

The impact of privatization on gender composition: evidence from Vietnam

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Abstract

Purpose – This study examines the impact of privatization on the gender composition of firms, an aspect that has received limited attention in the existing literature despite a substantial body of work on labor outcomes of privatization.

Design/methodology/approach – Using a nationally representative panel of Vietnamese firms from 2006 to 2015, the study employs a staggered difference-in-differences (DID) estimation strategy to identify the causal effects of privatization on female employment share.

Findings – The results show that privatization led to an average decrease of 1.3 percentage points in the share of female employment in initially female-dominated firms. By role, female production workers experienced an average decline of about 11.5%, while the reduction among female non-production workers was substantially larger at 19.3%.

Originality/value – By incorporating pre-existing gender structures within firms, this study offers a practical approach to uncover the heterogeneous effects of privatization on gender composition. The findings emphasize the need for gender-sensitive policy interventions, such as reskilling programs or transitional support, to mitigate the adverse effects of privatization on female employment, particularly in peripheral roles that are more vulnerable to labor restructuring.

Keywords Gender composition, Privatization, Labor restructuring, Female employment, State-owned enterprises

Paper type Research article

1. Introduction

In 2023, Brazilian workers organized 14 strikes against privatization [1]. In Sri Lanka, more than 5,000 workers held a one-day strike to oppose the privatization of a state-owned enterprise (SOE) in the telecommunication sector [2]. These events are not isolated incidents but part of a broader global trend where workers have organized countless strikes, demonstrations, traffic blockades and marches to protest against privatization, claiming that it poses a direct threat to job security (Kikeri, 1998). The concerns of these workers are not unfounded: privatization has been associated with potential job losses (Lähdemäki, 2024; Olsson and Tåg, 2025), immediate reductions in wages (Brown *et al.*, 2006; Arnold, 2023) and harsher working conditions (Stinson, 2004; Hermann and Flecker, 2012).

Given the significant and often contentious impact of privatization on workers, numerous studies have evaluated its effects on workers (see, for example, Kikeri, 1998; Brown *et al.*, 2006; Hennicke, 2023). These studies suggest that privatization can adversely affect job security and wages for workers [3], including areas where women are more vulnerable (Khalfalla and Ahmed, 2015). However, a critical gap remains in the literature about how privatization influences the gender composition of the workforce in privatized firms. Although this knowledge is essential for designing gender-inclusive labor policies, hardly any research has systematically addressed it before. Therefore, this study aims to shed light on this gap by examining the causal relationship between privatization and gender composition in the workforce.



Using a staggered difference-in-differences (DID) approach that accounts for variation in privatization timing across firms (Callaway and Sant'Anna, 2021), this study finds that privatization reduced the female share in firms with high female employment shares prior to privatization. In this subsample, privatization led to an average decrease of 1.3 percentage points in the female share. Assuming a baseline mean female employment share of 40%, this effect translates to a 3.3% relative decline [4]. Further analysis reveals that the decline in the female employment share is driven by a substantial reduction in the number of female workers *not* directly involved in the main economic activities of the enterprise (i.e. non-production workers). Specifically, after privatization, the number of female production workers fell by about 11.5%, while the number of female non-production workers declined by nearly 19.3%, indicating a substantially larger reduction.

This study makes two contributions to existing literature. *First*, unlike previous studies assessing the impact of privatization that have focused on labor outcomes such as total employment (Kikeri, 1998; Lähdemäki, 2024; Olsson and Tåg, 2025), wages (Brown *et al.*, 2006; Arnold, 2023) and working conditions (Hermann and Flecker, 2012; Stinson, 2004), this research examines privatization's effects on gender composition, a topic that has received limited attention in the existing literature. The use of gender composition as an outcome variable in this study is novel and, therefore, addresses a critical gap in the literature.

