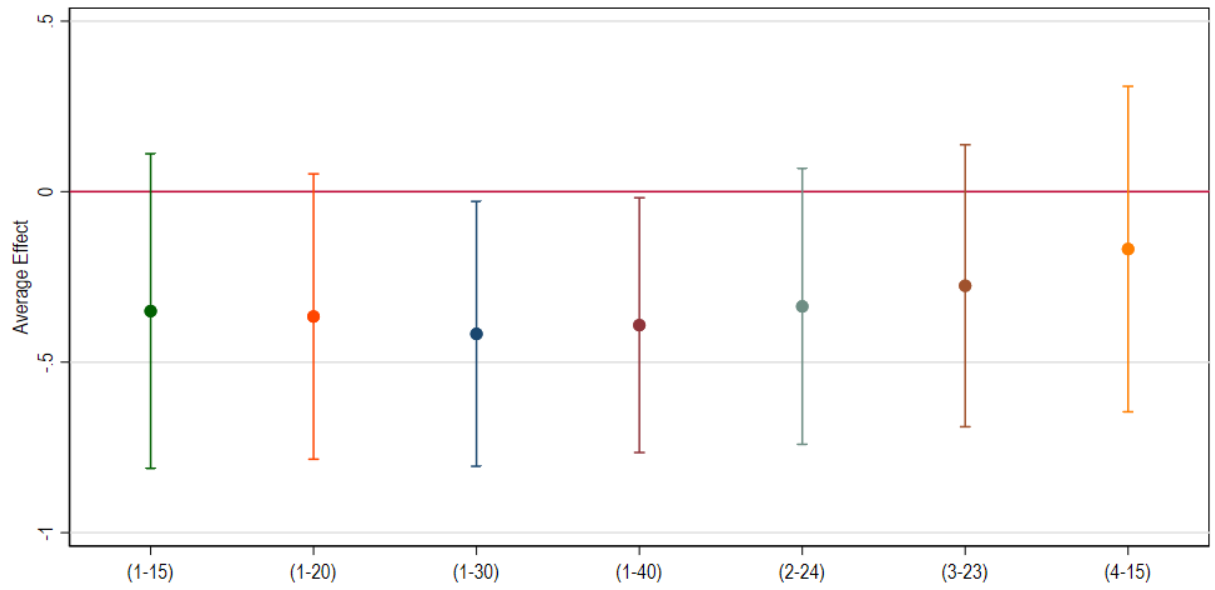

(d) Extensive Margin




*Notes:* We estimate the impact of the POSH Act on outcome variables of percent female workers (panel a), number of female workers (panel b) and number of male workers (panel c). The percent of female workers is defined as the number of female workers divided by the total number of male and female workers. We keep a set of establishments having 1-25 total regular employees in the latest pre-period during 2009-12. Establishments with 10-25 employees in the latest pre-period are defined as regulated and those with 1-9 employees are defined as unregulated. The estimation includes establishment and state-year fixed effects. The solid line represents the average annual treatment effects on the outcome variables, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Standard errors are clustered at establishment level.

*Source:* Annual Survey of Industries 2009-2016

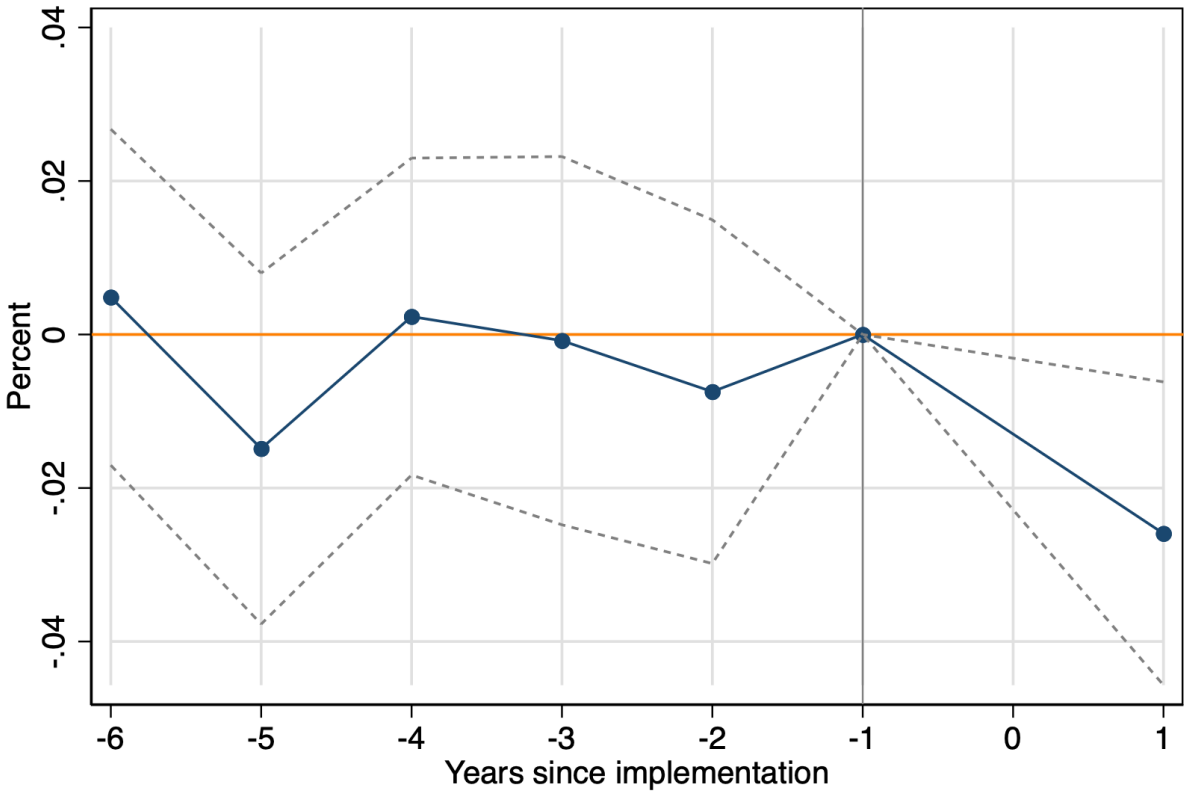
Figure 12: Impact of POSH Act on percent female workers in manufacturing firms (Various bandwidths)




*Notes:* We estimate the impact of the POSH Act on percent female workers. The percent of female workers is defined as the number of female workers divided by the total number of male and female workers. Each coefficient is the DID estimate keeping a set of establishments having the range of total regular employees in the latest pre-period during 2009-12 on the x axis. Establishments with at least 10 employees in the latest pre-period are defined as regulated and those with less than 10 employees are defined as unregulated. The estimation includes establishment and state-year fixed effects. The solid dots represent the average annual treatment effect on the outcome variable for each bandwidth, and the vertical capped lines denote the 95% confidence intervals. Standard errors are clustered at establishment level.

*Source:* Annual Survey of Industries 2009-2016

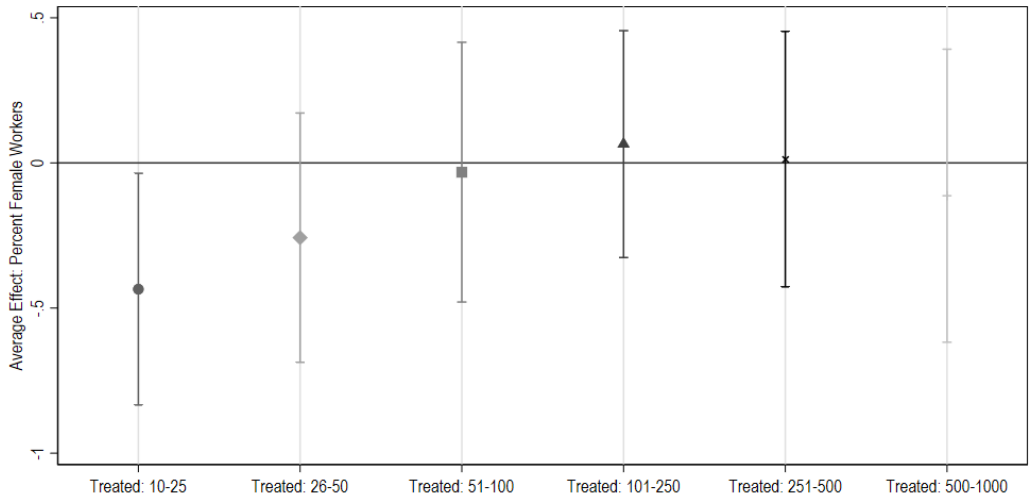
Figure 13: Impact of POSH Act on relative female employment using survey data(NSS)




*Notes:* We plot the impact of POSH Act on relative female wage employment. The outcome variable is whether a female is employed as a wage worker, keeping the sample of all wage workers. The solid line represents the average annual treatment effects, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Specifications include individual-level controls, district × year and industry (2-digit)-zone fixed effects. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Standard errors are clustered at district level.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labor Bureau (EUS 2014).

Figure 14: Impact of POSH Act on percent female workers in manufacturing firms (various establishment size definitions for regulated firms)

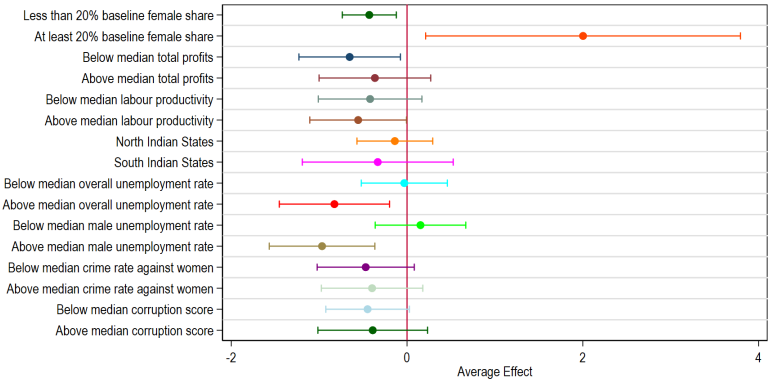



*Notes:* We estimate the impact of the POSH Act on percent female workers defined as the number of female workers divided by the total number of male and female workers. We report coefficients from regressions estimated with the specified range of establishment sizes as regulated (10-25, 26-50, 51-100, 101-250, 251-500, 501-1000), and firm sizes 1-9 as unregulated or untreated. Establishment size is defined using the latest observation for that establishment in the pre-period. The solid dots represent the average annual treatment effect and the vertical capped lines denote the 95% confidence intervals. The estimation includes establishment and state-year fixed effects. Standard errors clustered at establishment level.

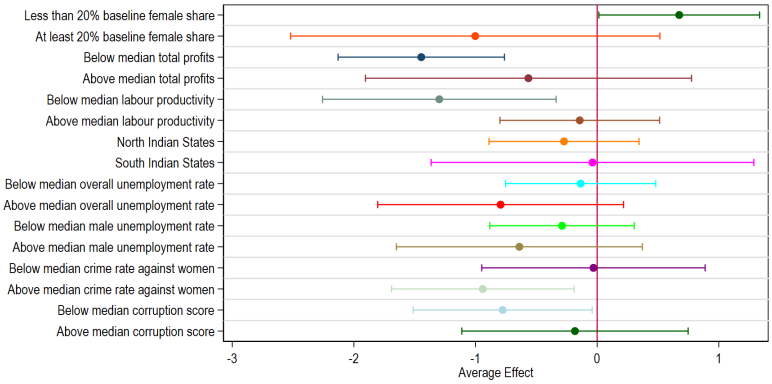
*Source:* Annual Survey of Industries 2009-2016

Figure 15: Impact of POSH on percent female workers and firm size in firms: Heterogeneity (ASI)

(a) Dependent variable: Percentage of female workers




(b) Dependent variable: Total employees (Firm Size)




*Notes:* We plot the impact of POSH Act on outcome variables of percent female workers in panel (a) and firm size (total regular employees) in panel (b). The results plot the coefficient of $Regulated \times Post$ for each subsample created using the following criteria: above and below 20% female worker share, above and below median total profits, labor productivity, overall and male state unemployment rate, crime rate against women, state corruption score and north vs south states. The percent of female workers is defined as the number of female workers divided by the total number of male and female workers. We keep a set of establishments having 1-25 total regular employees in the latest pre-period during 2009-12, with those having 10-25 employees in the latest pre-period are defined as regulated and those with 1-9 employees as unregulated. The solid dots represent the average annual treatment effect and the horizontal capped lines denote the 95% confidence intervals. The estimation includes establishment and state-year fixed effects. Standard errors clustered at establishment level.

*Source:* Annual Survey of Industries 2009-2016. State-level unemployment rates from 68th round of NSS (2011-12). India Corruption Study 2008 by Transparency International. State-level unemployment rates from 68th round of NSS (2011-12). Female share of workers, female wage and female to male wage ratio are calculated from pre-period data at firm level. State-level crime rate calculated using the 2012 statewise data for all crime against women from India's National Crime Records Bureau.

Table 1: Summary Statistics Prior to POSH (ASI, Unique Firms)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Unregulated Firms | | | Regulated Firms | | |
| **Variable** | **Mean** | **SD** | **N** | **Mean** | **SD** | **N** |
| **Panel A**: Main Dependent Variables | | | | | | |
| Proportion of Female Workers | 10.106 | 22.691 | 10522 | 10.891 | 22.272 | 16532 |
| No. of Female Workers | 0.498 | 1.192 | 10522 | 1.350 | 3.010 | 16532 |
| No. of Male Workers | 3.925 | 1.957 | 10522 | 9.858 | 4.334 | 16532 |
| Extensive Margin (Female Workers¿0) | 0.202 | 0.401 | 10522 | 0.258 | 0.438 | 16532 |
| **Panel B**: Firm Size Variables | | | | | | |
| Total Male and Female Permanent Workers | 4.423 | 1.894 | 10522 | 11.208 | 4.126 | 16532 |
| Total Permanent Employees | 6.095 | 2.164 | 10522 | 15.975 | 4.440 | 16532 |
| **Panel C**: Other Variables | | | | | | |
| Male Wage Rate | 100.367 | 144.168 | 10355 | 112.052 | 82.510 | 16367 |
| Female Wage Rate | 74.052 | 38.995 | 1760 | 84.574 | 55.599 | 3860 |
| Gender Wage Gap | 0.823 | 0.181 | 1596 | 0.841 | 0.185 | 3695 |
| Wage Rate (Thousands) | 0.099 | 0.144 | 10519 | 0.110 | 0.084 | 16531 |
| Profit per Worker (Millions) | 0.069 | 0.352 | 10522 | 0.089 | 0.294 | 16532 |
| Labour Productivity (Millions) | 1.162 | 2.934 | 10522 | 1.539 | 2.638 | 16532 |
| Total Output (Millions) | 8.749 | 23.304 | 10522 | 30.380 | 73.197 | 16532 |
| Total Profits (Millions) | 0.495 | 4.621 | 10522 | 1.879 | 13.500 | 16532 |

*Notes:* We only take unique firms by taking each firm's latest observation in the pre-POSH period. Firms having 1-25 permanent employees in the latest pre-POSH period are kept here. Proportion of female workers are defined as total female workers in permanent employment out of total male and female workers. Firm size is defined as total permanent workers in a firm, which includes total male workers, total female workers, supervisors, and other employees. Total output is defined as total value of output (price × quantity) produced by a firm deflated by two digit industry specific Wholesale Price Index (WPI) with 2004 as the base year. Profits are defined as the difference between the value of output and inputs used by the firm including depreciation, again deflated by the WPI. Gender wage gap is defined as the ratio of female wage rate by male wage rate. The female (male) wage rate is derived as wages paid to female (male) workers by female (male) worker mandays. Total wages are deflated deflated by Consumer Price Index (CPI) with 2004 as the base year. Labor productivity is defined as total value of real output per employee.
*Source:* Annual Survey of Industries 2009-2012.

Table 2: Impact of POSH Act on employment in firms (Bandwidth: 1-25)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Percent Female Workers | | Number of Female Workers | | Number of Male Workers | | Extensive Margin | |
| Post POSH × Regulated Firm | -0.2729 | -0.4342** | 0.0086 | -0.0393 | 0.4004** | 0.3444* | 0.0006 | -0.0027 |
| | (0.2032) | (0.2037) | (0.1286) | (0.1315) | (0.1810) | (0.1897) | (0.0042) | (0.0042) |
| Observations | 92525 | 92525 | 92525 | 92525 | 92525 | 92525 | 92525 | 92525 |
| Outcome Mean | 9.3841 | 9.3841 | 1.5230 | 1.5230 | 9.4043 | 9.4043 | 0.2081 | 0.2081 |
| R-Squared | 0.831 | 0.832 | 0.660 | 0.663 | 0.666 | 0.668 | 0.774 | 0.776 |
| *Controls* | | | | | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | | ✓ | | ✓ | | ✓ | | ✓ |



*Notes:* We estimate the impact of the implementation of the POSH Act in 2013 on female employment. The dependent variable in columns (1)-(2) is defined as the number of permanent female workers divided by the total number of permanent male and female workers. Columns (3)-(4) and (5)-(6) use total number of female workers and total number of male workers as the dependent variables, respectively. The dependent variable for columns (7)-(8) is the extensive margin which takes the value of 1 if the firm had any female workers, and 0 otherwise. Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) in the firm in the latest pre-period prior to POSH. We keep a set of establishments with total employees 1-25 in the latest pre-period. *Regulated Firm* takes a value of one if total permanent employees in the establishment are 10-25 in the pre-period and zero otherwise. *Post* is an indicator variable which equals one for years 2013-2016 and zero otherwise. The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects. Robust standard errors clustered at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* Annual Survey of Industries 2009-2016.

Table 3: Impact of POSH Act on employment in firms: Robustness (donut and non-linear)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Donut Analysis: Remove 8-12 | | | | Fractional Regression | |
| | Percent Female | Female Workers | Male Workers | Extensive | Percent Female Workers | |
| Regulated Firm × Post | -0.5338** | -0.1086 | 0.4434* | -0.0061 | -0.0073*** | -0.0084*** |
| | (0.2495) | (0.1780) | (0.2594) | (0.0050) | (0.0025) | (0.0025) |
| Observations | 66090 | 66090 | 66090 | 66090 | 115444 | 112746 |
| Outcome Mean | 9.4789 | 1.6724 | 10.1213 | 0.2123 | 0.0985 | 0.0988 |
| R-Squared | 0.829 | 0.654 | 0.665 | 0.773 | | |
| *Controls* | | | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ | | |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Firm Controls | | | | | ✓ | ✓ |

*Notes:* We estimate the impact of the implementation of the POSH Act in 2013 on female employment using a linear model in columns 1-4 and a non-linear model in columns 5-6. The dependent variable in column (1), (5) and (6) is defined as the number of permanent female workers divided by the total number of permanent male and female workers. Columns (2) and (3) use total number of female workers and total number of male workers as the dependent variables, respectively. The dependent variable for column (4) is a binary indicator that takes the value 1 if the firm hired any female workers, and 0 otherwise. Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) in the firm in the latest pre-period prior to POSH. We keep a set of establishments with total employees 1-7 or 13-25 in the latest pre-period in columns (1)-(4). We keep a set of establishments with total employees 1-25 in the latest pre-period in columns (5)-(6). Regulated Firm takes a value of one if total permanent employees in the establishment are 13-25 in the pre-period and zero otherwise in columns 1-4. Regulated Firm takes a value of one if total permanent employees in the establishment are 10-25 in the pre-period and zero otherwise in columns 5-6. Post is an indicator variable which equals one for years 2013-2016 and zero otherwise. For fractional regressions, we have used a probit model. The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects in columns 1-4. Robust standard errors clustered at the firm level in parentheses for columns 1-4. Fractional Regression includes Fixed Effects for Firm Size and State-Year. Additional Firm Controls include controls for 3-Digit NIC Industry Codes, whether the firm is rural/urban, and organization type. Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* Annual Survey of Industries 2009-2016

Table 4: Impact of POSH Act on female employment in firms: heterogeneity by baseline female employment share (Bandwidth: 1-25)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Percent Female Workers | Female Workers | Male Workers | Extensive |
| **Panel A: Baseline Female Share** $< 20$ | | | | |
| Regulated Firm × Post | -0.4293*** | 0.2280* | 0.3725* | -0.0021 |
| | (0.1567) | (0.1166) | (0.2114) | (0.0040) |
| Observations | 76186 | 76186 | 76186 | 76186 |
| Outcome Mean | 1.0243 | 0.1612 | 9.9717 | 0.0566 |
| R-Squared | 0.538 | 0.511 | 0.670 | 0.585 |
| **Panel B: Baseline Female Share** $\geq 20$ | | | | |
| Regulated Firm × Post | 2.0025** | -0.8191* | 0.1750 | 0.0458*** |
| | (0.9136) | (0.4402) | (0.3159) | (0.0139) |
| Observations | 14868 | 14868 | 14868 | 14868 |
| Outcome Mean | 48.9994 | 7.9765 | 6.7156 | 0.9258 |
| R-Squared | 0.687 | 0.678 | 0.583 | 0.514 |
| *Controls* | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | ✓ | ✓ | ✓ | ✓ |

*Notes:* We estimate the impact of the implementation of the POSH Act in 2013 on female employment in regulated firms (number of employees $\geq 10$). Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) in the firm prior to POSH. The percent of female workers is defined as the number of permanent female workers divided by the total number of permanent male and female workers. Baseline Percent refers to the percent of female workers in the firm prior to the implementation of the POSH Act. The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects. Robust standard errors clustered at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* Annual Survey of Industries 2009-2016

Table 5: Impact of POSH Act on relative female employment

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Regulated Firm × Post | –0.030*** | –0.026*** | –0.026*** | –0.023*** |
| | (0.006) | (0.006) | (0.006) | (0.006) |
| Regulated Firm | 0.025*** | 0.025*** | 0.020*** | 0.020*** |
| | (0.005) | (0.005) | (0.005) | (0.005) |
| Observations | 215104 | 215101 | 215104 | 215075 |
| Outcome mean | 0.181 | 0.181 | 0.181 | 0.181 |
| *Controls* | | | | |
| Individual level controls | ✓ | ✓ | ✓ | ✓ |
| Industry-zone FE | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | | ✓ | |
| State FE | ✓ | | | |
| State × Year FE | | ✓ | | |
| District FE | | | ✓ | |
| District × Year FE | | | | ✓ |

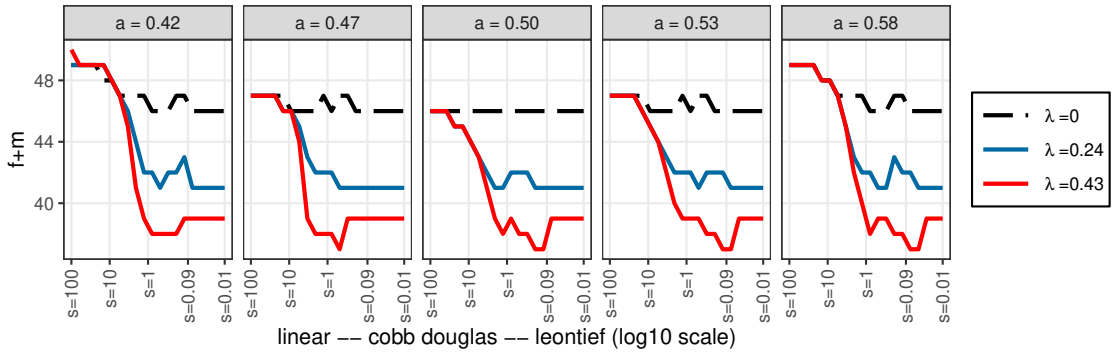
*Notes:* The dependent variable takes a value of one if an individual is female and zero if male. The sample is restricted to individuals working in the non-cultivation sector (by the principal employment status) as wage workers and who are aged 20-60. Regulated firm takes a value one for individuals working in an establishment (firm) having at least 10 employees and zero otherwise. Post takes a value of one for the year 2013-2014 and zero otherwise. Industry is defined at 2-digit level of classification. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Individual-level controls include age, age squared, education level and social group (caste). Regressions are weighted by probability weights based on survey design. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the district level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labour Bureau (EUS 2013-14).