Second, this study extends the debate in labor economics on gender differences in layoffs, which has predominantly focused on the private sector [5]. Studies in this area often find that the rate of involuntary job loss is significantly lower among women compared to men in private firms (see, for example, Keith and McWilliams, 1999; Wilkins and Wooden, 2013; Abrahams, 2024). By analyzing firms in the public sector, this research adds a fresh perspective on gender-based layoff dynamics in the context of institutional changes. This focus on SOEs' labor structures after privatization offers new empirical insights into layoff dynamics during transitions and helps bridge the gap between privatization research and gender-based labor market analysis. The findings of this study can help inform more targeted policies to maintain gender inclusiveness during periods of extraordinary institutional and organizational changes.

The paper is structured as follows: Section 2 offers a review of relevant literature. Section 3 establishes the theoretical framework and the study's key hypothesis. Section 4 describes the data, sample and variables employed in the analysis. Section 5 describes the identification strategy used to establish causal relationships between privatization and gender composition. Section 6 presents the study's empirical findings. Section 7 further explores the underlying mechanisms driving these results. And finally, Section 8 concludes the paper, summarizing key results and discussing their policy implications.

2. Literature review

The impact of privatization on labor outcomes in general, and on women in particular, has long been a topic of scholarly interest (e.g. Kikeri, 1998; Stinson, 2004; Brown *et al.*, 2006; Khalfalla and Ahmed, 2015; Hennicke, 2023). However, empirical evidence on how privatization affects the gender composition of the workforce is limited, and the few existing quantitative studies largely report null results. Brown *et al.* (2006), for instance, examined which types of workers in Ukraine are more likely to be laid off after privatization and found that privatized firms lay off women at a rate similar to SOEs. Similarly, Hennicke (2023) reported that privatization of SOEs in East Germany had no statistically significant impact on gender composition [6]. Overall, these studies did not establish any causal relationship between privatization and gender structures in the workforce.

One potential explanation for these inconclusive results is the omission of key factors shaping the outcome of labor restructuring. Recent labor market research has shown that gendered employment patterns are highly sensitive to the nature and context of economic shocks (e.g. Albanesi and Kim, 2021; Bluedorn *et al.*, 2021; Dang and Nguyen, 2021;

Deshpande, 2020; Goldin, 2022). For instance, economic crises have been traditionally associated with a larger employment drop for men than for women (Wilkins and Wooden, 2013). During recessions, women often exhibit greater labor market attachment due to the “added worker effect,” as households compensate for male job losses by increasing female labor supply (Ellieroth, 2017). However, recent studies show that employment losses were larger for women during the COVID-19 recession (Bluedorn *et al.*, 2021; Goldin, 2022). This new phenomenon can be attributed to several factors, but the main explanation could be that women are disproportionately represented in some industries that bore the brunt of lockdowns and social distancing measures imposed to slow down the spread of the virus (Albanesi and Kim, 2021). As a result, female-dominated industries such as retail and hospitality, which heavily rely on in-person interactions, witnessed widespread job losses among female workers (Deshpande, 2020; Dang and Nguyen, 2021).

Therefore, a possible explanation for the insignificant effects of privatization on female employment found in Brown *et al.* (2006) and Hennicke (2023) is that there might be some unobserved characteristics that these studies did not account for, and a possible factor could be pre-existing gender segregation. Gender segregation describes the tendency for certain industries or occupations to be dominated by individuals of one sex or the other (using absolute terms) [7]. In the Soviet Union, for instance, women were predominantly employed in sectors such as education, healthcare, trade and light manufacturing industry, while men were concentrated in heavy industries like mining and construction (see, e.g. Oglobin, 2005; Standing, 1989). In Eastern European countries, states had mandated women’s labor force participation in certain areas of the socialist labor market, supported by heavily subsidized childcare systems and generous parental leave (Ghodsee, 2019). In China, women faced restrictions on entering a wide range of occupations, while the state simultaneously promoted female participation in the public sector through legislation and legal mandates (Yang, 1999; Cooke, 2001). These gender segregation structures suggest that the impact of privatization on female employment is likely to vary depending on the sectoral and occupational distribution of women prior to reform. When women are disproportionately concentrated in specific industries or roles, the average effects of privatization may mask substantial heterogeneity [8].