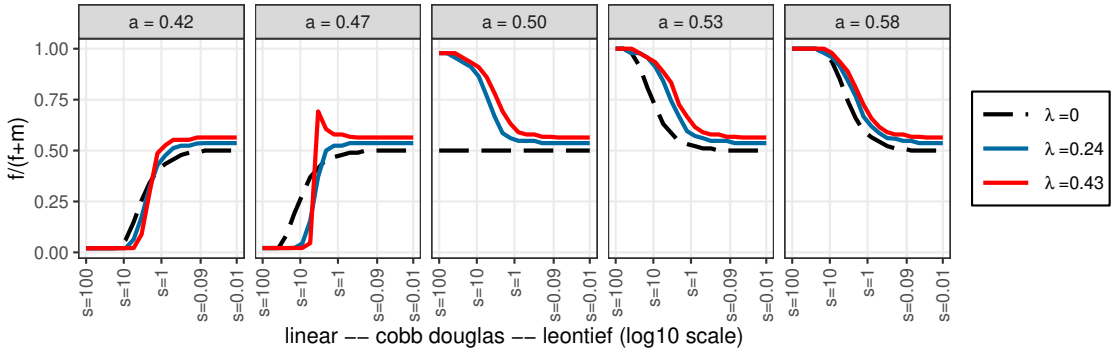
# A Model and calibration: Additional figures and tables

Figure A.1: Firm behavior varying with female share in response to SH

(a) Firm size



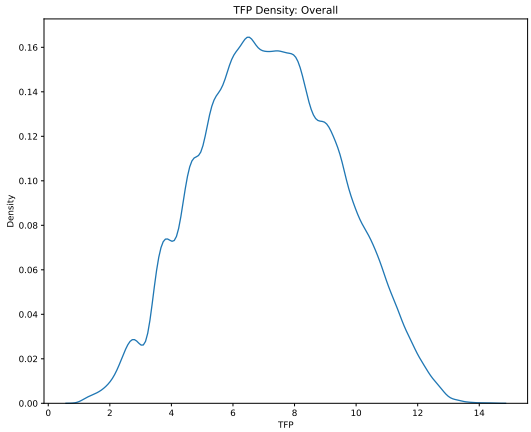

(b) Female share




*Notes:* In the above figures, a refers to $\alpha$ and $s$ refers to $\sigma$ in the theoretical model.

Figure A.2: Parameter Distribution from Calibration

(a) TFP $\gamma$




(b) Elasticity of Substitution $\sigma$

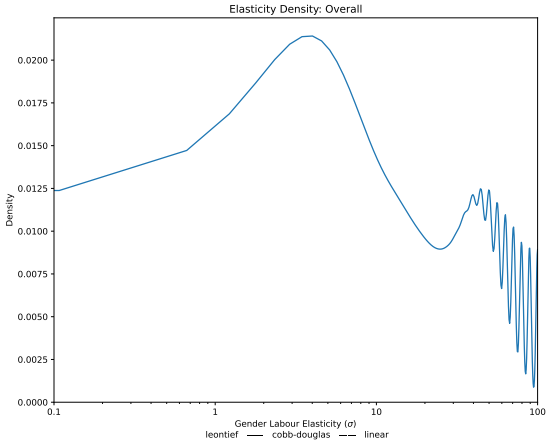
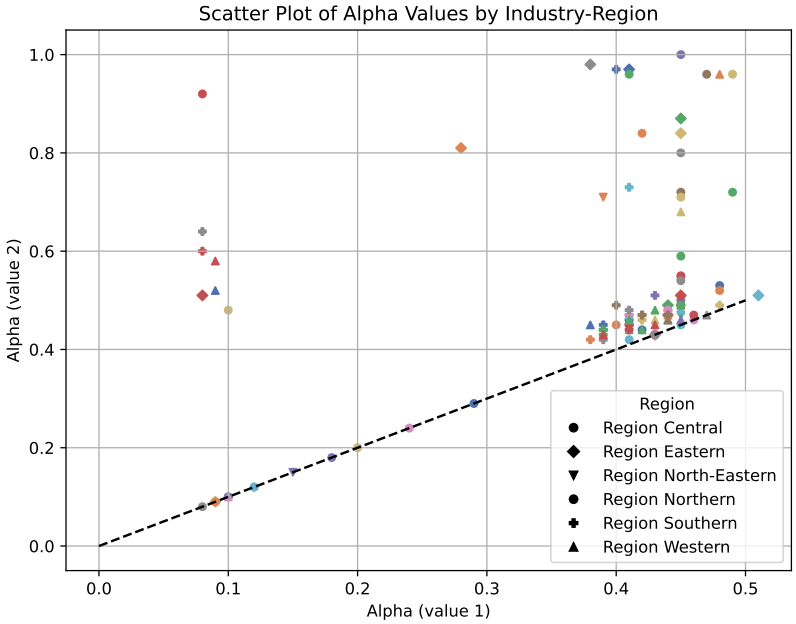


Figure A.3: Alpha Distribution from Calibration

(a) TFP




(b) Sigma

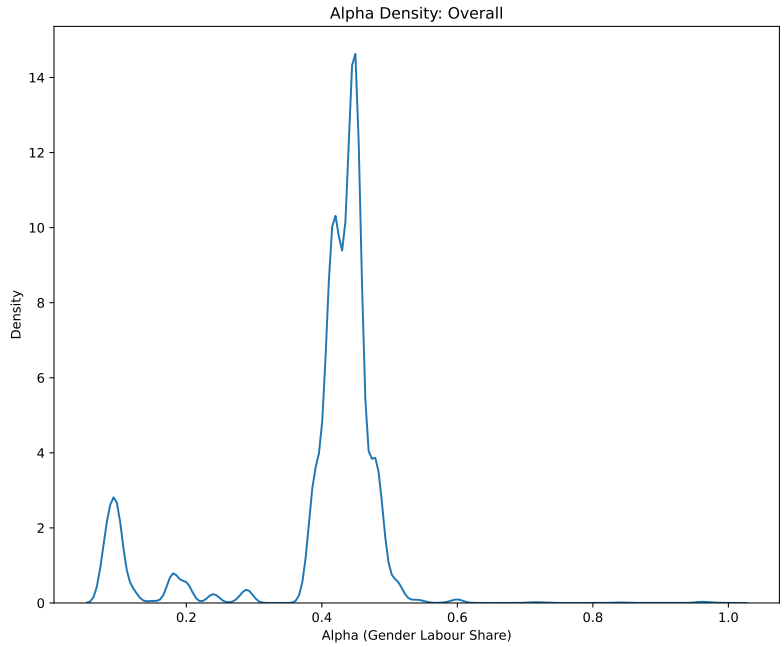


Figure A.4: Calibration Moments by Female Share

(a) Moments by Region

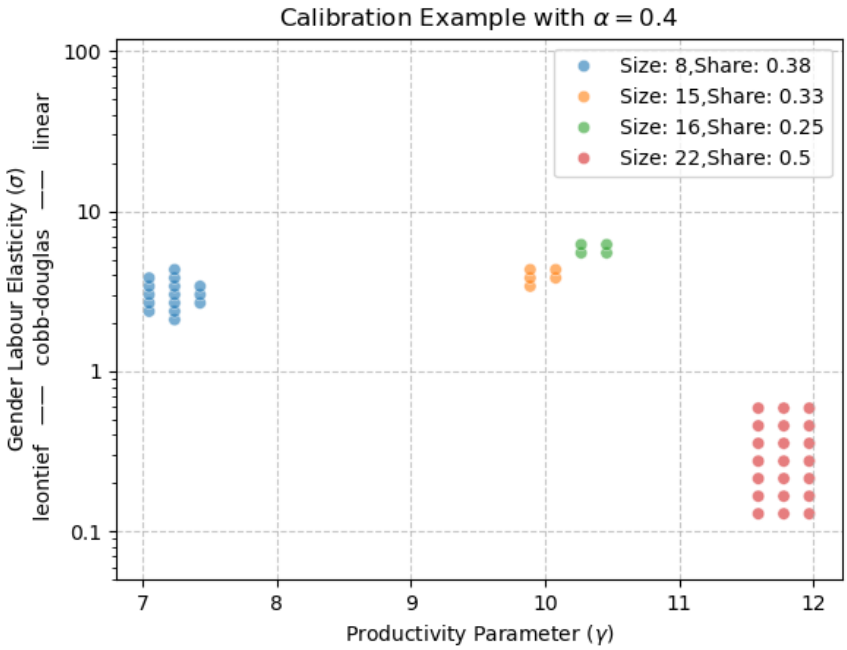
| female_share_bin | 0 | 0.01–0.2 | 0.2–0.4 | 0.4–0.6 | 0.6–0.8 | 0.8–1.0 | Total | Alpha Mean | Share Mean |
|---|---|---|---|---|---|---|---|---|---|
| region | | | | | | | | | |
| Central | 91.64 | 1.65 | 3.58 | 2.35 | 0.6 | 0.18 | 100 | 0.374791 | 0.030524 |
| Eastern | 87.45 | 2.93 | 4.98 | 3 | 1.3 | 0.34 | 100 | 0.391252 | 0.053152 |
| North-Eastern | 80.11 | 2.21 | 6.08 | 4.42 | 6.08 | 1.1 | 100 | 0.41044 | 0.105863 |
| Northern | 93.02 | 2.17 | 2.63 | 1.4 | 0.61 | 0.18 | 100 | 0.370283 | 0.025971 |
| Southern | 56.27 | 5.12 | 13.34 | 13.17 | 8.61 | 3.49 | 100 | 0.420484 | 0.223472 |
| Western | 85.39 | 3.32 | 5.67 | 3.43 | 1.54 | 0.65 | 100 | 0.399598 | 0.057863 |
| **Total** | **78.13** | **3.4** | **7.28** | **6.11** | **3.64** | **1.43** | **100** | | |

(b) Moments for Alpha Value Bins

| female_share_bin | 0 | 0.01–0.2 | 0.2–0.4 | 0.4–0.6 | 0.6–0.8 | 0.8–1.0 | Total |
|---|---|---|---|---|---|---|---|
| alpha_bin | | | | | | | |
| **0-0.1** | 94.96 | 1.42 | 2.59 | 1.04 | 0 | 0 | **100** |
| **0.1–0.2** | 97.9 | 1.09 | 0.72 | 0.29 | 0 | 0 | **100** |
| **0.2–0.3** | 98.2 | 0.54 | 1.08 | 0.18 | 0 | 0 | **100** |
| **0.3–0.4** | 70.43 | 5.36 | 13.72 | 10.46 | 0.02 | 0 | **100** |
| **0.4–0.5** | 76.86 | 3.7 | 7.87 | 6.43 | 3.67 | 1.47 | **100** |
| **0.5–0.6** | 12.65 | 0 | 0.35 | 19.5 | 52.02 | 15.47 | **100** |
| **0.6–0.7** | 0 | 0 | 0 | 20.55 | 34.54 | 44.91 | **100** |
| **0.7–0.8** | 0 | 0 | 0 | 20.16 | 69.86 | 9.98 | **100** |
| **0.8–0.9** | 0 | 0 | 0 | 36.36 | 45.45 | 18.18 | **100** |
| **0.9–1.0** | 0 | 0 | 0 | 12.6 | 62.43 | 24.97 | **100** |
| **Total** | **78.13** | **3.4** | **7.28** | **6.11** | **3.64** | **1.43** | **100** |

Figure A.5: Firm Matching Examples

(a) Matching for three distinct firms with one $\alpha$ value




(b) Matching for fixed male worker count, varying female worker count (varying size and share)

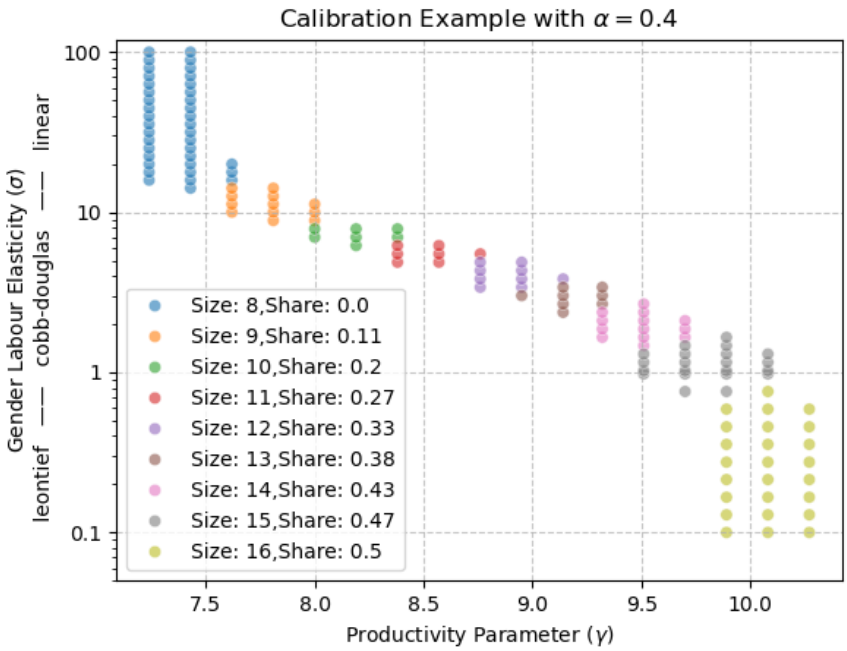
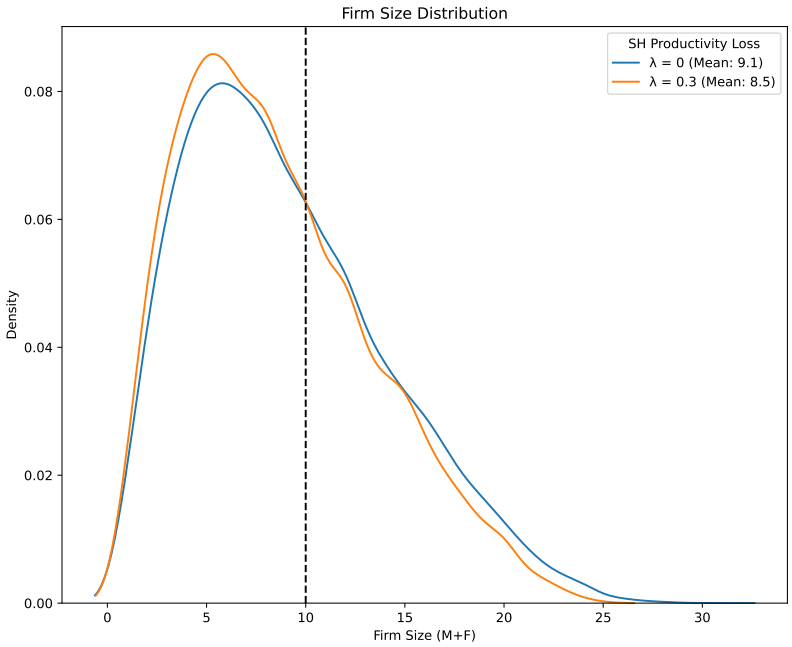


Figure A.6: Productivity Loss due to Harassment

(a) Firm Size (Absolute Difference)




(b) Firm Production (Percent Difference)

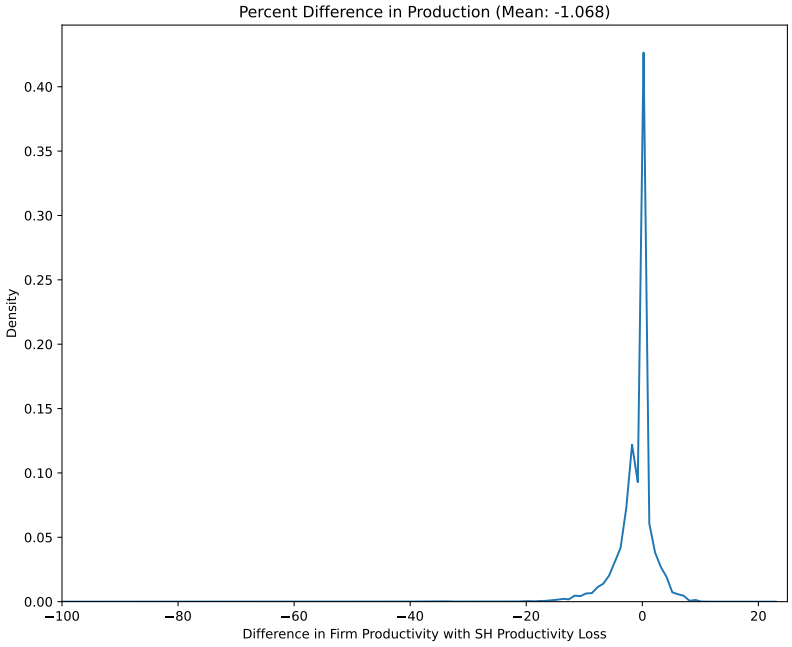
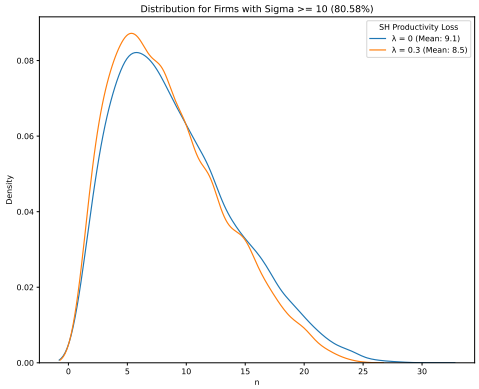
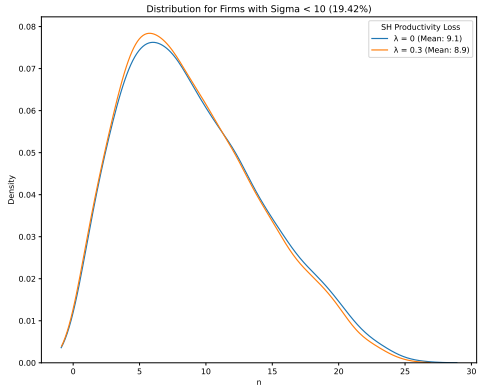


Figure A.7: Differences in Responses by Elasticity of Substitution $\sigma$

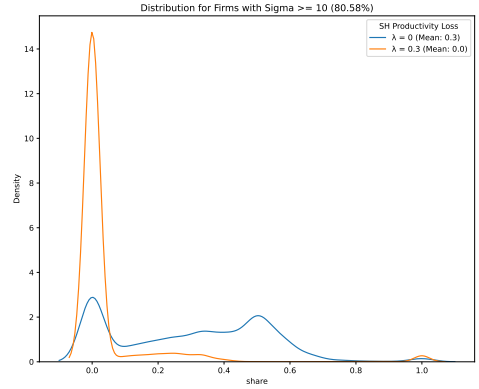
(a) Firm Size Distribution: $\sigma \geq 10$




(b) Firm Size Distribution: $\sigma < 10$




(c) Female Share Distribution: $\sigma \geq 10$




(d) Female Share Distribution: $\sigma < 10$

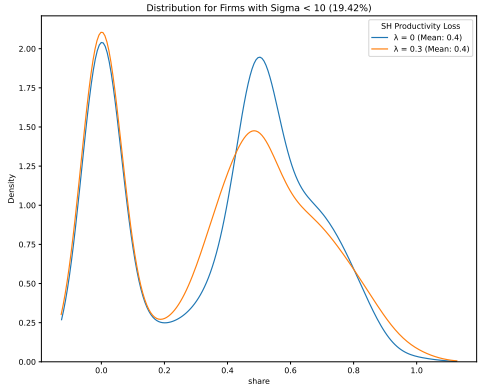
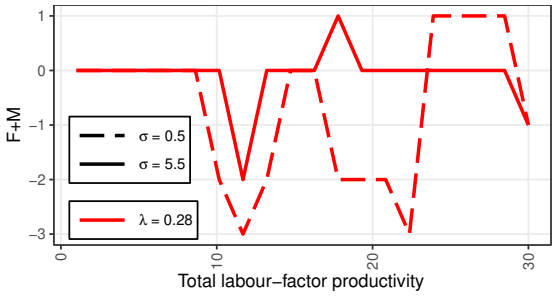
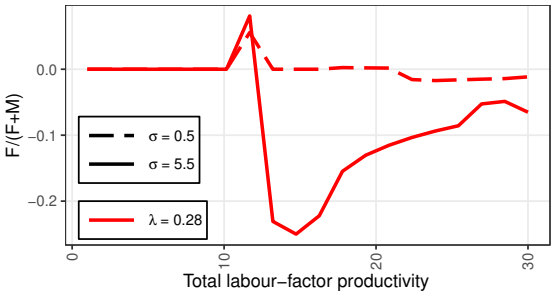