3. Theoretical framework

Gender segmentation theory helps explain how labor markets are divided along gender lines. Due to structural factors, discrimination and social norms, men and women are concentrated in different sectors, occupations and job roles (Hartmann, 1976). The “crowding hypothesis,” for instance, maintains that women are overwhelmingly concentrated in a narrow set of secondary, “feminized” jobs due to systematic discrimination (Bergmann, 1974; England, 1992). These forms of discrimination are sometimes based on the assumption that motherhood reduces work commitment among female workers (Budig and England, 2001; Correll *et al.*, 2007). If employers perceive women as more likely to exit the workforce at any time due to family responsibility, they may channel them into roles with lower training costs and less dependence on long-term accumulation of firm-specific skills (Caliendo, 2025).

On the other hand, if men and women differ in their anticipated career length or job continuity, they may make different human capital investment decisions and “self-select” themselves for certain roles, which can naturally lead to horizontal segregation (across industries) and vertical segregation (across job levels) in the labor market (Anker, 1997) [9]. Due to responsibilities at home, female employees tend to choose less “greedy” jobs (lower penalties for career breaks), occupations that require shorter, more flexible hours and lower availability, and avoid sectors with steep seniority-based wage growth or where skills depreciate quickly if not continuously used (e.g. STEM, law, managerial roles) (Goldin, 2014) [10].

Under the central planning system, SOEs often prioritized social and political objectives over profitability. According to *public choice theory*, state bureaucracies (e.g. SOEs,

government agencies and civil service units) have the incentives to maintain larger budgets than necessary (e.g. overemployment) to serve as a *de facto* social safety net (Niskanen, 2001). Likewise, politicians often control SOEs in ways that serve political goals (Boycko *et al.*, 1996). This tendency to maintain excessive employment among SOEs due to social and political goals can result in jobs being distributed based on societal gender norms rather than personal qualifications and skills [11]. Consequently, SOEs may exhibit even stronger gender segregation than comparable private firms, which could lead to female workers being artificially overrepresented in some industries or roles traditionally associated with women. The “extremely high participation of women in the paid workforce” was, in fact, a common phenomenon in most parts of Eastern Europe and the Former Soviet Union during the pre-transition era (Funk and Mueller, 1993, p. 7; Ghodsee, 2019).

Gender segregation within SOEs may have some benefits. It can offer employment opportunities for women facing structural barriers such as lower education or caregiving responsibilities, reducing gender gaps in labor market participation, which, in turn, helps stabilize society by serving as a “buffer” against unemployment (Barron and Norris, 1976; Standing, 1989). Nonetheless, the disproportionate concentration of women in certain roles within SOEs or across different state industries also means that they are locked into secondary, lower-status, lower-paying jobs, which restricts career development and reinforces structural inequality and discrimination within the labor market (Hartmann, 1976; Walby, 1997). Funk and Mueller (1993, p. 7) argued that these policies, “while enabling women to work, also served to reinforce women’s traditional role in the home.”

Among SOE restructuring measures, privatization is considered an effective way to improve firm efficiency, especially when it comes with labor restructuring (Cavaliere and Scabrosetti, 2008; Vickers and Yarrow, 1991). When an SOE is privatized and productive efficiency becomes the priority, the new owner often reduces the excessive labor force to reduce costs (Chong and López-de-Silanes, 2003). As a result, existing gender labor structures under the pre-transition era might have been dismantled in the process of privatization. This may lead to a temporary decline in the share of female workers within previously female-dominated firms after privatization, which can be formally formulated as follows:

H1. Privatization reduces the female employment share in initially female-dominated firms.