Figure A.8: Firm behavior with varying TFP in response to POSH policy

(a) Firm size




(b) Female share




(c) Female workers

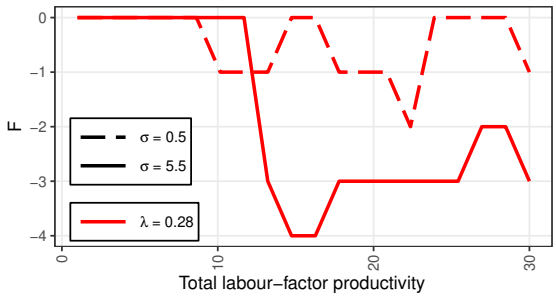


Figure A.9: Compliance as a function of calibrated board cost $\Theta$

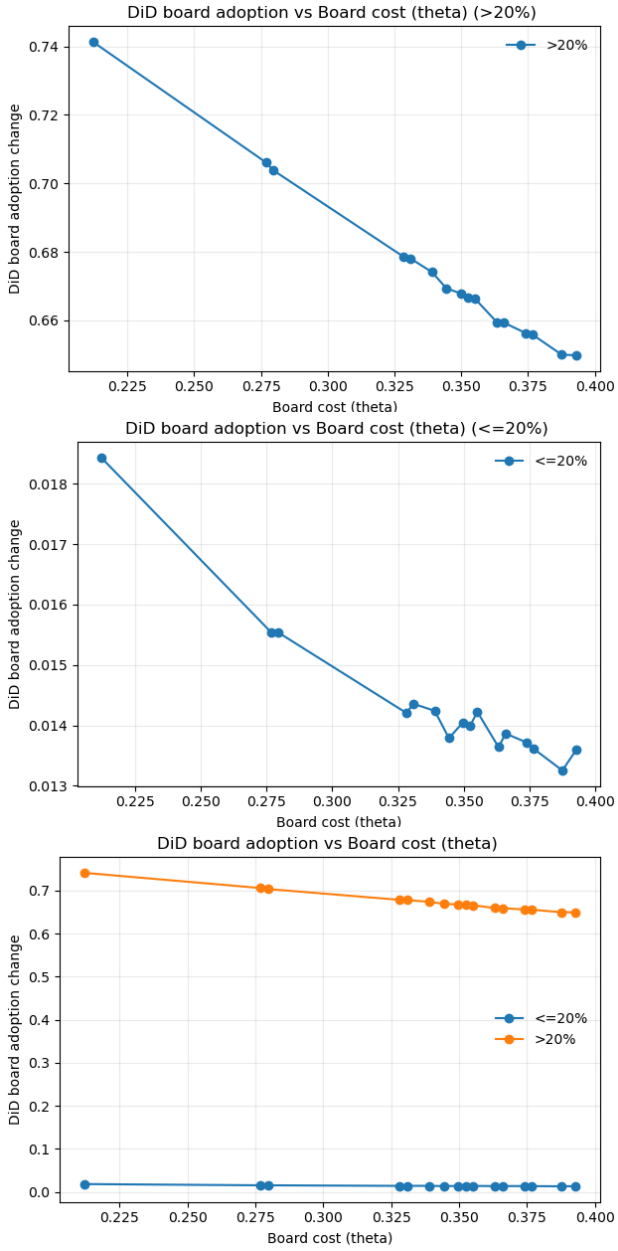


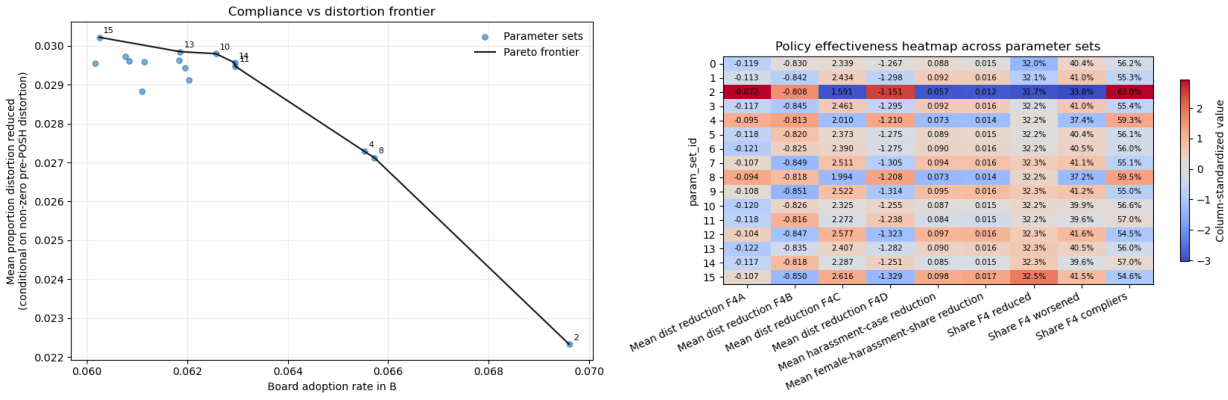
Figure A.10: Distortion reduction by compliance




(a) Firm size: compliers vs. non-compliers

(b) Female share: compliers vs. non-compliers

Figure A.11: The compliance-distortion frontier




(a) Compliance–distortion frontier

(b) Outcomes across calibrated tuples

# B Firm level evidence: Additional results

## B.1 Robustness checks

**Alternative bandwidths:** Our baseline sample includes establishments with pre-POSH size 1–25. As a robustness check, we vary the bandwidth around the threshold of 10 by restricting the sample to 1–15 and 1–20, and expanding it to 1–30 and 1–40 (along with additional alternative bands that shift both upper and lower bounds). Figure 12 plots the estimates for the percent female workers across bandwidths. The estimated effect is negative for wider bandwidths, but becomes statistically insignificant for very narrow windows around the cutoff (e.g., 4–15). This pattern is consistent with firms just below the threshold also adjusting hiring to avoid approaching the applicability of the Act. We discuss threshold-adjacent firms further below.

**Strategic manipulation and measurement error:** Firms near the cutoff may strategically adjust employment and may also switch between regulated and unregulated status over time. Unregulated firms close to 10 may behave similarly to regulated firms to avoid crossing the threshold. In addition, because we assign treatment status using the latest observed pre-POSH firm size, treatment can be measured with error for firms only observed in earlier pre-period years.[1] These issues would bias estimates toward zero. We therefore implement "donut" specifications that drop firms close to the cutoff (8–12). Table 3 shows that the percent female workers falls by 0.53 percentage points (5.4%) in column (1), slightly larger than the baseline estimate in Table 2, column (2). The effects on female and male employment remain negative and positive, respectively, with larger magnitudes than in the baseline.

We also vary the donut width (Appendix Figure B.2); the decline in the percent female workers remains negative and statistically significant, and grows with the donut size suggesting attenuation of estimate driven by firms close to the threshold. To diagnose which side of the cutoff drives this, we estimate one-sided donuts (Appendix Figure B.3): panel (a) drops firms just below 10 and panel (b) drops firms just above 10. Firms slightly above the cutoff behave similarly to larger treated firms (17–25). In contrast, firms sized 6–9 behave differently from firms sized 1–5, and treatment effects increase when 6–9 firms are excluded from the control group. This suggests that near-threshold untreated firms partially "shadow" treated-firm behavior, plausibly because small expansions could bring them under the Act.

[1] For example, a firm observed in 2011 (but not 2012) may have size 9 in 2011 and grow to 10 in 2012, implying mis-classification if we only observe 2011.

**Fractional regression:** We also re-estimate effects on female share using a fractional-response model to check if our estimates are driven by the choice of functional form in specification. Specifically, we use the fraction of female workers (in $[0, 1]$) as the dependent variable and estimate a fractional probit. The model does not converge with high-dimensional establishment fixed effects, so we do not include $\delta_i$. Marginal effects in columns (4)–(5) of Table 3 imply a decline of $-0.0084$ relative to a mean of 0.0988 (column 5), i.e., an 8.5% reduction in the fraction of female workers for regulated relative to unregulated establishments post-POSH. Overall, the results are consistent with the linear specification. Given the well-known limitations of fixed-effects fractional models when $T \ll N$ (Hausman & Leonard, 1997), we prefer the linear model that allows establishment fixed effects.

**Accounting for other contemporary policies:** To assess sensitivity to other state policies that may affect female employment, we re-estimate the main specification after dropping states that enacted size-based amendments to the Factories Act[2] or amended restrictions on women's night work in factories. Results in Appendix Table B.3 remain consistent with the baseline.

**Extended data through 2018–19:** We extend the ASI panel through 2018–19, noting potential confounding from the 2017 Maternity Benefit (Amendment) Act (MBAA). Under MBAA, women who have worked at least 80 days with an employer (and where the employer has at least 10 employees) are eligible for six months of paid maternity leave. Employers may respond by shifting women from salaried to daily-wage contracts to avoid eligibility. Because ASI "permanent" workers include both salaried and daily-wage workers, the net effect on total female employment is ambiguous.[3] Appendix Figure B.5 shows an overall decline in the percent female workers through 2018–19, with a modest uptick in 2018–19, consistent with a concurrent increase in female labor supply after MBAA.

**Placebo:** We keep establishments sized 10–25 in the latest pre-period and use placebo thresholds to re-define "regulated" and "unregulated" groups, treating firms above each placebo cutoff as regulated. Figure B.10 plots the coefficients for each cutoff. We find no effect on the percent female workers under these fake thresholds, suggesting that within the small-firm sample, changes are not driven by spurious threshold-specific dynamics.

[2] India's Factories Act is one of the most important set of labor regulations that imposes a host of compliance obligations (related to working conditions, health, safety, and welfare provisions) on manufacturing plants triggering at different specified employment thresholds.

[3] Bose & Chatterjee (2024) document a decline in salaried relative to daily-wage female employment among treated firms.

**Spillover effects:** A concern is that women displaced from regulated firms may move to unregulated firms, mechanically generating estimated treatment effects. Such reallocation should be most pronounced among firms near the size cutoff. Since the estimates are robust to donut specifications, we do not view spillovers as the main driver. Nonetheless, following Butts (2021), we test for spillovers by constructing an exposure index for each state-industry pair: average pre-period female employment in regulated firms as a share of total female employment in that state-industry. We then estimate whether unregulated firms in higher exposure state-industry cells experience a post-2013 increase in the female share. Appendix Table B.5 shows no evidence of spillovers; importantly, the main DiD coefficient is unchanged.

## B.2 Validation of ASI results using pooled ASI–UNES data

While the ASI is a comprehensive source for regulated manufacturing establishments, it provides limited coverage of firms unregulated under POSH because it surveys only registered units. We therefore combine ASI with nationally representative data on the unregistered sector (repeated cross-sections), namely the 67th (2010–11) and 73rd (2015–16) rounds of the quinquennial Unincorporated Non-Agricultural Enterprise Surveys (UNES) conducted by the NSSO. UNES covers unincorporated non-agricultural enterprises in manufacturing, trade, and services, excluding construction.[4] Restricting attention to manufacturing, we pool UNES for 2010–11 and 2015–16 with ASI for the corresponding years.

UNES provides detailed information on enterprise characteristics, including employment, output, expenses, receipts, location, and ownership, and importantly reports gender-disaggregated counts for hired workers, paid owners, and other workers/helpers, each split into full-time and part-time.[5] In the main analysis, we study establishments of size 1–25, where firms with fewer than 10 workers come from UNES and firms with 10–25 workers come from ASI. Firm size is defined as total workers in UNES and as permanent employees in ASI.[6] Outcomes are constructed using hired workers only, since POSH is expected to affect hiring decisions rather than ownership composition.

Appendix Table B.7 reports pre-period summary statistics for 2010. Regulated firms have a slightly higher female share than unregulated firms (11.5% versus 9.5%) and are larger and more productive, with higher wages, profits, and output. UNES does not provide

[4]UNES uses a stratified multi-stage sampling design with Census 2001 villages in rural areas and Urban Frame Survey blocks in urban areas as first-stage units. Enterprises are included if they operated for at least 30 days during the reference year, or 15 days for seasonal enterprises and self-help groups. The target population largely consists of informal-sector establishments.

[5]Workers employed for more than half of the enterprise's normal working hours on a regular basis are classified as full-time; the rest are classified as part-time.

[6]This maintains comparability with ASI, where paid owners are counted among supervisory or managerial staff.

gender-disaggregated wage rates, so gender wage gaps cannot be compared in the pooled data.

We estimate a repeated-cross-section difference-in-differences model using 2010 as the pre-period and 2015 as the post-period:

$$Y_{ijstr} = \beta_1\big(Regulated\ Firm_{ir} \times Post_t\big) + \delta_{jsr} + \delta_{st} + \delta_{jt} + \epsilon_{ijstr}, \tag{B.24}$$

where $Y_{ijstr} \in \{\text{percent female hired},\ \text{number hired female},\ \text{number hired male}\}$ for firm $i$ in industry $j$, state $s$, and year $t$, with regulation status $r$. $Regulated\ Firm_{ir} = 1$ for firms with size 10–25 and 0 for firms with size below 10, while $Post_t$ equals one in 2015. The specification includes state×industry×regulation-status fixed effects, state×year fixed effects, and industry×year fixed effects, where industry is defined at the 4-digit NIC-2008 level, the most detailed classification common to both datasets. Regressions use revised survey weights to account for pooling the two datasets.[7] Standard errors are clustered at the state level.

Appendix Table B.8 reports the results. The female share of hired workers declines by 1.4 percentage points in regulated relative to unregulated firms after POSH, corresponding to a 14.9% decline relative to the pre-period mean of 9.4 percentage points. We also find a modest and statistically insignificant decline in the number of hired female workers, alongside an increase in hired male workers. Overall, the pooled UNES–ASI evidence corroborates both the ASI panel results and the individual-level findings: after POSH, regulated firms experienced a decline in relative female employment.

## B.3 Robustness to using individual survey data rather than firm level panel data

We also complement the firm-level analysis with nationally representative individual survey data from the NSS Employment–Unemployment rounds (2004–05, 2009–10, 2011–12) and the 2014 Employment–Unemployment Survey, restricting attention to wage workers aged 20–60 in the non-cultivation sector and exploiting the POSH applicability threshold at 10 workers. These data capture employment across all non-farm sectors—manufacturing, services and construction and across all unregistered and registered enterprises. These allow us to check whether results hold more broadly across all industrial sectors. Using a more coarse measure of firm-size captured in these data (0-5, 6-9, 10-20, >20) and a difference-in-differences design that compares regulated and unregulated establishments before and after POSH,

[7] We first rescale sampling weights within each dataset-year so that they sum to one. We then multiply these rescaled weights by the pre-POSH shares of manufacturing firms with size below 10 (0.98) and at least 10 (0.02), respectively, based on Economic Census 2005.

and controlling for worker characteristics, district-by-year fixed effects, and industry fixed effects, we find that women's relative wage employment in regulated establishments declines by 2.2–2.9 percentage points, or 12–16 percent relative to the mean (Table 5). Event-study estimates show no evidence of differential pre-trends and a discrete post-POSH decline in 2014 (Figure 13). We verify the robustness of these findings to similar checks as for ASI. Details discussed in Appendix Section C.

Taken together, the above results using various data sources, confirm that there was a decline in the share of female workers in regulated vs unregulated enterprises after the POSH Act.

## B.4 Heterogeneity

This appendix details the heterogeneity results that help distinguish among the channels highlighted in the main text.

**Compliance costs:** A direct implication of the model is that responses should be stronger where the fixed cost of compliance is large relative to firm surplus. We assess this in three ways. First, we re-define treatment using progressively larger pre-period size groups. If compliance costs are closer to fixed costs, they should be easier to absorb in larger firms. Figure 14 shows little change in female share for these larger regulated groups. For firms with more than 100 workers, the point estimate is positive but imprecise, and female worker counts also rise slightly (Appendix Figure B.9). Second, we split firms by baseline profits. Figure 15 and Appendix Table B.9 show larger declines among below-median-profit firms, with the sharpest drop in the bottom profit quartile, although differences across profit groups are imprecisely estimated. Third, using baseline labor productivity (output per worker), we find the largest and most precisely estimated decline in the bottom productivity quartile. Taken together, these patterns are consistent with compliance costs biting most where profits and productivity are low.

We also examine corruption as an auxiliary proxy for enforcement frictions rather than as a direct primitive of the model. If compliance is enforced through inspections, corruption could raise the effective burden of compliance through extortion, though in principle it could also ease avoidance through bribery. In the individual data, high-corruption states show a somewhat larger decline in relative female wage employment (Figure C.5, panel b). In the firm-level data, corruption does not generate clear heterogeneity in female share, although overall firm size falls more, albeit noisily, in high-corruption states (Figure 15, panel b). We therefore interpret corruption as suggestive evidence on enforcement frictions rather than as a direct test of the model.

**Ease of substitution away from women:** The model's second direct prediction is that responses should be stronger where firms can more easily substitute men for women, or where women are less central to production. Empirically, we proxy this with low baseline female intensity, which may reflect high substitutability, low female production weight, or both. We first test this in the ASI by splitting firms at a baseline female share of 20%. Figure 15, panel (a), shows that firms with baseline female share below 20% experience a decline in female share after POSH, whereas firms with baseline female share of at least 20% show an increase; Appendix Figure B.11 shows the same dynamic pattern in event-study form. This is the key heterogeneity used later in the policy calibration, where low-female-share firms are interpreted as being more likely to avoid compliance and shed women, while more female-intensive firms are more likely to comply and preserve or expand female employment.

We then use the individual data to exploit occupational and sectoral variation in baseline female intensity. Using pre-POSH female shares by 2-digit NCO occupation, we classify occupations with female share above 20% as high-female. Figure C.5 shows that the decline in relative female wage employment is concentrated entirely in low-female occupations, and Figure C.6 shows no differential pre-trends. The sectoral results are similar: Table C.8 shows declines in all three broad sectors, but the largest in construction (4.1 percentage points, or 36%), followed by manufacturing (2.9 percentage points, or 21%), with the smallest decline in services. This ordering mirrors baseline female intensity: construction has the lowest baseline female share, while services have the highest. Figure C.7 again shows no differential pre-trends. These patterns are consistent with substitution away from women being easier where women are a more marginal input. They also imply greater occupational segregation after POSH; because low-female occupations are higher paying on average, this reallocation likely widened overall occupational segregation and the gender wage gap.

**Harassment environment and reporting risk:** Beyond the model's two core channels, we examine proxies for the broader harassment environment and reporting risk. These are not directly observed structural primitives in the model, but they are natural empirical proxies for the baseline environment captured by harassment risk and reporting conditions. We proxy this environment using state-level crimes against women in 2012. In the individual data, high-crime states exhibit a larger decline in relative female wage employment after POSH (Figure C.5, panel b). In the firm-level data, however, crime-based heterogeneity in female share is weak (Figure 15, panel a). We therefore treat the crime results as suggestive rather than definitive.

A related proxy is heterogeneity by women's age and education. If some groups are perceived to face greater harassment risk or are more likely to report, the effective cost of

employing them may rise more after POSH. Consistent with this, Figure C.5, panel (a), shows larger declines for younger women: 3.4 percentage points for ages 31–40 and 2.4 percentage points for ages 20–30. By education, the point estimates are largest for women with primary schooling or less, but differences across education groups are not statistically significant. These results are best interpreted as reduced-form evidence on group-specific exposure or reporting conditions rather than as direct tests of the model's primitives.

**Availability of male workers:** We also examine local labor-market tightness as a reduced-form proxy for the effective ease of substitution toward men. The baseline model does not explicitly contain local labor-market matching, but if substituting toward men is easier where male labor is more available, the decline in relative female employment should be larger in looser male labor markets. This is what we find. In both the firm-level and individual-level data, districts with higher overall unemployment and higher male unemployment show somewhat larger declines in female employment after POSH (Figure 15, panel a; Figure C.5, panel b).

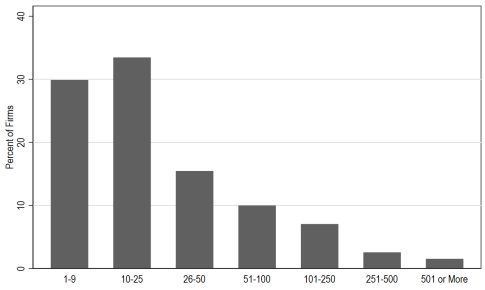
**Gender norms:** Finally, we examine whether gender norms alter the response by comparing northern and southern states (Dyson & Moore, 1983). The model does not deliver a sharp sign prediction here. More conservative norms could reduce women's baseline attachment to formal work, making employed women more positively selected and harder to replace; but they could also increase the perceived cost of mixed-gender interactions after POSH, strengthening substitution away from women. SH incidence and reporting may also move in opposite directions across these environments. Empirically, we find no meaningful north–south heterogeneity in either the individual- or firm-level estimates (Figure C.5, panel b; Figure 15, panel a).

Overall, the strongest support is for the two direct channels in the model: compliance costs matter more for smaller, less productive, and less profitable firms, and substitution away from women is strongest where women are less central to production. The patterns by crime, age, corruption, and local unemployment are best viewed as reduced-form proxies for the harassment environment, enforcement frictions, and the effective ease of substitution, rather than as direct tests of the model's predictions.

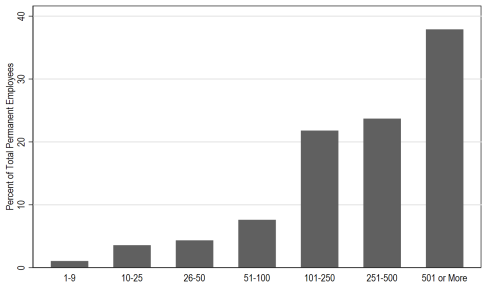
## B.5 Additional figures and tables

Figure B.1: Firm size distribution (ASI): Workers

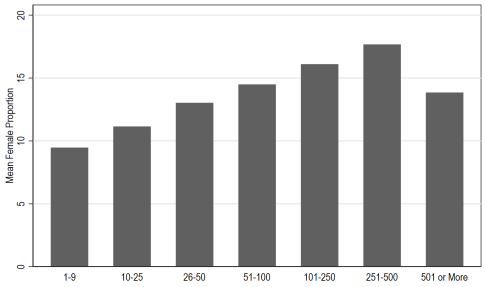
(a) Firm size distribution




(b) Distribution of employees by size



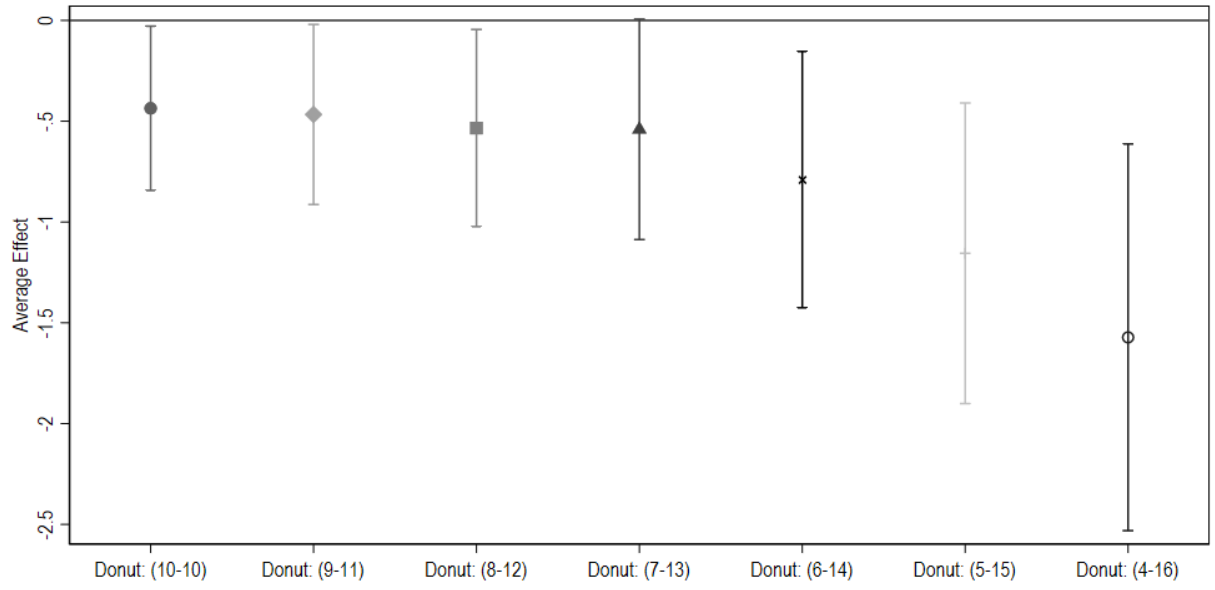

(c) Percent female workers by size




*Notes:* In panel (a), we plot the distribution of firm size in ASI data, where the firm size is defined as total regular employees i.e., the sum of total male workers, total female workers, supervisors and other workers on the x-axis. In panel (b) we plot the proportion of total regular employees employed in each firm size bracket on the x-axis where the firm size is based on total regular employees. In panel (c), we plot the mean of the percent of female workers in firms for each firm size range based on total regular employees. The percent of female workers is defined as the number of female workers divided by the sum of female and male workers.

*Source:* Annual Survey of Industries 2009-2016.

Figure B.2: Impact of POSH Act on percent female workers in firms: Robustness (various donut sizes)

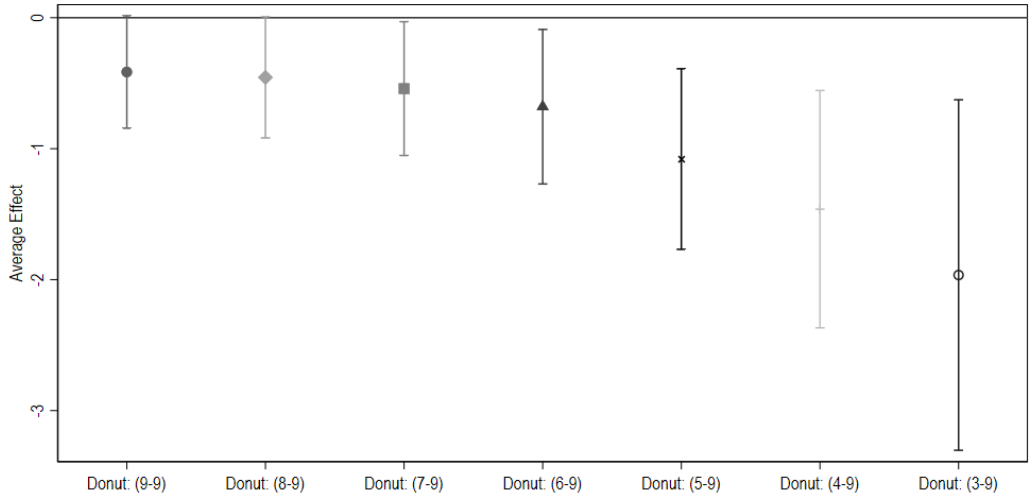



*Notes:* We estimate the impact of the POSH Act on percent female workers. The percent of female workers is defined as the number of female workers divided by the total number of male and female workers. We keep establishments having 1-25 regular workers (establishment size) in the latest pre-period. We report coefficients from regressions with the specified range of establishment sizes on the x-axis dropped from the analyses sample. The estimation includes establishment and state-year fixed effects. The solid dots represent the average annual treatment effect on the outcome variable for each bandwidth, and the vertical capped lines denote the 95% confidence intervals. Standard errors are clustered at establishment level.

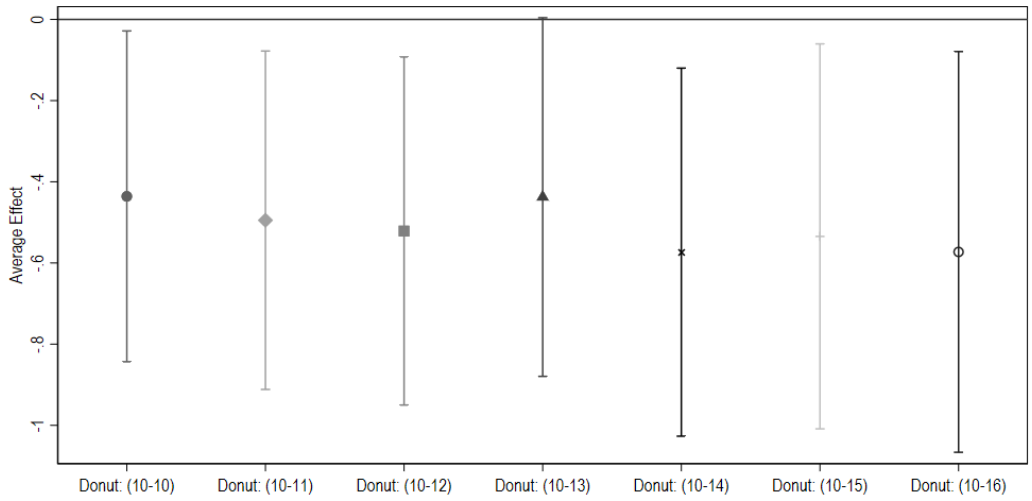
*Source:* Annual Survey of Industries 2009-2016

Figure B.3: Impact of POSH Act on percent female workers in firms: Robustness (one sided donut)

(a) Percent female workers: Left sided donut



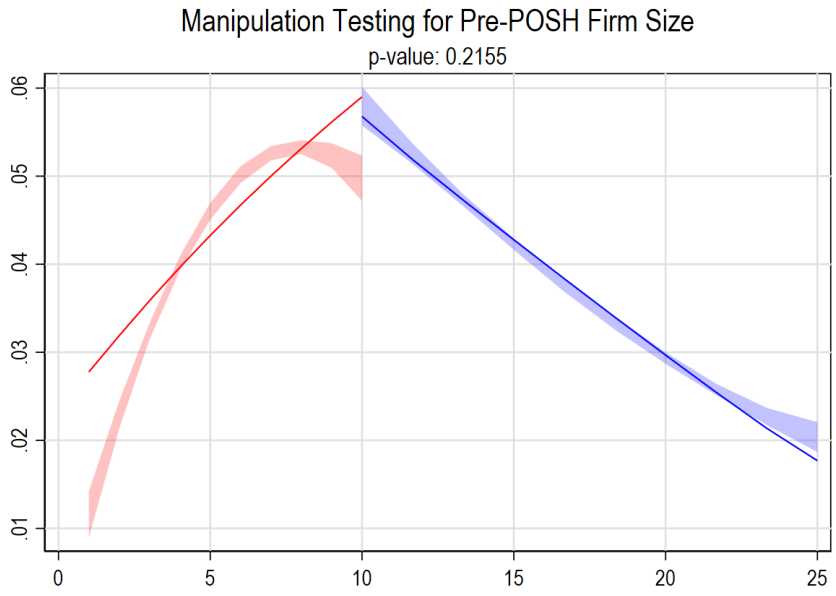

(b) Percent female workers: Right sided donut




*Notes:* We estimate the impact of the POSH Act on percent female workers. The percent of female workers is defined as the number of female workers divided by the total number of male and female workers. We keep establishments having 1-25 regular workers (establishment size) in the latest pre-period. We report coefficients from regressions with the specified range of establishment sizes on the x-axis dropped from the analyses sample. Panel (a) drops establishments to the left of the threshold 10 and panel (b) drops establishments to the right of the threshold 10. The estimation includes establishment and state-year fixed effects. The solid dots represent the average annual treatment effect on the outcome variable for each bandwidth, and the vertical capped lines denote the 95% confidence intervals. Standard errors are clustered at establishment level.

*Source:* Annual Survey of Industries 2009-2016

Figure B.4: McCrary test for firm or establishment size distribution across threshold

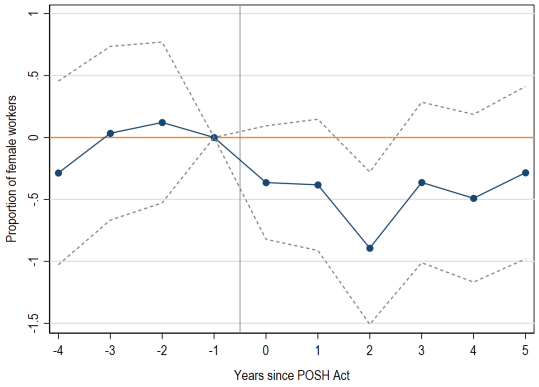



*Notes:* We use the McCrary test to check for firm or establishment size manipulation in the pre-POSH period, and report the p-value of the discontinuity test in the figure. The sample here includes the latest observation for every firm prior to the implementation of POSH (2009-2012), i.e., the firm size we have also used to define whether a firm is regulated or not.

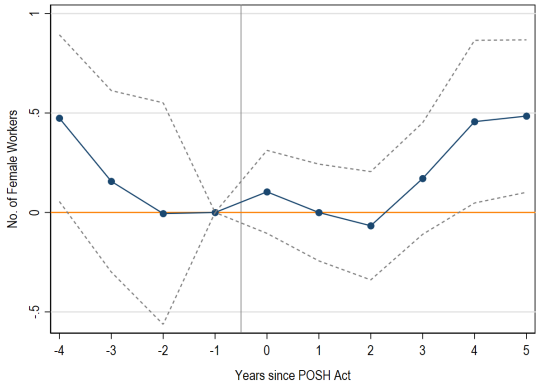
*Source:* Annual Survey of Industries 2009-2012

Figure B.5: Impact of POSH Act on male and female employment in firms (extended data till 2019)

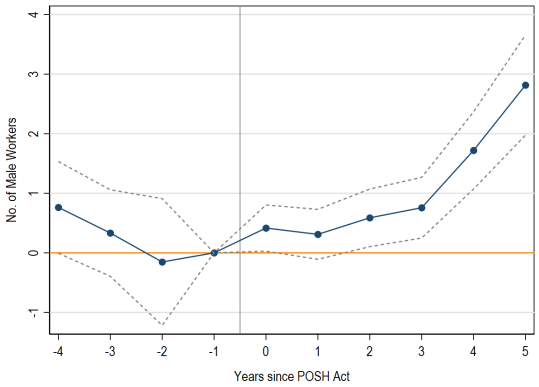
(a) Percent of female workers



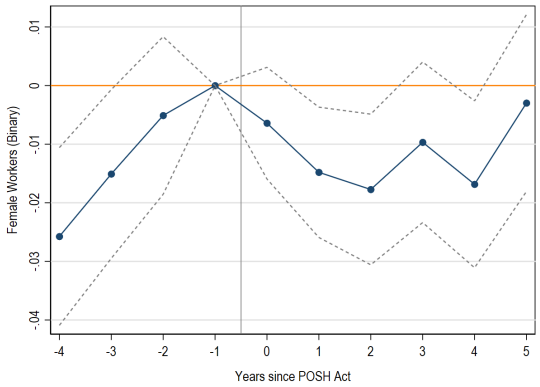

(b) Number of female workers




(c) Number of male workers




(d) Extensive Margin

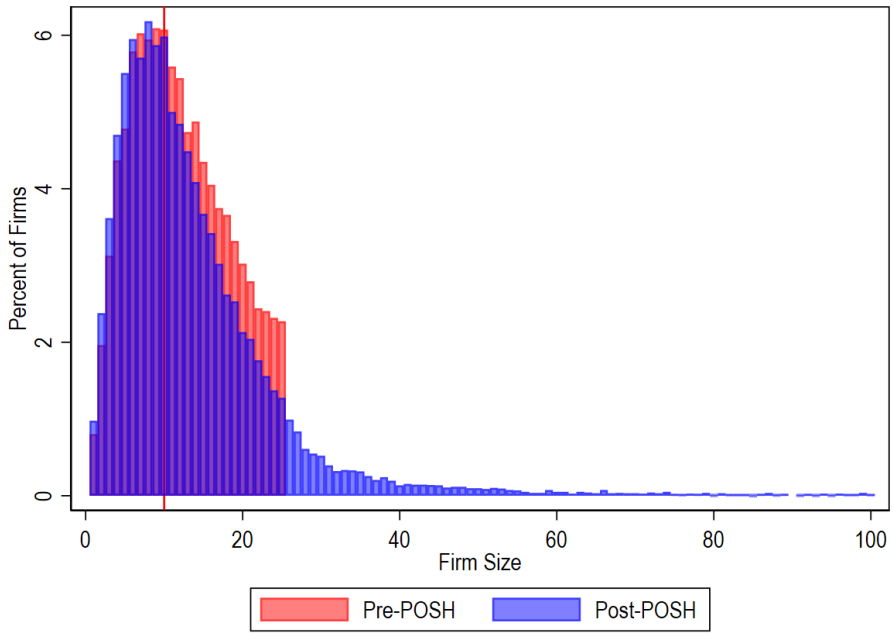



*Notes:* We estimate the impact of the POSH Act on outcome variables of percent female workers (panel a), number of female workers (panel b), number of male workers (panel c) and whether a female worker is employed (extensive). The percent of female workers is defined as the number of female workers divided by the total number of male and female workers. We keep a set of establishments having 1-25 total regular employees in the latest pre-period during 2009-12. Establishments with 10-25 employees in the latest pre-period are defined as regulated and those with 1-9 employees are defined as unregulated. The estimation includes establishment and state-year fixed effects. The solid line represents the average annual treatment effects on the outcome variables, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Standard errors are clustered at establishment level.

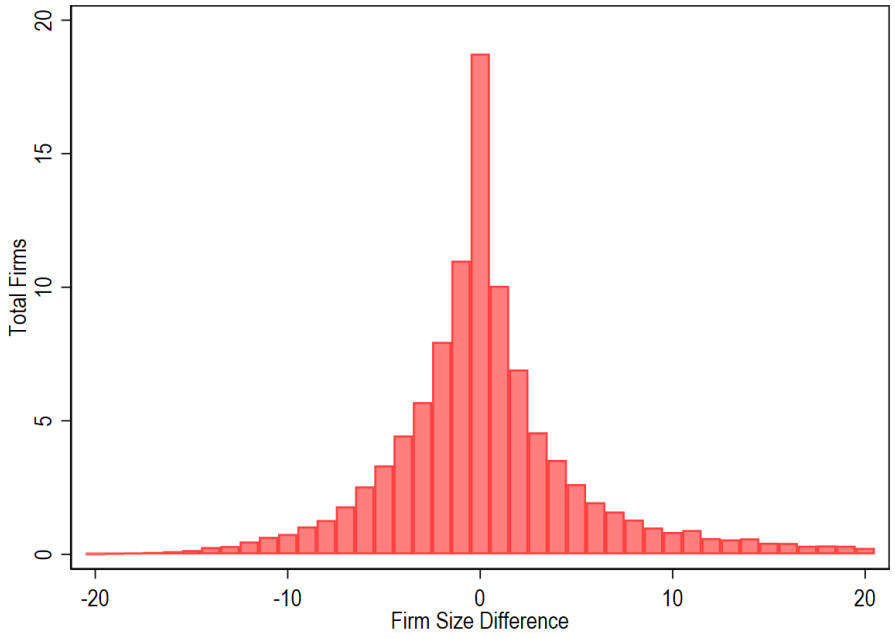
*Source:* Annual Survey of Industries 2009-2019

Figure B.6: Pre and post-POSH firm size distribution: Bandwidth (1-25, pre-POSH)

(a) Firm size distribution




(b) Change in firm size distribution

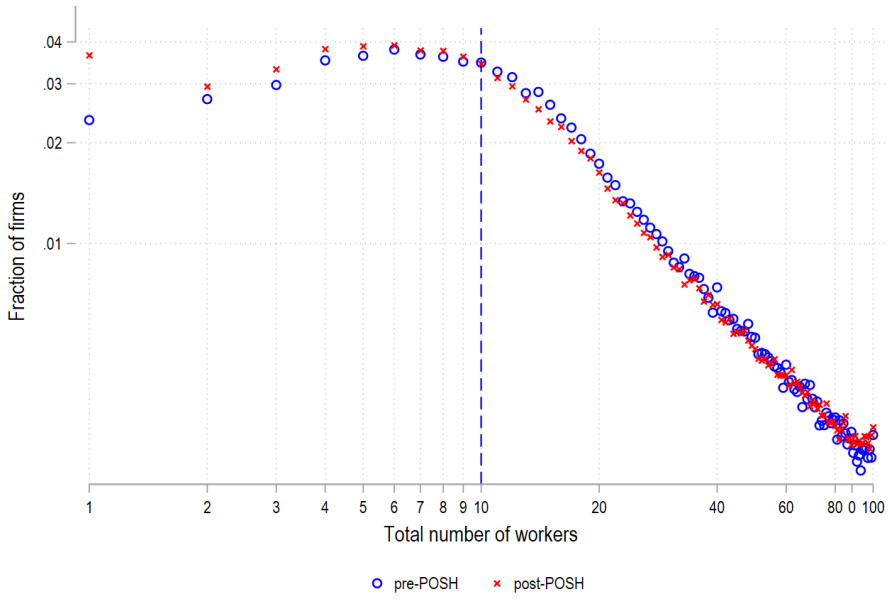



*Notes:* Figure (a) plots the percentage of firms (establishments) for each firm size for our sample of firms sized 1-25 prior to POSH. We use unique data points for pre and post-POSH firm size: keeping the latest pre-POSH observation and earliest post-POSH observation. Figure (b) plots the density of firm size changes. The pre-POSH distribution uses data from 2009-2012, while post-POSH period includes data from 2013-2016.

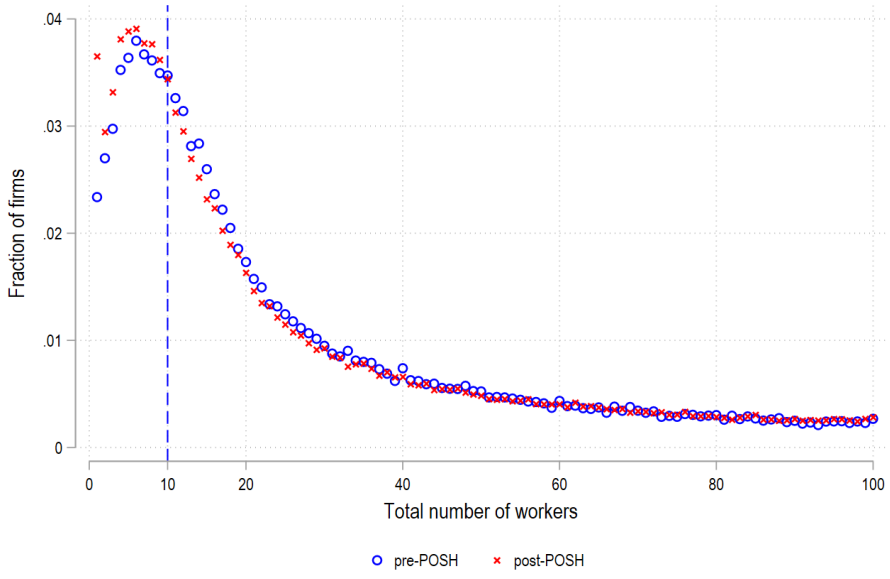
*Source:* Annual Survey of Industries 2009-2016.

Figure B.7: Pre and post-POSH firm size distribution (ASI)

(a) Log-Log Scale




(b) Linear Scale

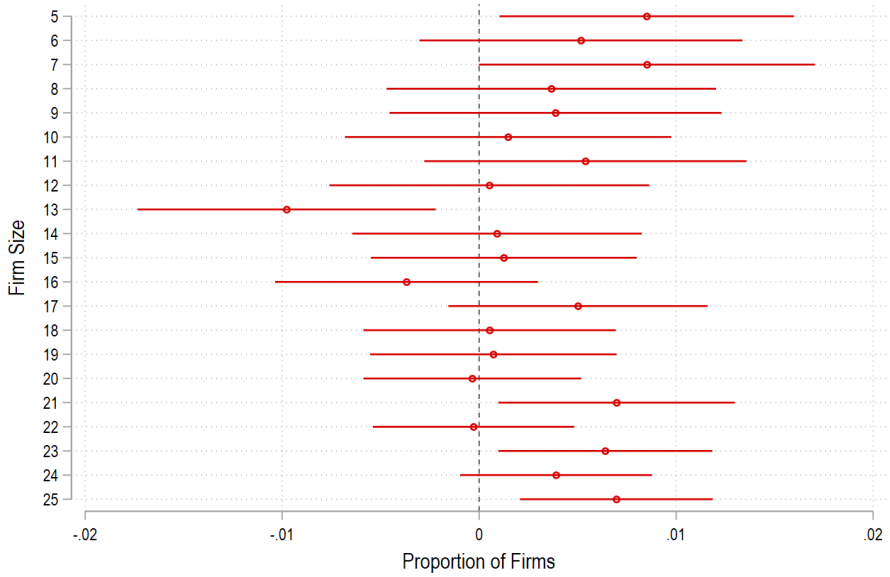



*Notes:* Figure (a) plots the density of firms for each firm size on a logarithmic scale where both axes are on a log scale. Figure (b) plots the density of firms for each firm size on a linear scale. The Pre-POSH distribution uses data from 2009-2012, while Post-POSH uses data from 2013-2016.

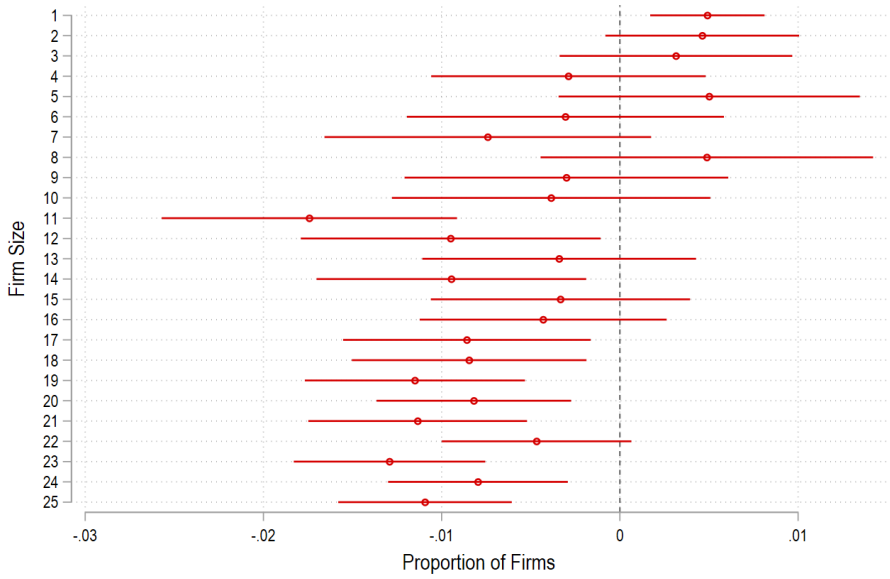
*Source:* Annual Survey of Industries 2009-2016.

Figure B.8: Changes in firm size density (ASI)

(a) Pre-POSH Years




(b) Post-POSH Years

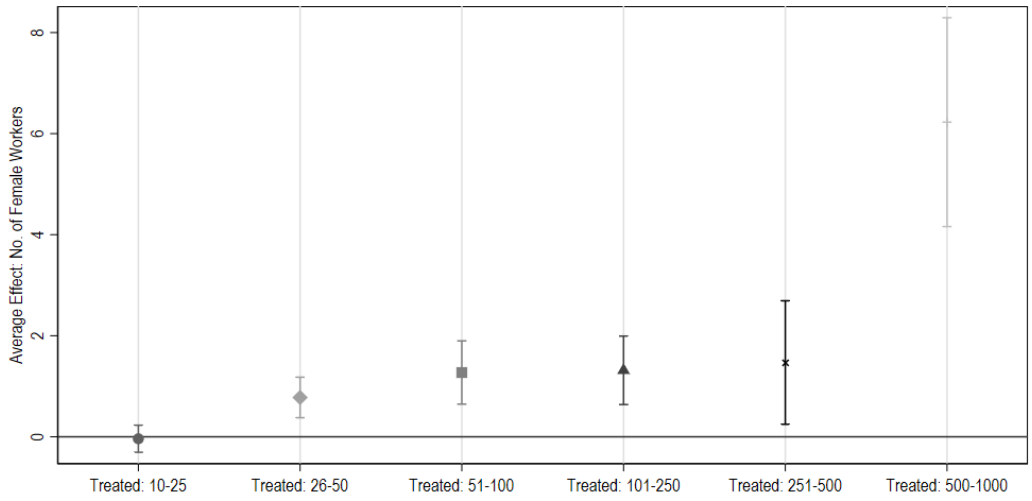



*Notes:* The figure plots the coefficient of *Post* from the equation: $Density_{st} = Post_t + \epsilon$ for every integer firm size $s \in [5, 15]$ where for pre-POSH period (a), the sample consists of the two years 2012 (Post=1) and 2009 (Post=0) and for post-POSH period (b), 2016 (Post=1) and 2012 (Post=0).

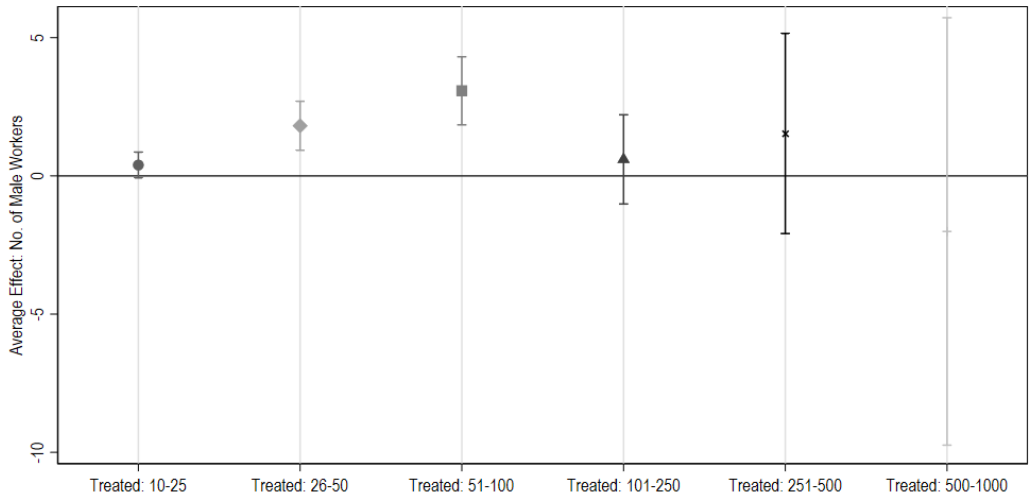
*Source:* Annual Survey of Industries 2009-2016.

Figure B.9: Impact of POSH Act on male and female employment in firms (various firm size thresholds to define regulated firms)

(a) Number of female workers



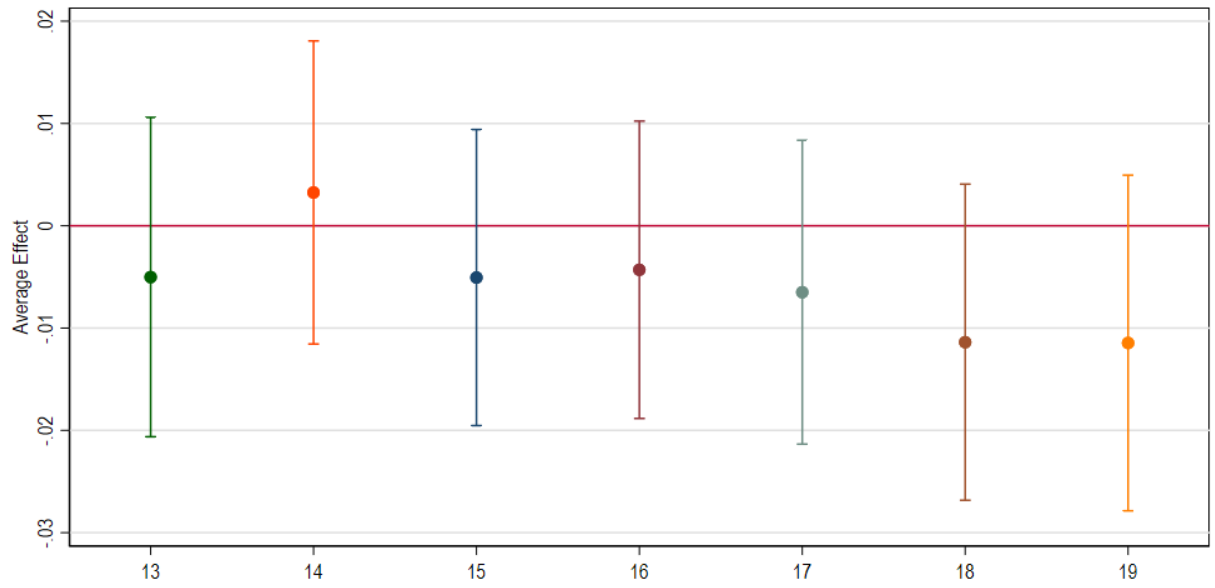

(b) Number of male workers




*Notes:* We estimate the impact of the POSH Act on the number of female workers (panel a) and number of male workers (panel b). We report coefficients from regressions estimated with the specified range of establishment sizes as regulated (10-25, 26-50, 51-100, 101-250, 251-500, 501-1000), and establishment sizes 1-9 as unregulated or untreated. Establishment size is defined using the latest observation for that establishment in the pre-period. The solid dots represent the average annual treatment effect and the vertical capped lines denote the 95% confidence intervals. The estimation includes establishment and state-year fixed effects. Standard errors clustered at establishment level.

*Source:* Annual Survey of Industries 2009-2016

Figure B.10: Impact of POSH on percent female workers in manufacturing firms (bandwidth: 10-25): Placebo

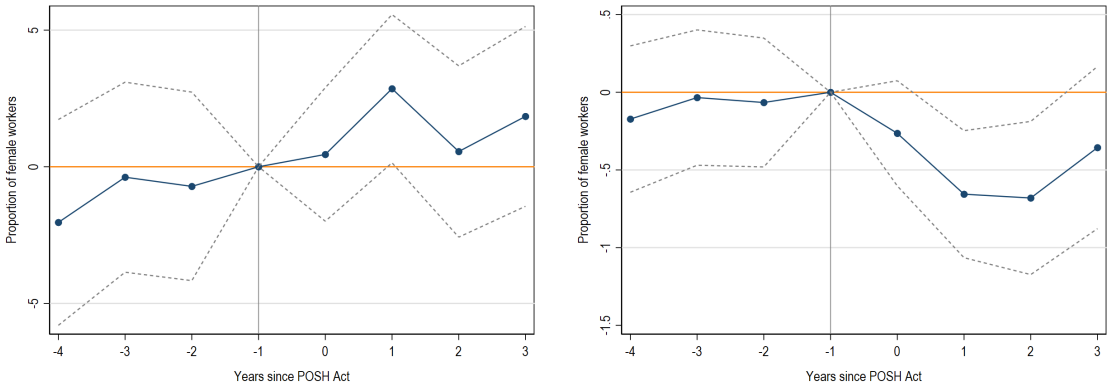



*Notes:* We estimate the impact of the POSH Act on percent female workers using thresholds (specified in the figure on the x axis) within the sample of regulated firms (number of regular employees *geq* 10 in the latest pre-POSH period). The percent of female workers is defined as the number of female workers divided by the total number of male and female workers. We keep a set of establishments having 10-25 total regular employees in the latest pre-period during 2009-12. We consider different false or placebo thresholds within the sample of regulated firms. The solid dots represent the average annual treatment effect on the outcome variable for each bandwidth, and the vertical capped lines denote the 95% confidence intervals. The estimation includes establishment and state-year fixed effects. Standard errors are clustered at establishment level.

*Source:* Annual Survey of Industries 2009-2016

Figure B.11: Impact of POSH Act on percent of female workers in firms: Sub-sample by baseline percent of female workers (bandwidth of 1-25)

(a) Firms with baseline female percent $\geq 20$ (b) Firms with baseline female percent $< 20$

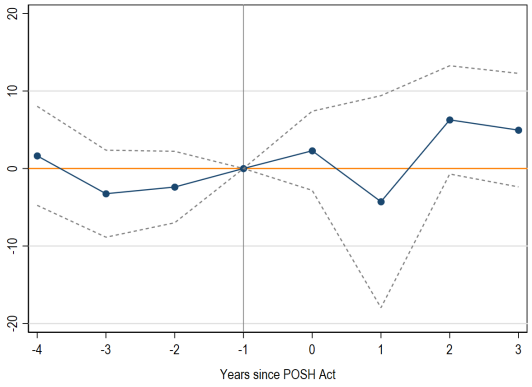



*Notes:* We estimate the impact of the POSH Act on outcome variables of percent female workers. The percent of female workers is defined as the number of female workers divided by the total number of male and female workers. We keep a set of establishments having 1-25 total regular employees in the latest pre-period during 2009-12. Establishments with 10-25 employees in the latest pre-period are defined as regulated and those with 1-9 employees are defined as unregulated. Panel (a) restricts to establishments having at least 20% female workers in the pre-period; panel (b) restricts to establishments having less than 20% female workers in the pre-period. The estimation includes establishment and state-year fixed effects. The solid line represents the average annual treatment effects on the outcome variables, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Standard errors are clustered at establishment level.

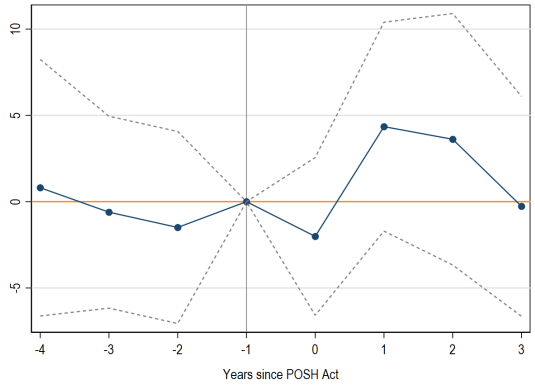
*Source:* Annual Survey of Industries 2009-2016

Figure B.12: Impact of POSH Act on daily wages in firms (bandwidth of 1-25)

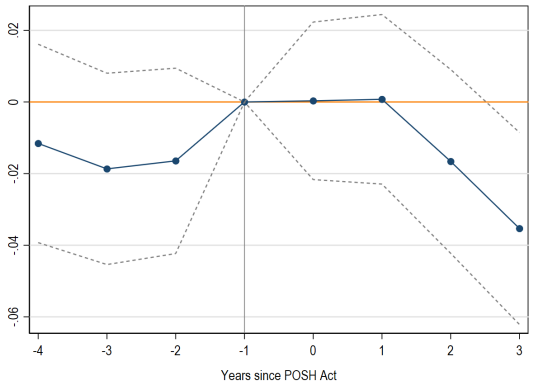
(a) Male wage rate




(b) Female wage rate




(c) Gender wage gap

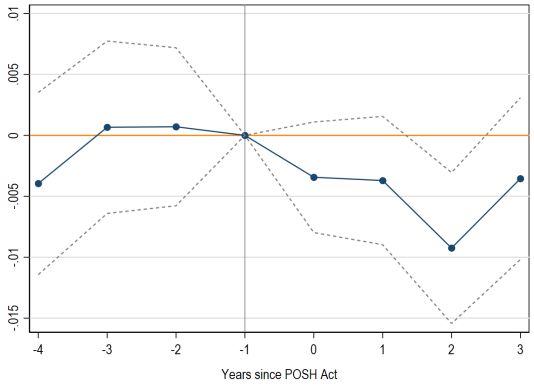



*Notes:* We estimate the impact of the POSH Act on outcome variables of male daily wage (panel a), female daily wage (panel b) and female to male wage ratio (panel c). The female (male) wage rate is derived as the wages paid to female (male) workers by female (male) worker mandays. Gender wage gap is defined as the ratio of female wage rate by male wage rate. We keep a set of establishments having 1-25 total regular employees in the latest pre-period during 2009-12. Establishments with 10-25 employees in the latest pre-period are defined as regulated and those with 1-9 employees are defined as unregulated. The estimation includes establishment and state-year fixed effects. The solid line represents the average annual treatment effects on the outcome variables, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Standard errors are clustered at establishment level.

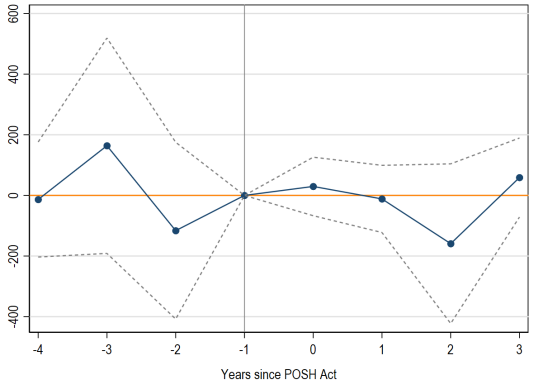
*Source:* Annual Survey of Industries 2009-2016

Figure B.13: Impact of POSH Act on other firm employment outcomes: Mandays (bandwidth of 1-25)

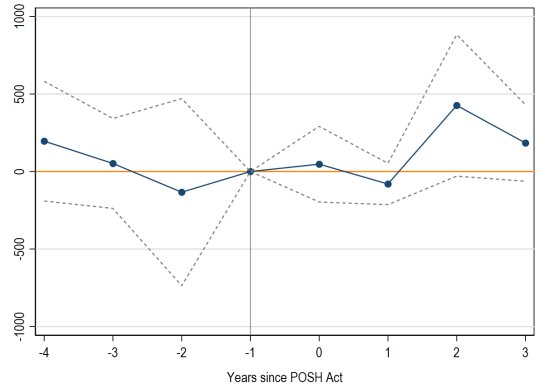
(a) Proportion of female mandays



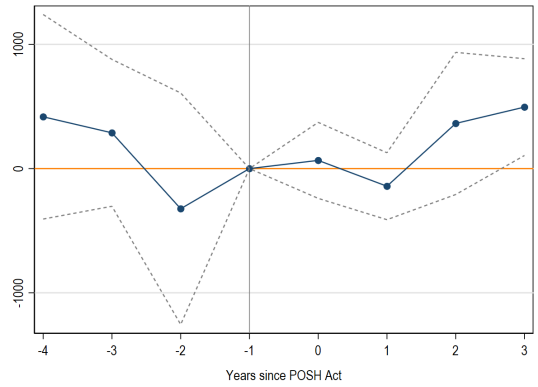

(b) Female mandays




(c) Male mandays




(d) Total mandays

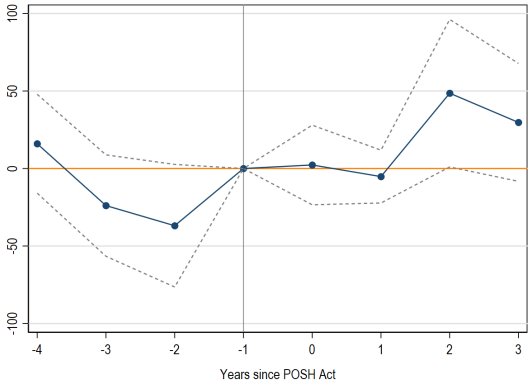



*Notes:* We estimate the impact of the POSH Act on outcome variables of percent female mandays (panel a), female mandays (panel b), male mandays (panel c) and total mandays (panel d). Percent female mandays are calculated as female mandays divided by female and male mandays. Total mandays include all mandays of permanent employees. We keep a set of establishments having 1-25 total regular employees in the latest pre-period during 2009-12. Establishments with 10-25 employees in the latest pre-period are defined as regulated and those with 1-9 employees are defined as unregulated. The estimation includes establishment and state-year fixed effects. The solid line represents the average annual treatment effects on the outcome variables, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Standard errors are clustered at establishment level.

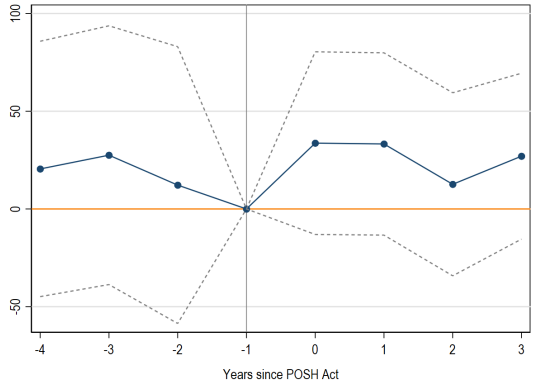
*Source:* Annual Survey of Industries 2009-2016

Figure B.14: Impact of POSH Act on mandays per worker in firms (bandwidth of 1-25)

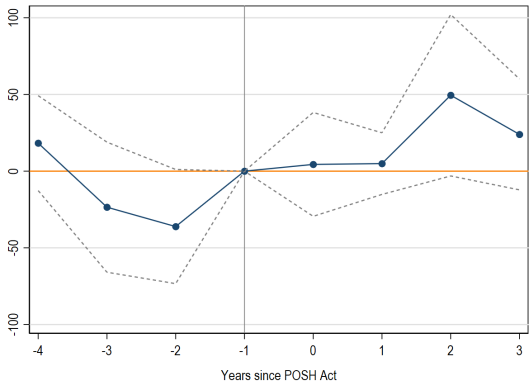
(a) Mandays per worker: Total




(b) Mandays per worker: Female



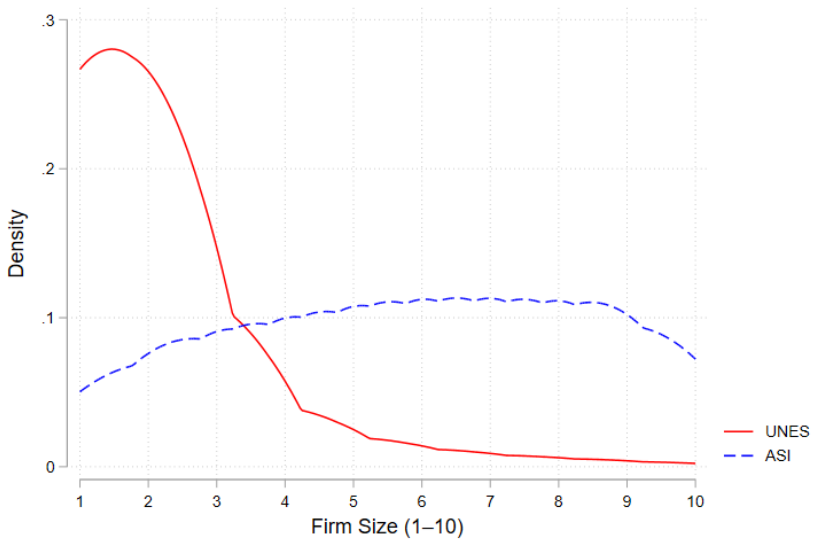

(c) Mandays per worker: Male




*Notes:* We estimate the impact of the POSH Act on outcome variables of mandays per worker (panel a), mandays per female worker (panel b) and mandays per male worker (panel c). Percent female mandays are calculated as female mandays divided by female and male mandays. We keep a set of establishments having 1-25 total regular employees in the latest pre-period during 2009-12. Establishments with 10-25 employees in the latest pre-period are defined as regulated and those with 1-9 employees are defined as unregulated. The estimation includes establishment and state-year fixed effects. The solid line represents the average annual treatment effects on the outcome variables, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Standard errors are clustered at establishment level.

*Source:* Annual Survey of Industries 2009-2016

Figure B.15: Pre-POSH firm size distribution (Bandwidth: 1-10): UNES vs ASI




*Notes:* This figure plots the density of firms for each firm size (total number of workers) from 1 to 10 for pre-period UNES and ASI data.

*Source:* National sample Surveys - Unincorporated Non-Agricultural Enterprises, Excluding Construction (UNES) 2010-11 (round 67), Annual Survey of Industries (ASI) 2010-11 (only 2010).

Table B.1: Other major prevention of workplace sexual-harassment policy architectures from across the world

| **Country (the policy)** | **Core employer duty (prevention/response)** | **Required firm-level procedure** | **Threshold / scope trigger** | **Enforcement channel & financial penalty** |
|---|---|---|---|---|
| **Israel** (Prevention of Sexual Harassment Law, 1998; Regulations as amended) | Employer must take reasonable measures to prevent SH & handle complaints; duty to promulgate internal rules | Internal rules/policy and employer handling mechanism for complaints | $\geq$25 employees must publish internal rules/procedure | Civil liability framework; compensation/damages via civil remedies |
| **Brazil** (CIPA / Law 14.457/2022) | Workplace measures against harassment/violence (training, channels, internal rules) in covered firms | CIPA-related internal committee ("Internal Committee for Accident Prevention and Harassment") with SH/violence prevention responsibilities | Firms required to maintain CIPA under NR-5 (sector risk $\times$ establishment size) | Labour regulation/inspection + legal liability; financial exposure through regulatory non-compliance |
| **France** (Labour Code) | Prevention obligations; organizational point of contact for SH/sexist acts | Designated SH point of contact/officer (in covered firms) | $\geq$250 employees | Labour code compliance + liability exposure; financial bite via legal/compliance consequences |
| **Pakistan** (Protection against Harassment of Women at the Workplace Act, 2010) | Duty to adopt a code of conduct and address complaints through an inquiry process | Three-member Inquiry Committee (must include at least one woman member) | Organizational duty (not framed as small-firm threshold) | Internal inquiry + external oversight/appeal; enforceable sanctions through the process |
| **Philippines** (Anti-Sexual Harassment Act, RA 7877, 1995) | Duty to promulgate rules and procedures to prevent and address SH | Committee on Decorum and Investigation (CODI) / complaint-handling mechanism | Applies across covered workplaces/education/training institutions (no firm-size trigger) | Administrative and legal channels; enforceable liability/sanctions |
| **United Kingdom** (Equality Act 2010 + Worker Protection Act, Oct 2024) | Duty to take reasonable steps to prevent SH | No universal committee mandate; prevention duty is the core lever | Broad employer duty (not size-triggered) | Employment Tribunal framework; up to 25% compensation uplift on sexual harassment claims for breach of prevention duty; EHRC enforcement |
| **Australia** (Sex Discrimination Act positive duty; enforcement since 2023) | Positive duty to eliminate, as far as possible, SH and related unlawful conduct | No universal committee mandate; duty focuses on organizational prevention systems | Broad coverage (not size-triggered) | Regulatory enforcement (AHRC compliance powers) + civil liability; financial bite via enforcement and damages/settlements |

*Continued on next page*

Table B.1 – *continued from previous page*

| **Country (the policy)** | **Core employer duty (prevention/response)** | **Required firm-level procedure** | **Threshold / scope trigger** | **Enforcement channel & financial penalty** |
|---|---|---|---|---|
| **Canada (Federal)** (Canada Labour Code harassment & violence regime + AMPs, Jan 2021) | Mandatory prevention, training, assessment, and response in federally regulated workplaces | System requirements (policy/training/risk assessment/response), not a single committee template | Federally regulated employers | Labour compliance regime; Administrative Monetary Penalties (AMPs) for non-compliance |
| **South Korea** (Equal Employment Opportunity Act + Labour Standards Act, 2018–2019) | Employer duty to prevent SH; mandatory annual prevention training; duty to investigate and take protective measures | Rules of Employment (RoE) must address SH prevention and response; consultation/complaint system required | $\geq$10 employees must file RoE with Ministry of Employment and Labor | Administrative fines (up to KRW 5M for non-compliance with corrective orders); criminal fines up to KRW 30M for retaliation |
| **Sweden** (Discrimination Act 2008:567) | Employer duty to prevent SH; must investigate allegations and take reasonable measures | Policy and active-measures framework against discrimination/harassment | All employers covered; written documentation required for $\geq$25 employees | Equality Ombudsman supervision; financial penalty for non-compliance with orders; discrimination compensation via courts |
| **Germany** (General Equal Treatment Act / AGG, 2006) | Employer duty to take preventive measures and protect employees from SH; must respond to complaints | Complaints office (Beschwerdestelle) required under AGG §13; internal policies/training recommended | Broad employer duty (no firm-size threshold for core obligations) | Civil liability; compensation/damages under AGG §15 (employer liable if fails to take appropriate measures) |
| **Denmark** (Equal Treatment Act + Working Environment Act, amended 2023) | Explicit duty to ensure harassment-free environment; duty to react to incidents | Risk assessment (APV) must address SH; internal policies recommended | Broad employer duty (no firm-size threshold) | Board of Equal Treatment claims; compensation (DKK 20K–40K typical; 1/3 uplift for serious cases); fines for non-compliance |
| **Japan** (Equal Employment Opportunity Act + Labour Policy Comprehensive Promotion Act, 2020/2022) | Employer duty to implement measures to prevent SH and power harassment; establish consultation channels | Internal policy clarification; consultation/complaint system; response procedures required | Large companies from June 2020; also SMEs from April 2022 | Administrative guidance by MHLW; public disclosure ("name and shame") for non-compliance; civil liability for damages |

Table B.2: Overall summary statistics for all firms (ASI, 2009-2016)

| | (1) | (2) | (3) |
|---|---|---|---|
| **Variable** | **Mean** | **SD** | **N** |
| **Panel A**: Main Dependent Variables | | | |
| Proportion of Female Workers | 11.999 | 23.677 | 350980 |
| No. of Female Workers | 6.665 | 30.264 | 350980 |
| No. of Male Workers | 33.361 | 83.668 | 350980 |
| Extensive Margin (Female Workers¿0) | 0.293 | 0.455 | 350980 |
| **Panel B**: Firm Size Variables | | | |
| Total Male and Female Permanent Workers | 40.026 | 96.385 | 350980 |
| Total Permanent Employees | 51.480 | 122.649 | 385423 |
| **Panel C**: Other Variables | | | |
| Male Wage Rate | 127.336 | 443.866 | 348205 |
| Female Wage Rate | 102.533 | 142.269 | 109689 |
| Gender Wage Gap | 0.850 | 0.180 | 106527 |
| Wage Rate (Thousands) | 0.125 | 0.442 | 351307 |
| Profit per Worker (Millions) | 0.106 | 0.554 | 383026 |
| Labour Productivity (Millions) | 1.455 | 3.250 | 383026 |
| Total Output (Millions) | 117.014 | 444.675 | 385423 |
| Total Profits (Millions) | 14.028 | 86.023 | 385423 |

*Notes:* Percentage of female workers are defined as total female workers in permanent employment out of total male and female workers. Firm size is defined as total permanent workers in a firm, which includes total male workers, total female workers, supervisors, and other employees. Firm size (Output) is defined as total value of output (price × quantity) produced by a firm deflated by two digit industry specific Wholesale Price Index (WPI) with 2004 as the base year. Total wages are deflated deflated by Consumer Price Index (CPI) with 2004 as the base year. The female (male) wage rate is derived as real wages paid to female (male) workers by female (male) worker mandays. Gender wage gap is defined as the ratio of female wage rate by male wage rate. Profits are defined as the difference between the value of output and inputs used by the firm including depreciation, again deflated by the WPI. Labor productivity is defined as total value of real output per employee. Similarly, profit per employee is defined as total real profit divided by total employees. Labor productivity is defined as total value of real output per employee.
*Source:* Annual Survey of Industries 2009-2016.

Table B.3: Impact of POSH Act on employment in firms: Dropping states with other legislative amendments (Bandwidth: 1-25)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| States Without: | Factories Act Amendments | | | | Night Shift Amendments | | | |
| | Percent Female | Female Workers | Male Workers | Extensive | Percent Female | Female Workers | Male Workers | Extensive |
| Regulated Firm × Post | -0.4504** | -0.0739 | 0.3813 | -0.0035 | -0.4654* | -0.0161 | 0.5100 | -0.0044 |
| | (0.2175) | (0.1352) | (0.2549) | (0.0045) | (0.2500) | (0.1812) | (0.3190) | (0.0049) |
| Observations | 82644 | 82644 | 82644 | 82644 | 65797 | 65797 | 65797 | 65797 |
| Outcome Mean | 10.0043 | 1.6190 | 9.3857 | 0.2199 | 10.0245 | 1.7581 | 9.7589 | 0.2167 |
| R-Squared | 0.835 | 0.665 | 0.659 | 0.780 | 0.849 | 0.689 | 0.726 | 0.791 |
| *Controls* | | | | | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

*Notes:* We estimate the impact of the implementation of the POSH Act in 2013 on female employment. The dependent variable in column (1) and (5) is defined as the number of permanent female workers divided by the total number of permanent male and female workers. Columns (2) and (6) use total number of female workers, column (3) and (7) use total number of male workers, and columns (4) and (8) use a binary outcome of whether the firm has any female workers or not. Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) in the firm in the latest pre-period prior to POSH. We keep a set of establishments with total employees 1-25 in the latest pre-period. *Regulated Firm* takes a value of one if total permanent employees in the establishment are 10-25 in the pre-period and zero otherwise. *Post POSH* is an indicator variable which equals one for years 2013-2016 and zero otherwise. We drop Jharkhand, Madhya Pradesh, and Rajasthan in the analysis of states without amendments to the Factories Act till 2016. Similarly, we drop Punjab, Assam, Madhya Pradesh, Maharashta, and Andhra Pradesh in our analysis of states without amendments to Night Shift regulations for female workers till 2016. The estimation includes Establishment Fixed Effects and State-Year Fixed Effects. Robust standard errors clustered at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
*Source:* Annual Survey of Industries 2009-2016

Table B.4: Impact of POSH Act on employment in firms (bandwidth 1-25): Difference-in-Discontinuity estimates

| | Percent Female | | No. of Female Workers | | No. of Male Workers | | Extensive | |
|---|---|---|---|---|---|---|---|---|
| Post POSH × Regulated Firm | -1.1498* | -1.1457* | -0.0097 | -0.0112 | 0.2974 | 0.2579 | -0.0040 | -0.0026 |
| | (0.5941) | (0.5955) | (0.0909) | (0.0904) | (0.2568) | (0.2561) | (0.0127) | (0.0127) |
| Post × Running Variable | 0.7262** | 0.6968** | 0.0421 | 0.0407 | -0.0820 | -0.0519 | 0.0078 | 0.0066 |
| | (0.2910) | (0.2915) | (0.0428) | (0.0428) | (0.1113) | (0.1119) | (0.0058) | (0.0058) |
| Regulated Firm × Post × Running Variable | -0.6690** | -0.6639** | -0.0462 | -0.0472 | 0.0252 | -0.0076 | -0.0059 | -0.0053 |
| | (0.3044) | (0.3045) | (0.0472) | (0.0474) | (0.1264) | (0.1266) | (0.0062) | (0.0062) |
| Post × Running Variable Squared | 0.0958*** | 0.0946*** | 0.0066 | 0.0068 | -0.0008 | 0.0034 | 0.0013** | 0.0012* |
| | (0.0337) | (0.0336) | (0.0051) | (0.0051) | (0.0121) | (0.0121) | (0.0006) | (0.0006) |
| Regulated Firm × Post × Running Variable Squared | -0.1023*** | -0.0997*** | -0.0069 | -0.0071 | 0.0095 | 0.0052 | -0.0015** | -0.0014** |
| | (0.0342) | (0.0342) | (0.0053) | (0.0053) | (0.0130) | (0.0130) | (0.0007) | (0.0007) |
| Observations | 91744 | 91744 | 91744 | 91744 | 91744 | 91744 | 91744 | 91744 |
| Outcome Mean | 9.1839 | 9.1839 | 1.0448 | 1.0448 | 8.4791 | 8.4791 | 0.2054 | 0.2054 |
| R-Squared | 0.834 | 0.835 | 0.742 | 0.744 | 0.674 | 0.677 | 0.775 | 0.776 |
| *Controls* | | | | | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry-Year-Zone FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | | ✓ | | ✓ | | ✓ | | ✓ |

*Notes:* We estimate the impact of the implementation of the POSH Act in 2013 on female employment. The dependent variable in columns (1)-(2) is defined as the number of permanent female workers divided by the total number of permanent male and female workers. Columns (3)-(4) and (5)-(6) use total number of female workers and total number of male workers as the dependent variables, respectively. The dependent variable for columns (7)-(8) is the extensive margin which takes the value of 1 if the firm had any female workers, and 0 otherwise. Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) in the firm in the latest pre-period prior to POSH. We keep a set of establishments with total employees 1-25 in the latest pre-period. *Regulated Firm* takes a value of one if total permanent employees in the establishment are 10-25 in the pre-period and zero otherwise. *Post* is an indicator variable which equals one for years 2013-2016 and zero otherwise. The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects. Robust standard errors clustered at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B.5: Impact of state-industry level regulated firm exposure (in terms of female employment) on female worker share in firms: Evidence from firm-level data (Bandwidth: 1-25)

| | (1) | (2) |
|---|---|---|
| Unregulated firm × Exposure Index × Post | -0.3201 | -0.3893 |
| | (0.4732) | (0.4696) |
| Regulated firm × Post | -0.3031 | -0.4608** |
| | (0.2212) | (0.2232) |
| Observations | 87874 | 87874 |
| Outcome Mean | 9.3170 | 9.3170 |
| R-Squared | 0.834 | 0.835 |
| *Controls* | | |
| Firm FE | ✓ | ✓ |
| Year FE | ✓ | |
| State × Year FE | | ✓ |

*Notes:* The dependent variable is defined as the number of female workers divided by the total number of male and female workers. Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) in the firm in the latest pre-period prior to POSH. We keep a set of establishments with total employees 1-25 in the latest pre-period. *Regulated Firm* takes a value of one if total permanent employees in the establishment are 10-25 in the pre-period and zero otherwise. *Post* is an indicator variable which equals one for years 2013-2016 and zero otherwise. Exposure index for each state-industry pair is constructed using the individual-level data (defined as the mean total employment in regulated firms in a state-industry as a proportion of total employment in the state-industry where regulated firm is a firm having at least 10 employees but at most 19 employees in the pre-period i.e., 2004-05, 2009-10, and 2011-12). The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects. Robust standard errors clustered at the firm level in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

*Source:* Annual Survey of Industries 2009-2016, National sample Surveys 2004-5 (round 61), 2009-10 (round 66), and 2011-12 (round 68).

Table B.6: Impact of POSH Act on other employment outcomes in firms (bandwidth: 1-25)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Permanent Employees | Contract Workers | Contract Share | Supervisor Share |
| Post POSH × Regulated Firm | 0.5009 | 0.2156 | 1.0382*** | -0.0242 |
| | (0.3277) | (0.3650) | (0.2288) | (0.1685) |
| Observations | 92399 | 92399 | 92399 | 92399 |
| Outcome Mean | 15.2468 | 6.2545 | 8.2031 | 13.1323 |
| R-Squared | 0.672 | 0.792 | 0.760 | 0.631 |
| *Controls* | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | ✓ | ✓ | ✓ | ✓ |

*Notes:* We estimate the impact of the implementation of the POSH Act in 2013 on employment in firms. The dependent variable in column(1) is the total number of permanent employees and for column (2) it is the number of workers hired through a contractor (third-party). The dependent variable for column (3) is defined as the number of contract workers divided by the total number of permanent and contract workers in the firm. Similarly, the dependent variable for column (4) is the number of supervisors divided by the total number of permanent and contract workers in the firm. Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) and contract workers in the firm in the latest pre-period prior to POSH. We keep a set of establishments with total employees 1-25 in the latest pre-period. *Regulated Firm* takes a value of one if the firm size is 10-25 in the pre-period and zero otherwise. *Post* is an indicator variable which equals one for years 2013-2016 and zero otherwise. The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects. Robust standard errors clustered at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
*Source:* Annual Survey of Industries 2009-2016

Table B.7: Summary statistics prior to POSH (UNES unregulated firms + ASI regulated firms)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **Unregulated Sector** | | | **Regulated Sector** | | |
| **Variable** | **Mean** | **SD** | **N** | **Mean** | **SD** | **N** |
| **Panel A**: Main Dependent Variables | | | | | | |
| Percent female workers | 9.546 | 26.494 | 32591 | 11.533 | 22.611 | 10129 |
| No. of female workers | 0.281 | 0.851 | 32591 | 1.412 | 2.990 | 10129 |
| No. of male workers | 2.239 | 1.681 | 32591 | 9.805 | 4.322 | 10129 |
| **Panel B**: Firm Size Variables | | | | | | |
| Total permanent employee | 1.790 | 1.308 | 95468 | 15.847 | 4.374 | 10672 |
| **Panel C**: Other Variables | | | | | | |
| Daily wage rate | 60.426 | 33.165 | 32395 | 102.973 | 50.102 | 10108 |
| Profit per worker (millions) | 0.005 | 0.006 | 32591 | 0.106 | 0.311 | 10672 |
| Total profits (millions) | 0.011 | 0.016 | 32655 | 2.284 | 6.724 | 10672 |
| Labor productivity (millions) | 0.021 | 0.052 | 32555 | 1.812 | 3.207 | 10672 |
| Total Output (Millions) | 0.012 | 0.070 | 95346 | 38.767 | 74.313 | 10672 |

*Notes:* The appended firm-level data consists of regulated sector data sourced from the ASI database and the unregulated sector data sourced from the NSS unincorporated firms survey database. Regulated sector consists of firms restricted to firm size of at least 10 while unregulated sector consists of firms with total number of employees less than 10. Percentage female workers are defined as total hired female workers out of total hired male and female workers (multiplied by 100). Wage rate, profit, and output of a firm are deflated by two-digit industry specific Wholesale Price Index (WPI) with 2004 as the base year. Total wages are deflated by Consumer Price Index (CPI) with 2004 as the base year. Labor productivity is defined as total value of real output per employee. To generate the weights for generating the summary statistics, before the firm bandwidth selection, sampling weights respective to each dataset have been rescaled so that they sum up to 1 for each data source (NSS or ASI) and year. Then to get the final weights, these rescaled weights have been multiplied by the pre-POSH proportion of manufacturing firms with firm size less than 10 (i.e., 0.98 as per Economic Census 2005 data) for NSS observations and by the pre-POSH proportion of manufacturing firms with firm size at least 10 (i.e., 0.02 as per Economic Census 2005 data) for ASI observations.
*Source:* National sample Surveys - Unincorporated Non-Agricultural Enterprises, Excluding Construction (UNES) 2010-11 (round 67), Annual Survey of Industries (ASI) 2010-11 (only 2010).

Table B.8: Impact of POSH Act on female employment share in regulated sector (UNES unregulated firms + ASI regulated firms): Bandwidth 1-25

| | (1) | (2) | (3) |
|---|---|---|---|
| | Percent Female Workers | Number of Female Workers | Number of Male Workers |
| Regulated Firm × Post | –1.354** | –0.005 | 0.045 |
| | (0.550) | (0.070) | (0.111) |
| Observations | 85039 | 85039 | 85039 |
| Baseline Outcome Mean | 9.447 | 0.508 | 3.877 |
| R-Squared | 0.319 | 0.408 | 0.558 |
| State × Industry(4-digit) × Regulated Sector FE | ✓ | ✓ | ✓ |
| State × Year FE | ✓ | ✓ | ✓ |
| Industry-zone FE | ✓ | ✓ | ✓ |

*Notes:* The appended firm-level data consists of regulated sector data sourced from the ASI database and the unregulated sector data sourced from the NSS unincorporated firms survey database. Regulated sector consists of manufacturing firms restricted to firm size 10-25 while unregulated sector consists of manufacturing firms with total number of employees less than 10. The dependent variable is the percentage of female workers in a firm in column (1), number of female workers in a firm in column (2), and number of male workers in a firm in column (3). Workers include (full time/part time) formal and informal hired workers working in the manufacturing firms. Post takes a value of one for the years 2015-16 (2015-16 for NSS and the closest financial year i.e., 2015 for ASI) and zero for the years 2010-11 (2010-11 for NSS and the closest financial year i.e., 2010 for ASI). States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Puducherry, Andaman & Nicobar Islands). To generate the weights for the regressions, before the firm bandwidth selection, sampling weights respective to each dataset have been rescaled so that they sum up to 1 for each data source (NSS or ASI) and year. Then to get the final weights, these rescaled weights have been multiplied by the pre-POSH proportion of manufacturing firms with firm size less than 10 (i.e., 0.98 as per Economic Census 2005 data) for NSS observations and by the pre-POSH proportion of manufacturing firms with firm size at least 10 (i.e., 0.02 as per Economic Census 2005 data) for ASI observations. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National sample Surveys - Unincorporated Non-Agricultural Enterprises, Excluding Construction (UNES) 2010-11 (round 67), and 2015-16 (round 73), Annual Survey of Industries (ASI) 2010-11 (only 2010), and 2015-16 (only 2015).

Table B.9: Impact of POSH Act on employment in firms: Heterogeneity by firm performance (bandwidth: 1-25)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Percent Female Workers | Female Workers | Male Workers | Extensive |
| **Panel (a): Heterogeneity by Total Profit (Millions)** | | | | |
| Regulated Firm × Post | -0.1557 | 0.1275 | -0.0705 | 0.0020 |
| | (0.4275) | (0.3266) | (0.3501) | (0.0084) |
| Regulated Firm × Post × Q2 Profits | -1.0095* | -0.4528 | -0.5707 | -0.0217* |
| | (0.5867) | (0.4147) | (0.4005) | (0.0115) |
| Regulated Firm × Post × Q3 Profits | -0.2652 | -0.4548 | -0.1713 | -0.0140 |
| | (0.6062) | (0.4198) | (0.4079) | (0.0124) |
| Regulated Firm × Post × Q4 Profits | -0.2229 | 0.3926 | 1.3147 | 0.0122 |
| | (0.6511) | (0.6274) | (1.3851) | (0.0142) |
| Observations | 92367 | 92367 | 92367 | 92367 |
| Outcome Mean | 9.3841 | 1.5230 | 9.4043 | 0.2081 |
| R-Squared | 0.832 | 0.663 | 0.667 | 0.775 |
| **Panel (b): Heterogeneity by Labour Productivity (Millions)** | | | | |
| Regulated Firm × Post | -0.8567* | -0.1903 | 0.2196 | -0.0105 |
| | (0.4897) | (0.5115) | (0.3516) | (0.0085) |
| Regulated Firm × Post × Q2 Productivity | 0.9249 | 0.3527 | -0.4921 | 0.0163 |
| | (0.6091) | (0.5517) | (0.5761) | (0.0116) |
| Regulated Firm × Post × Q3 Productivity | 0.0196 | 0.0943 | 0.1009 | 0.0009 |
| | (0.6330) | (0.5245) | (0.4182) | (0.0120) |
| Regulated Firm × Post × Q4 Productivity | 0.5805 | 0.0589 | -0.1611 | 0.0039 |
| | (0.6199) | (0.5364) | (0.5022) | (0.0124) |
| Observations | 92367 | 92367 | 92367 | 92367 |
| Outcome Mean | 9.3841 | 1.5230 | 9.4043 | 0.2081 |
| R-Squared | 0.832 | 0.663 | 0.668 | 0.775 |
| *Controls* | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | ✓ | ✓ | ✓ | ✓ |

*Notes:* We estimate the heterogeneous impact of the POSH Act on firm or establishment employment by the latest pre-period profitability and labor productivity of the firm. The dependent variable in columns (1) is defined as the number of female workers divided by the total number of male and female workers. Columns (2) and (3) use total number of female workers and male workers as the dependent variables, respectively. The dependent variable for column (4) is the extensive margin of employing female workers which takes the value of one if the firm had any female workers, and 0 otherwise. Regulation status is determined using the total regular employees (total female workers, total male workers, other workers, and supervisors) in the establishment in the latest pre-period prior to POSH. We keep a set of establishments with total regular employees 1-25 in the latest pre-period. *Regulated Firm* takes a value of one if the firm or establishment size is 10-25 in the pre-period and zero otherwise. *Post* is an indicator variable which equals one for years 2013-2016 and zero otherwise. We create quartiles of total firm profits and labor productivity based on the latest pre-POSH value of these variables for each firm. Robust standard errors clustered at the establishment level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B.10: Impact of POSH Act on wage rate in firms (bandwidth: 1-25)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Male Wage Rate | | Female Wage Rate | | Gender Wage Gap | |
| **Panel A: All Firms in Sample** | | | | | | |
| Post POSH × Regulated Firm | 2.7547** | 2.5818** | 1.5646 | 1.5051 | -0.0028 | -0.0007 |
| | (1.1861) | (1.1997) | (1.7228) | (1.9164) | (0.0082) | (0.0083) |
| Observations | 91014 | 91014 | 15939 | 15939 | 14669 | 14669 |
| Outcome Mean | 107.4423 | 107.4423 | 81.1782 | 81.1782 | 0.8413 | 0.8413 |
| R-Squared | 0.364 | 0.367 | 0.604 | 0.610 | 0.548 | 0.559 |
| **Panel B: Firms with both Male and Female Workers** | | | | | | |
| Post POSH × Regulated Firm | 2.2171 | 1.1380 | 1.8046 | 1.5796 | -0.0028 | -0.0007 |
| | (1.8921) | (2.0253) | (1.8536) | (2.0949) | (0.0082) | (0.0083) |
| Observations | 14669 | 14669 | 14669 | 14669 | 14669 | 14669 |
| Outcome Mean | 101.6969 | 101.6969 | 82.1595 | 82.1595 | 0.8413 | 0.8413 |
| R-Squared | 0.694 | 0.700 | 0.606 | 0.613 | 0.548 | 0.559 |
| *Controls* | | | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | | ✓ | | ✓ | | ✓ |

*Notes:* The female (male) wage rate is calculated as real wages paid to female (male) workers by female (male) worker man-days. Gender wage gap is defined as the ratio of female wage rate by male wage rate. We estimate the impact of POSH Act implemented in 2013 on male wage rate (columns 1-2), female wage rate (columns 3-4) and the gender wage gap (columns 5-6). Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) in the firm in the latest pre-period prior to POSH. We keep a set of establishments with total employees 1-25 in the latest pre-period. *Regulated Firm* takes a value of one if total permanent employees in the establishment are 10-25 in the pre-period and zero otherwise. *Post* is an indicator variable which equals one for years 2013-2016 and zero otherwise. The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects. For Panel B, we only keep firms where both male and female workers are employed, i.e. wage rates for both genders and therefore gender wage gap is available. Robust standard errors clustered at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
*Source:* Annual Survey of Industries 2009-2016

Table B.11: Impact of POSH Act on firm performance (bandwidth: 1-25)

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Wage Rate (Thousands) | Profit per Employee (Millions) | Profit per Manday (Millions) | Output per Employee (Millions) | Output per Manday (Millions) |
| Post POSH × Regulated Firm | 0.0026** | -0.0028 | 0.0000 | 0.0023 | 0.0000 |
| | (0.0011) | (0.0062) | (0.0000) | (0.0267) | (0.0002) |
| Observations | 92373 | 92399 | 92377 | 92399 | 92384 |
| Outcome Mean | 0.1057 | 0.0936 | 0.0000 | 1.2866 | 0.0039 |
| R-Squared | 0.367 | 0.456 | 0.314 | 0.756 | 0.679 |
| *Controls* | | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| State-Year FE | ✓ | ✓ | ✓ | ✓ | ✓ |

*Notes:* We use ASI data to estimate the impact of POSH Act implementation in 2013 on firm performance indicators (profit per employee, wages per worker, and labor productivity) in regulated firms (number of employees > 10). Profits per employee are calculated by dividing total profits by total number of employees, wage rate is calculated by taking the sum of total wages paid to male and female workers, and dividing by their total mandays, and labor productivity is calculated by dividing total output by total employees. The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects. Robust standard errors clustered at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
*Source:* Annual Survey of Industries 2009-2016

Table B.12: Impact of POSH Act on workdays in firms (bandwidth: 1-25)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Female Proportion | Paid Mandays per Worker | | | Total Mandays(1000s) | | |
| | % Total Mandays | Female | Male | Total | Female | Male | Total |
| Post POSH × Regulated Firm | -0.4322** | 17.1732 | 26.1772** | 24.7218** | 0.0318 | 0.3667*** | 0.4679** |
| | (0.2029) | (11.1956) | (12.2052) | (11.1507) | (0.0675) | (0.1205) | (0.2064) |
| Observations | 92373 | 15892 | 91010 | 92399 | 92399 | 92399 | 92399 |
| Outcome Mean | 9.3280 | 326.1272 | 342.6633 | 349.4739 | 0.5148 | 3.1514 | 5.2590 |
| R-Squared | 0.833 | 0.382 | 0.351 | 0.321 | 0.477 | 0.455 | 0.409 |
| *Controls* | | | | | | | |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State × Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

*Notes:* We estimate the impact of the implementation of the POSH Act in 2013 on the number of mandays in firms. One manday here refers to the number of working days put in by workers, which means multiple shifts in the same day result in multiple workdays. The dependent variable in columns (1)-(3) is defined as the total amount of workdays by male/female/total workers divided by the number of male/female/total workers. The dependent variable for column (4) is defined as the number of female workdays divided by the total of male and female workdays. Regulation status is determined using the total permanent employees (total female workers, total male workers, other workers, and supervisors) and contract workers in the firm in the latest pre-period prior to POSH. We keep a set of establishments with total employees 1-25 in the latest pre-period. *Regulated Firm* takes a value of one if the firm size is 10-25 in the pre-period and zero otherwise. *Post* is an indicator variable which equals one for years 2013-2016 and zero otherwise. The estimation includes Establishment Fixed Effects, Year Fixed Effects, and State-Year Fixed Effects. Robust standard errors clustered at the firm level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* Annual Survey of Industries 2009-2016

# C Individual level evidence: Strategy, figures and tables

We next use nationally representative individual-level employment data to examine whether the POSH Act affected women's relative wage employment outside manufacturing as well. We combine the Employment and Unemployment rounds of India's National Sample Survey (NSS) that report establishment size—the 61$^{st}$ (2004–05), 66$^{th}$ (2009–10), and 68$^{th}$ (2011–12) rounds—with the 4$^{th}$ Employment Unemployment Survey (EUS) conducted in 2013–14 by the Ministry of Labour and Employment. This yields six pre-POSH years and one post-POSH year. Because relatively few EUS observations were collected in late 2013, we treat 2014 as post-POSH. We do not use PLFS in the main analysis because the Maternity Benefit (Amendment) Act came into force in 2017, though we later use PLFS to assess sensitivity.

The NSS and EUS report individual demographic and employment characteristics, including age, education, social group, employment status, and establishment size. We measure employment using *principal status*, which classifies an individual as employed if they worked for at least six months during the previous year. For those principally employed outside cultivation, the surveys report establishment size in four bins: $< 6$, 6–9, 10–19, and $> 20$ workers. We restrict the sample to wage workers aged 20–60 in the non-cultivation sector, since employment in own-account or family enterprises is unlikely to respond directly to POSH. The final sample contains 215,180 wage workers, of whom 17.5% are women and 44.5% work in regulated establishments. In the pre-period, regulated firms employ slightly more women and somewhat older, more educated, and higher-caste workers on average. Although the NSS provides earnings information, the 2014 EUS does not, so wage analyses cannot be carried out consistently in these data. Our baseline difference-in-differences specification is:

$$Female_{idjt} = \beta_1\big(Regulated_{it} \times Post_t\big) + X'_{it}\gamma + \delta_{dt} + \delta_j + \varepsilon_{idjt}, \tag{C.25}$$

where $Female_{idjt}$ is an indicator equal to one if wage worker $i$, in district $d$, industry $j$, and year $t$, is female. $Regulated_{it}$ equals one if the worker is employed in an establishment with at least 10 workers and zero otherwise, and $Post_t$ equals one in 2014. $X_{it}$ includes education, social group, age, and age squared. $\delta_{dt}$ denotes district-by-year fixed effects, which absorb local time-varying shocks and policy changes, and $\delta_j$ denotes 2-digit industry fixed effects. Regressions are estimated using survey weights and standard errors are clustered at the district level. The coefficient of interest, $\beta_1$, captures the differential post-POSH change in the probability that a wage worker in a regulated establishment is female. To assess the

identifying assumption, we estimate an event-study specification:

$$Female_{idjt} = \sum_{\tau \neq 2012} \alpha_\tau \big(Regulated_{it} \times 1[t = \tau]\big) + X'_{it}\gamma + \delta_{dt} + \delta_j + \varepsilon_{idjt}, \tag{C.26}$$

where 2012 is the omitted year. The $\alpha_\tau$ coefficients trace the differential evolution of women's relative wage employment in regulated versus unregulated establishments before and after POSH. As a complementary exercise, we also estimate a district-level treatment-intensity design:

$$ShareFemale_{dt} = \beta_2 \big(Exposure_d \times Post_t\big) + Z'_{dt}\pi + \delta_d + \delta_t + u_{dt}, \tag{C.27}$$

where $ShareFemale_{dt}$ is the female share among wage workers in district $d$ and year $t$, $Exposure_d$ is the pre-POSH share of wage workers employed in regulated establishments in district $d$, and $Z_{dt}$ includes district-level controls. This specification asks whether districts more exposed to regulated-firm employment experienced larger post-POSH declines in women's relative wage employment.

Table 5 reports the individual-level DiD estimates. Across columns, we progressively strengthen the specification by moving from state fixed effects to state-by-year fixed effects, district fixed effects, and finally district-by-year fixed effects; Equation C.25 presents the most demanding specification. Across specifications, relative female wage employment in regulated establishments declines by 2.2–2.9 percentage points after POSH, corresponding to a 12–16 percent decline relative to the mean female share among wage workers. Our preferred specification includes district-by-year fixed effects, which flexibly absorb local shocks and policy changes. Figure 13 shows no evidence of differential pre-trends and a discrete post-POSH decline in 2014.

The individual-level results are robust to several alternative specifications. Adding industry-by-year fixed effects leaves the estimates largely unchanged. Restricting the sample by dropping workers in firms with at least 20 employees, so that the comparison is tighter around the 10-worker threshold, produces similar estimates. Dropping states that changed the Factories Act threshold or amended restrictions on women's night work also does not alter the findings. A placebo exercise assigning the reform to 2010 yields no differential decline in women's relative employment between 2010 and 2012, supporting the identifying assumption. The district-level treatment-intensity design also implies a meaningful post-POSH decline in female wage employment in more exposed districts.

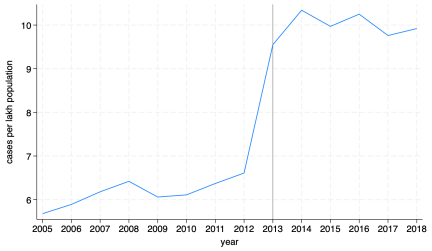
Finally, we use PLFS 2017–18 and 2018–19 to examine whether the post-POSH patterns persist once later data become available. Distinguishing salaried from casual workers is important because the Maternity Benefit (Amendment) Act applies only to women with

sufficiently continuous employment, potentially inducing substitution from salaried to casual contracts. The PLFS results show that the relative decline in female salaried employment in regulated firms continues, while the post-2017 rise in female casual employment is consistent with such contractual substitution. As in the ASI analysis, we also test for spillovers from regulated to unregulated firms and find no evidence that the estimated effects are driven by women displaced from regulated firms moving into unregulated establishments.

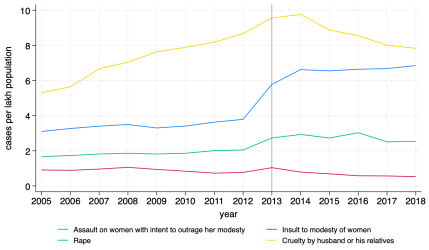
## C.1 Figures

Figure C.1: Trends in sexual and other crimes against women

(a) Sexual harassment




(b) Crimes against women




(c) Sexual harassment cases (BSE-500 firms)

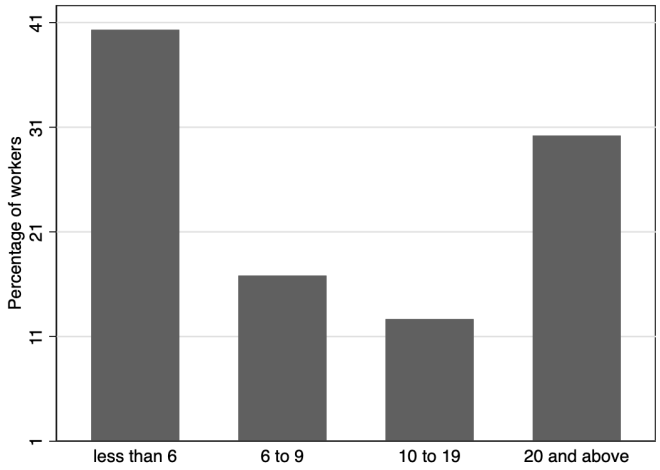



*Notes:* We plot the trend in assault cases on women (per lakh population). Panel (a) plots the trend in total number of cases of sexual harassment of women (which includes the categories of assault on women with intent to outrage her modesty, insult to modesty of women, and rape) from 2005 to 2018 per lakh population. Panel (b) plots the trend in number of reported cases of all categories of crimes against women (sexual harassment and cruelty by husband or his relatives) from 2005 to 2018 per lakh population. Panel (c) plots the trend in sexual harassment cases reported in top 500 firms of the BSE. Data on top 500 companies from the Bombay Stock Exchange have been compiled from annual reports by ComplyKaro. Data is reported according to financial years (April-March), the year in the graph refers to the first part of the financial year. For example, the reported cases for April 2016 - March 2017 are shown at year label 2016.

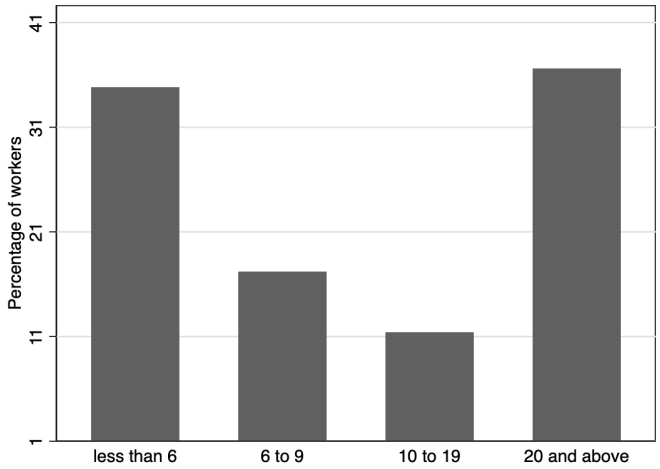
*Source:* National Crime Records Bureau (2005 to 2018) and ComplyKaro.

Figure C.2: Distribution of Workers (NSS)

(a) Pre-POSH Distribution of workers by establishment size (NSS)




(b) Post-POSH Distribution of workers by establishment size (NSS)

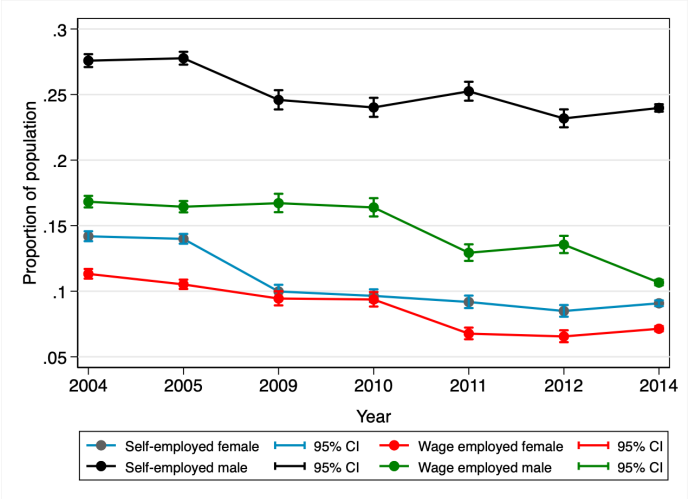



*Notes:* These figures report the distribution of total wage workers (in non-cultivation sector) across establishment (or firm) size in the NSS data before POSH Act implementation (panel a) and after implementation (panel b). We plot the distribution of working-age (20-60 years) individuals employed (by the principal employment status i.e., employed for at least 6 months in the last reference year).

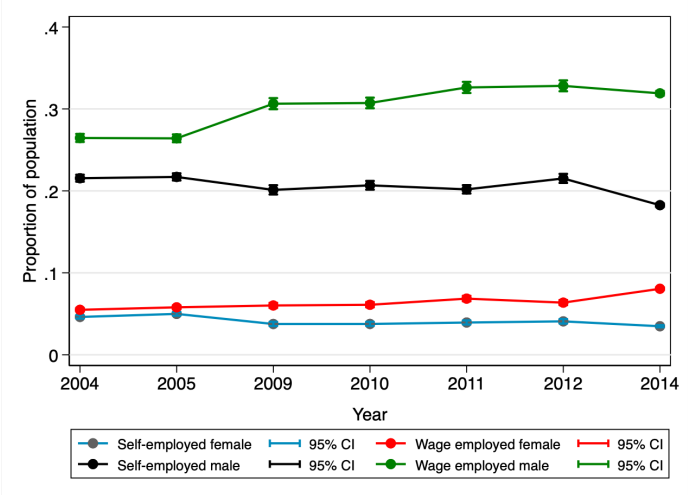
*Source:* National sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labor Bureau (EUS 2014).

Figure C.3: Trends in male and female employment in India: Cultivation vs non-cultivation sectors (2004-2014)

(a) Cultivation sector




(b) Non-cultivation sector

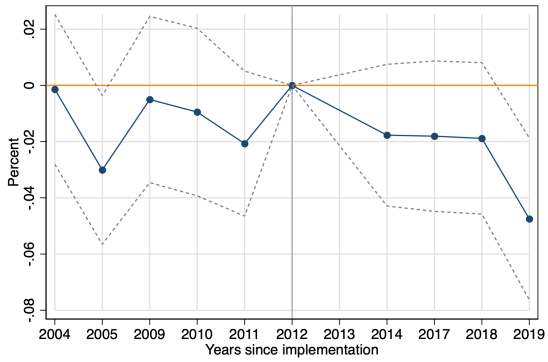



*Notes:* The figure shows the distribution of working-age (20-60 yrs) females and males across wage and self-employment, in cultivation (panel a) and non-cultivation (panel b) sectors over time. We define employment based on principal status of employment in the survey.

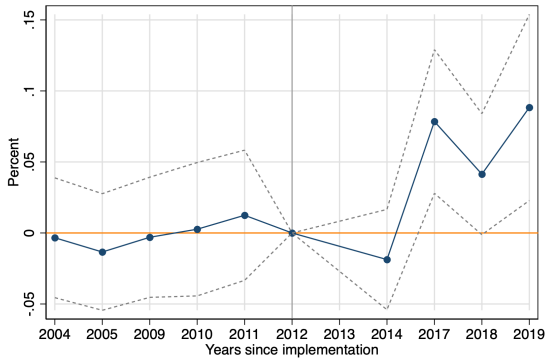
*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labor Bureau (EUS 2014).

Figure C.4: Impact of POSH Act on relative female employment: Extended data and by type of contract

(a) Salaried employees




(b) Casual or daily wage employees

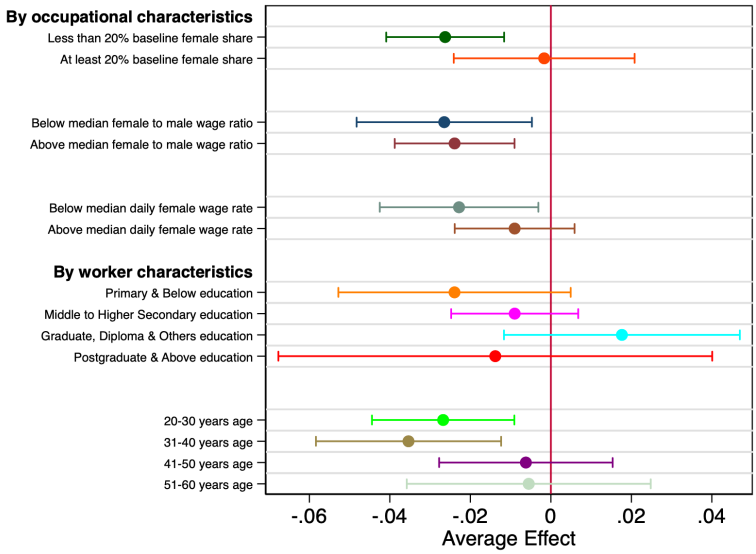



*Notes:* We plot the impact of POSH Act on relative female wage employment. The outcome variable is whether a female is employed as a wage worker in salaried employment (panel a) and casual wage worker (panel b), keeping the sample of all salaried workers and casual wage workers in panel (a) and (b), respectively. The solid line represents the average annual treatment effects, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Specifications include individual-level controls, district × year and industry (2-digit)-zone fixed effects. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Standard errors are clustered at district level.

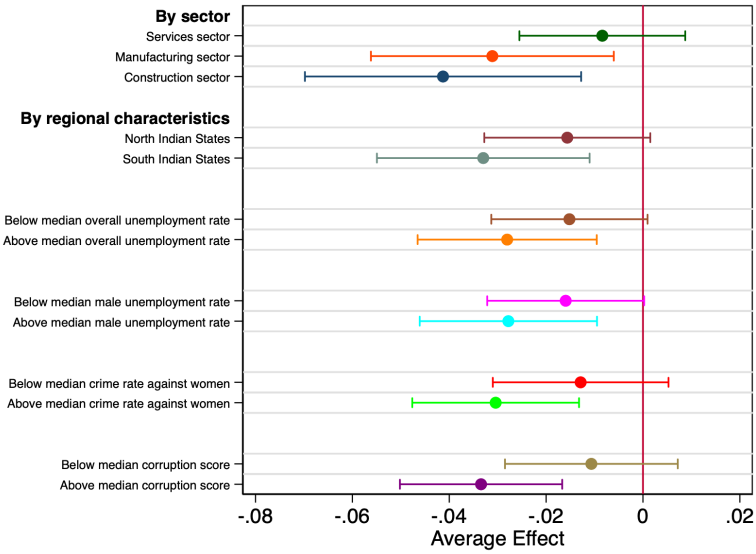
*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68), Labor Bureau (EUS 2014) and Periodic Labor Force Surveys 2017-18 and 2018-19.

Figure C.5: Impact of POSH Act on relative female employment: Heterogeneity (NSS)

(a) By occupational and worker characteristics




(b) By sector and regional characteristics

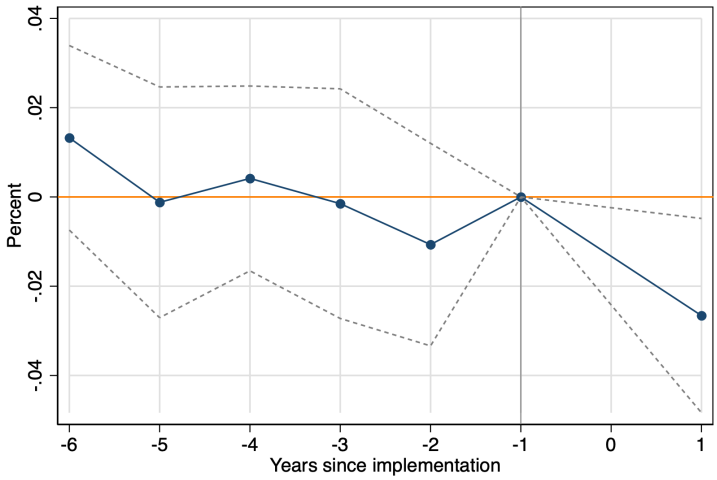



*Notes:* We plot the impact of POSH Act on relative female wage employment. The dependent variable takes a value of one if an individual is female and zero if male. The sample is restricted to individuals aged 20-60 employed in wage work in the non-cultivation sector (by principal employment status). We plot sub-sample wise estimates ($\beta_1$) for each group. Panel (a) plots the sub-sample wise impacts based on occupational share, wage ratio (i.e., daily female relative to male wage), daily female wage, educational level, and age. Panel (b) plots heterogeneous impacts by industrial sector, region, crime rate against women, male and overall district unemployment rate, and state corruption score. North Indian States: Gujarat, Rajasthan, Uttar Pradesh, Uttarakhand, Madhya Pradesh, Punjab, Haryana, Delhi, Chhattisgarh and Chandigarh. South Indian States: Kerala, Tamil Nadu, Andhra Pradesh, Telangana, Karnataka, Maharashtra and Puducherry. All sub-sample specifications include individual-level controls, district × year, and industry(2-digit)-zone fixed effects. Standard errors are clustered at district level. The solid dots represent the average annual treatment effect and the horizontal capped lines denote the 95% confidence intervals.

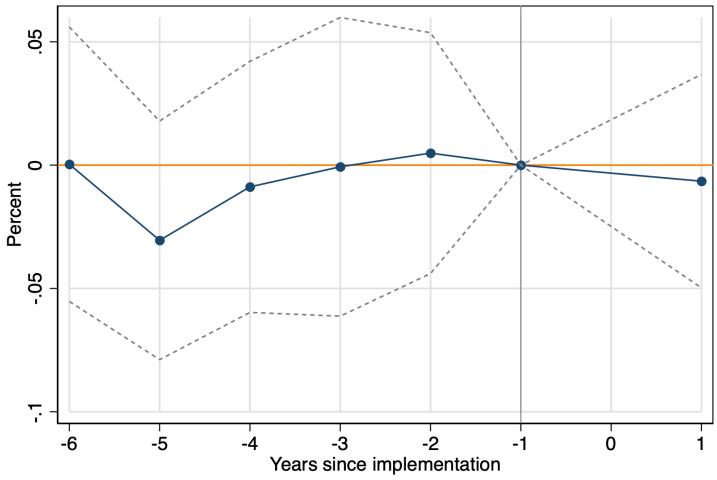
*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labor Bureau (EUS 2014). India Corruption Study 2008 by Transparency International. District-level unemployment rates from 68th round of NSS (2011-12). Female share of workers, female wage and female to male wage ratio are calculated from 68th round of NSS (2011-12) at the occupation level. State-level crime rate calculated using the 2012 statewise data for all crime against women from India's National Crime Records Bureau.

Figure C.6: Impact of POSH Act on relative female employment: Heterogeneity by occupations (NSS)

(a) Below 20% share of female employees



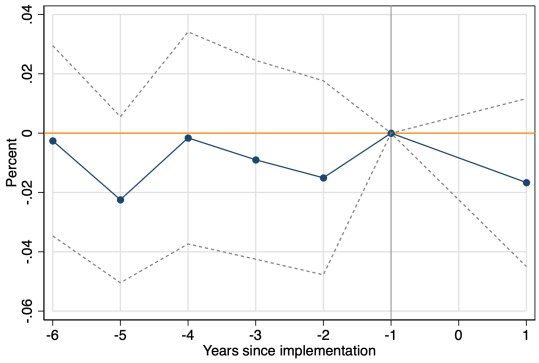

(b) Above 20% share of female employees



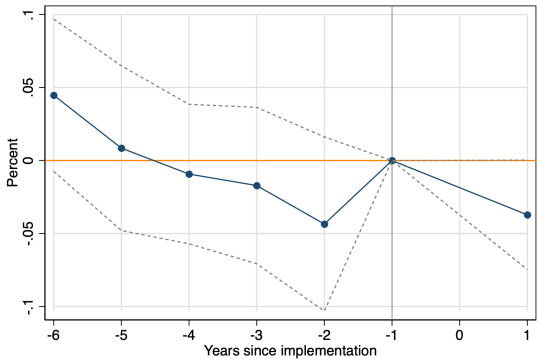

*Notes:* We plot the impact of POSH Act on relative female wage employment. The outcome variable is whether a female is employed as a wage worker, keeping the sample of all wage workers. Panel (a) plots the event study estimates for occupations having less than 20% women and panel (b) plots them for occupations having more than 20% women in the pre-period (2004-2012). The solid line represents the average annual treatment effects, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Specifications include individual-level controls, district × year and industry (2-digit)-zone fixed effects. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Standard errors are clustered at district level.
*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labor Bureau (EUS 2014).

Figure C.7: Impact of POSH Act on relative female employment: Variation across sectors (NSS)

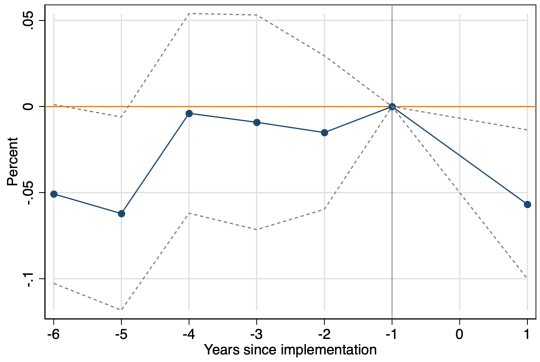
(a) Services




(b) Manufacturing




(c) Construction




*Notes:* We plot the impact of POSH Act on relative female wage employment. The outcome variable is whether a female is employed as a wage worker, keeping the sample of all wage workers. Panel (a) plots the event study estimates for services sector, panel (b) for the manufacturing sector and panel (c) for the construction sector. The solid line represents the average annual treatment effects, and the dashed lines denote the 95% confidence intervals. The treatment effects are plotted with respect to the year before the implementation of the act (2012) which is denoted by a vertical line. Specifications include individual-level controls, district × year and industry (2-digit)-zone fixed effects. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Standard errors are clustered at district level.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labor Bureau (EUS 2014).

## C.2 Tables

Table C.1: Summary statistics by regulation status: Pre-POSH (NSS, Individual level)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **Unregulated Firms** | | | **Regulated Firms** | | |
| Variable | Mean | SD | N | Mean | SD | N |
| Proportion of female workers employed | 0.171 | 0.377 | 82384 | 0.177 | 0.382 | 62307 |
| Age | 34.925 | 10.325 | 82384 | 36.658 | 10.382 | 62307 |
| ***Education:*** | | | | | | |
| Illiterate | 0.236 | 0.425 | 82384 | 0.128 | 0.334 | 62307 |
| Below Secondary | 0.438 | 0.496 | 82384 | 0.285 | 0.452 | 62307 |
| Secondary | 0.129 | 0.335 | 82384 | 0.134 | 0.340 | 62307 |
| Higher Secondary/Diploma | 0.090 | 0.286 | 82384 | 0.151 | 0.358 | 62307 |
| Graduate & Above | 0.096 | 0.295 | 82384 | 0.297 | 0.457 | 62307 |
| Others | 0.010 | 0.102 | 82384 | 0.006 | 0.074 | 62307 |
| ***Caste:*** | | | | | | |
| Scheduled Tribe | 0.068 | 0.251 | 82384 | 0.060 | 0.237 | 62307 |
| Scheduled Caste | 0.246 | 0.431 | 82384 | 0.177 | 0.381 | 62307 |
| Other Backward Castes | 0.418 | 0.493 | 82384 | 0.359 | 0.480 | 62307 |
| Others | 0.268 | 0.443 | 82384 | 0.405 | 0.491 | 62307 |

*Notes:* Columns (1)-(3) show the summary statistics for workers employed in unregulated firms or establishments. Columns (4)-(6) show the summary statistics for workers employed in regulated firms or establishments. Firms with at least 10 employees are defined as regulated firms while those having less than 10 employees are defined as unregulated firms. Note, firm here denotes the establishment where the worker is employed. The sample of individuals is restricted to those working in the non-cultivation sector (by the principal employment status i.e., employed for at least 6 months in the last reference year) as wage worker and who are aged 20-60. We keep data in the pre-POSH period i.e., from 2004 to 2012. Proportion of female workers refers to mean of the outcome variable whether an individual employed as a wage worker in the non-agricultural sector is female. Age is measured in years. The data provides highest completed level of education.
*Source:* 61st (2004-05), 66th (2009-10) and 68th (2011-12) rounds of National Sample Survey.

Table C.2: Impact of POSH Act on relative female employment: Regulated vs unregulated firms

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | For unregulated Firms | | For regulated Firms | |
| Post | 0.039*** | 0.039*** | 0.018*** | 0.025*** |
| | (0.004) | (0.004) | (0.006) | (0.006) |
| Observations | 118664 | 118664 | 96420 | 96420 |
| Outcome mean | 0.182 | 0.182 | 0.180 | 0.180 |
| *Controls* | | | | |
| Individual level controls | ✓ | ✓ | ✓ | ✓ |
| Industry-zone FE | ✓ | ✓ | ✓ | ✓ |
| State FE | ✓ | | ✓ | |
| District FE | | ✓ | | ✓ |

*Notes:* The dependent variable takes a value of one if an individual is female and zero if male. The sample is restricted to individuals working in the non-cultivation sector (by the principal employment status) as wage workers and who are aged 20-60. The sample is further restricted to individuals employed in unregulated establishments or firms (in columns (1) and (2)) and regulated firms (in columns (3) and (4)). Regulated firms are those having at least 10 employees and unregulated those having less than 10 employees. Post takes a value of one for the year 2013-2014 and zero otherwise. Industry is defined at 2-digit level of classification. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Individual-level controls include age, age squared, education level and social group (caste). Regressions are weighted by probability weights based on survey design. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the district level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labour Bureau (EUS 2013-14).

Table C.3: Impact of POSH Act on relative female employment: Robustness

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | NIC × Year FE | Firm Size < 20 | Factories AA | Night Shift AA | Placebo |
| Regulated Firm × Post POSH | –0.015** | –0.019** | –0.025*** | –0.018** | –0.022*** |
| | (0.007) | (0.009) | (0.007) | (0.007) | (0.009) |
| Regulated Firm × Post 2010 | | | | | –0.002 |
| | | | | | (0.008) |
| Regulated Firm | 0.017*** | 0.006 | 0.018*** | 0.025*** | 0.021*** |
| | (0.005) | (0.005) | (0.005) | (0.006) | (0.006) |
| Observations | 215064 | 146625 | 191915 | 165578 | 215075 |
| Outcome mean | 0.181 | 0.184 | 0.183 | 0.181 | 0.181 |
| R-Squared | 0.273 | 0.304 | 0.273 | 0.278 | 0.267 |
| *Controls* | | | | | |
| Individual level controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| District × Year FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry-zone FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry-year FE | ✓ | | | | |

*Notes:* The dependent variable takes a value of one if an individual is female and zero if male. The sample is restricted to individuals working in the non-cultivation sector (by the principal employment status) as wage workers and who are aged 20-60. Regulated firm takes a value one for individuals working in an establishment (firm) having at least 10 employees and zero otherwise. Post takes a value of one for the year 2013-2014 and zero otherwise. Post 2010 takes a value of one for the years 2011-2014 and zero otherwise. Industry is defined at 2-digit level of classification. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). We drop Jharkhand, Madhya Pradesh, and Rajasthan in the analysis of states without amendments to the Factories Act thresholds till 2016 (column 3). We drop Punjab, Assam, Madhya Pradesh, Maharashta, and Andhra Pradesh in our analysis of states without amendments to night shift regulations for female workers till 2016 (columns 4). Individual-level controls include age, age squared, education level and social group (caste). Regressions are weighted by probability weights based on survey design. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the district level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labour Bureau (EUS 2013-14).

Table C.4: Impact of POSH Act on female wage employment share: Regulated vs unregulated firms (District-level)

| | (1) | (2) | (3) |
|---|---|---|---|
| Regulated Firm Share * Post | –0.064*** | –0.042** | –0.046** |
| | (0.018) | (0.021) | (0.018) |
| Regulated Firm Share | 0.047*** | 0.052*** | 0.028** |
| | (0.013) | (0.013) | (0.013) |
| Observations | 4093 | 4069 | 4092 |
| Outcome mean | 0.151 | 0.151 | 0.151 |
| *Controls* | | | |
| Individual controls (district-aggregates) | ✓ | ✓ | ✓ |
| Year FE | ✓ | | ✓ |
| State FE | ✓ | | |
| State × Year FE | | ✓ | |
| District FE | | | ✓ |

*Notes:* The dependent variable is the female share in total wage employment aggregated at district by year level. The share is calculated for individuals working in the non-cultivation sector (by the principal employment status) as wage worker, aged 20-60. Regulated firm share is the proportion of wage workers in regulated firms where a firm having at least 10 employees is termed as 'regulated'. Post takes a value of one for the year 2013-2014 and zero otherwise. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Individual-level controls include the means of age, age squared, education level and social group (caste) at district by year level. Districts are merged into the parent districts and boundaries of year 2004 are used. Regressions are weighted by probability weights based on survey design. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the district level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labour Bureau (EUS 2013-14).

Table C.5: Impact of POSH Act on relative female employment: Extended data (individual level, NSS, EUS, PLFS)

| | (1) | (2) |
|---|---|---|
| Regulated Firm × Post × Salaried | –0.040*** | –0.052*** |
| | (0.015) | (0.015) |
| Regulated Firm × Post | 0.029** | 0.039*** |
| | (0.014) | (0.014) |
| Salaried × Post | 0.025*** | 0.025*** |
| | (0.007) | (0.007) |
| Regulated Firm | 0.073*** | 0.074*** |
| | (0.009) | (0.009) |
| Salaried | 0.011 | 0.012* |
| | (0.007) | (0.007) |
| Observations | 319311 | 319275 |
| Outcome mean | 0.181 | 0.181 |
| *Controls* | | |
| Individual level controls | ✓ | ✓ |
| Industry-zone FE | ✓ | ✓ |
| Year FE | ✓ | |
| District FE | ✓ | |
| District × Year FE | | ✓ |

*Notes:* The dependent variable takes a value of one if an individual is female and zero if male. The sample is restricted to individuals working in the non-cultivation sector (by the principal employment status) as wage workers and who are aged 20-60. Regulated firm takes a value one for individuals working in an establishment (firm) having at least 10 employees and zero otherwise. Post takes a value of one for the years 2013-2019 and zero otherwise. Salaried takes a value one for individuals working on salaried contracts and zero otherwise (casual or daily wage payments). Industry is defined at 2-digit level of classification. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Individual-level controls include age, age squared, education level and social group (caste). Regressions are weighted by probability weights based on survey design. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the district level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68), Labour Bureau (EUS 2013-14), and Periodic Labour Force Surveys 2017-18 and 2018-19.

Table C.6: Impact of state-industry level regulated firm exposure (in terms of female employment) on relative female employment: Evidence from individual-level data

| | (1) | (2) |
|---|---|---|
| Unregulated firm × Exposure index × Post | –0.035*** | –0.030** |
| | (0.013) | (0.013) |
| Regulated firm × Post | –0.022*** | –0.022*** |
| | (0.008) | (0.008) |
| Observations | 214840 | 214814 |
| Outcome mean | 0.181 | 0.181 |
| *Controls* | | |
| Individual level controls | ✓ | ✓ |
| Industry-zone FE | ✓ | ✓ |
| State × Industry (2-digit) FE | ✓ | ✓ |
| State × Year FE | ✓ | |
| District × Year FE | | ✓ |

*Notes:* The dependent variable takes a value of one if a candidate is female and zero if male. The sample is restricted to individuals who are aged 20-60 working in the non-cultivation sector (by the principal employment status i.e., employed for at least 6 months in the last reference year) as wage worker (regular salaried/casual worker). Regulated firm takes a value one for individual working in a firm having at least 10 employees and zero otherwise - opposite for Unregulated firm. Post takes a value of one for the years 2013-2019 and zero otherwise. Exposure index for each state-industry pair is defined as the mean female employment in regulated firms in a state-industry as a proportion of total female employment in the state-industry in the latest pre-period year i.e., 2013. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Puducherry, Andaman & Nicobar Islands). Individual-level controls include age, age squared, education level and social group (caste) of a candidate. Districts are merged into the parent districts and boundaries of year 2004 are used. Regressions are weighted by probability weights calculated based on survey design. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the district level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68), and Labour Bureau (EUS 2013-14).

Table C.7: Occupational distribution by gender

| | (1) | (2) | (3) |
|---|---|---|---|
| **Occupation** | **Daily real wage** | **Wage ratio** | **Proportion of female** |
| **Panel A: Above 20% proportion of female employees** | | | |
| Life Science and Health Professionals | 1126.28 | 0.56 | 51% |
| Teaching Associate Professionals | 572.41 | 0.66 | 47% |
| Life Science and Health Associate Professionals | 519.09 | 0.76 | 44% |
| Sales and Service Elementary Occupations | 241.84 | 0.47 | 43% |
| Teaching Professionals | 896.53 | 0.80 | 36% |
| Personal and Protective Service Workers | 400.86 | 0.39 | 24% |
| Other Craft and Related Trades Workers | 216.26 | 0.53 | 23% |
| Customer Services Clerks | 681.42 | 0.86 | 20% |
| | **582** | **0.63** | |
| **Panel B: Below 20% proportion of female employees** | | | |
| Other Professionals | 815.19 | 0.76 | 16% |
| Office Clerks | 642.41 | 0.92 | 16% |
| Legislators and Senior Officials | 1239.09 | 0.72 | 14% |
| laborers in Mining, Construction, Manufacturing and Transport | 199.78 | 0.66 | 14% |
| Precision, Handicraft, Printing and Related Trades Workers | 273.62 | 0.44 | 12% |
| Physical, Mathematical and Engineering Science Professionals | 1446.84 | 1.00 | 11% |
| Other Associate Professionals | 832.03 | 0.85 | 11% |
| Extraction and Building Trades Workers | 229.53 | 0.53 | 10% |
| Machine Operators and Assemblers | 322.44 | 0.43 | 10% |
| Physical and Engineering Science Associate Professionals | 990.39 | 0.91 | 9% |
| Corporate Managers | 1417.44 | 1.09 | 9% |
| Stationary-Plant and Related Operators | 432.81 | 0.38 | 8% |
| General Managers | 1919.02 | 0.80 | 7% |
| Models, Sales Persons and Demonstrators | 281.51 | 1.47 | 6% |
| Metal, Machinery and Related Trades Workers | 420.21 | 0.76 | 2% |
| Drivers and Mobile Plant Operators | 352.70 | 1.29 | 1% |
| | **738** | **0.81** | |

*Source:* Real wage as of year 2017. Wage ratio refers to female to male daily wage ratio for all paid wage workers (i.e., regular salaried/contract/casual worker). Proportion of females out of all employed in paid wage work in that occupation is calculated and sorted in descending order. The National Classification of Occupations 2004 (NCO 2004) at the two digit level are used. All statistics are calculated for the pre-period 2004-2012.

Table C.8: Impact of POSH Act on relative female employment: Heterogeneity by sector

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Services | | Manufacturing | | Construction | |
| Regulated Firm × Post | –0.013 | –0.008 | –0.022* | –0.031** | –0.044*** | –0.041*** |
| | (0.008) | (0.009) | (0.013) | (0.013) | (0.014) | (0.015) |
| Regulated Firm | –0.013** | –0.013** | 0.013 | 0.020* | 0.069*** | 0.077*** |
| | (0.006) | (0.007) | (0.011) | (0.012) | (0.010) | (0.010) |
| Observations | 122511 | 122468 | 40695 | 40192 | 50058 | 49746 |
| Outcome mean | 0.224 | 0.224 | 0.132 | 0.133 | 0.113 | 0.114 |
| *Controls* | | | | | | |
| Individual level controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry-zone FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | | ✓ | | ✓ | |
| District FE | ✓ | | ✓ | | ✓ | |
| District × Year FE | | ✓ | | ✓ | | ✓ |

*Notes:* The dependent variable takes a value of one if an individual is female and zero if male. The sample is restricted to individuals working in the Services sector in columns (1) and (2), in the Manufacturing sector in columns (3) and (4), and in the Construction sector in columns (5) and (6) (by the principal employment status i.e., employed for at least 6 months in the last reference year) as wage worker (regular salaried/contract/casual worker) and who are aged 20-60. Regulated firm takes a value one for individual working in a firm having at least 10 employees and zero otherwise. Post takes a value of one for the year 2013-2014 and zero otherwise. Industry is defined at 2-digit level of classification. States are divided into six zones - Northern (Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, Rajasthan), Central (Uttarakhand, Uttar Pradesh, Chhattisgarh, Madhya Pradesh), Eastern (Bihar, West Bengal, Jharkhand, Odisha), North-Eastern (Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Assam), Western (Gujarat, Daman & Diu, Dadra & Nagar Haveli, Maharashtra, Goa), and Southern (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep, Puducherry, Andaman & Nicobar Islands). Individual-level controls include age, age squared, education level and social group (caste) of a candidate. Districts are merged into the parent districts and boundaries of year 2004 are used. Regressions are weighted by probability weights calculated based on survey design. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the district level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labour Bureau (EUS 2013-14).

Table C.9: Impact of POSH Act on female employment trends: By employment types and sectors

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| **Panel (a): Non-farm wage emp and sectors** | | | | |
| | Non-farm wage emp | manuf | service | construct |
| Reg firm share (dist) × Post | −0.017 | 0.002 | −0.008 | −0.009 |
| | (0.025) | (0.009) | (0.018) | (0.010) |
| Observations | 581184 | 581184 | 581184 | 581184 |
| Outcome Mean | 0.074 | 0.010 | 0.052 | 0.011 |
| R-Squared | 0.077 | 0.032 | 0.098 | 0.028 |
| **Panel (b): Non-farm self-emp and sectors** | | | | |
| | Non-farm self emp | manuf | service | construct |
| Reg firm share (dist) × Post | 0.016 | 0.005 | 0.010 | 0.000 |
| | (0.015) | (0.010) | (0.008) | (0.001) |
| Observations | 581184 | 581184 | 581184 | 581184 |
| Outcome Mean | 0.053 | 0.024 | 0.027 | 0.000 |
| R-Squared | 0.034 | 0.042 | 0.014 | 0.003 |
| *Controls* | | | | |
| Individual-level controls | ✓ | ✓ | ✓ | ✓ |
| District FE | ✓ | ✓ | ✓ | ✓ |

*Notes:* Keeping only the sample of females aged 20-60, the dependent variables in Panel (a) take the value of one if a female is employed in column (1), employed as a wage worker in column (2), employed in non-cultivation sector in column (3), and employed in cultivation sector in column (4) and 0 otherwise. Similarly, the dependent variables in Panel (b) take the value of one if a female is employed as a wage worker in the non-cultivation sectors in column (1), in the manufacturing sector in column (2), in the service sector in column (3), and in the construction sector in column (4). In Panel (c), the dependent variables take the value of one if a female is self-employed in the non-cultivation sectors in column (1), in the manufacturing sector in column (2), in the service sector in column (3), and in the construction sector in column (4). We regress the dependent variables on the share of regulated firms in the district of the observation × Post where a firm is defined as regulated if it has at least 10 employees and Post takes a value of one for the year 2013-2014 and zero otherwise. Individual-level controls include age, age squared, education level, and social group (caste). Regressions are weighted by probability weights based on survey design. Each column reports the effective number of observations after incorporating the included fixed effects. Robust standard errors clustered at the district level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Source:* National Sample Surveys 2004-5 (round 61), 2009-10 (round 66), 2011-12 (round 68) and Labour Bureau (EUS 2013-14).