4. Data, sample construction and variables

4.1 Data

This study utilizes data from the annual enterprise surveys conducted by Vietnam’s General Statistical Office (GSO) between 2006 and 2015. These surveys cover all Vietnamese enterprises above a specified size threshold and have been used to calculate Vietnam’s Gross Domestic Product [12]. As such, they provide nationally representative coverage of the enterprise sector in Vietnam.

4.2 Sample construction

To study the impact of privatization, a longitudinal sample of firms was constructed from the original GSO dataset. Firms were appended across the sample period using unique firm identifiers to create a panel of firms observed from 2006 to 2015. Firms that changed their legal status from “SOEs” to “non-SOEs” were classified as privatized firms, while SOEs that remained under state control during the same period were designated as “never-treated” firms and included as control units. The sample was then restricted to these two types of firms, as SOEs provide a more suitable counterfactual group for privatized firms than other firm types (Lähdemäki, 2024). The final sample comprises 41,156 firm-year observations, representing 5,559 firms, with 2,551 firms in the treatment group and 3,008 unswitched SOEs serving as

controls [13]. Table 1 presents descriptive statistics on characteristics of firms in the sample [14].

4.3 Variables

4.3.1 Privatization indicator. Previous studies have defined privatization in two main ways: either as the sale of a 100% state-owned company that reduces state ownership below this threshold, effectively creating a joint-stock company (Bai et al., 2009; Loc and Tran, 2016; Pan et al., 2022), or as the sale that reduces government ownership to below the 50% threshold (Hsieh and Song, 2015; Tran et al., 2015). However, even when the state’s share falls below 50%, it may still retain control over the privatized firm if it remains the largest single shareholder [15]. This study thus extends previous studies by defining privatization not just as an equity sale that reduces the state share below the 50% threshold, but also as a transaction in which the state transfers control rights from the government to the private sector. This distinction is important because labor restructuring is more likely to occur in this case (e.g. Boycko et al., 1996; Aghion and Blanchard, 1998).

Specifically, firms in the GSO survey are categorized into several groups: SOEs, non-SOEs, cooperatives and foreign firms. SOEs are defined as firms where the state holds more than 50% of charter capital, as well as a number of firms with less than 50% state ownership yet the state still retains a controlling stake [16]. After excluding all foreign firms and cooperatives, the remaining firms are classified as non-SOEs. Firms that transition from SOEs to non-SOEs are considered privatized, while those that remain state-owned throughout the observed period serve as the control group in the analysis.

4.3.2 Dependent variable. The main outcome variable in this study is the share of female employment. This variable is calculated as the number of female workers divided by the total employment in the firm’s workforce. Figure 1 shows the share of female employment across broad sectors of economic activity, expressed as a percentage. The Accommodation and Food Service sector has the highest female representation, with women comprising approximately 56.2% of the workforce. This is closely followed by the education sector and financial sector, where the female share is a bit lower but still exceeds 50%. Conversely, the construction sector and the electricity sector show the lowest female participation, with women constituting less than 20% of the workforce in each. The mining sector also displays relatively low female representation, at approximately 20%. These patterns suggest gender segregation exists within Vietnam’s SOE workforce, with certain sectors disproportionately dominated by either men or women, confirming the patterns proposed by the gender segmentation theory. To test the study hypothesis, initially female-dominated firms are defined as firms with a female share greater than the sample median at the baseline period (European Commission, 2014).

Table 1. Summary statistics

	No. of obs.	Mean	SD	Min	Median	Max
Profit after tax (Deflated)	41,156	11,091	146,358	-2,060,233	419	13,622,215
Total assets (Deflated)	41,093	424,951	5,903,879	4	50,620	470,486,720
Number of employees	41,130	361	1,415	1	119	88,044
Number of female employees	41,032	127	537	0	32	37,163
Year of establishment	24,544	1995	14	1945	1999	2013

Note(s): Profit after Tax and Total Assets are deflated using 2010 as the base year. Both variables are measured in million VND

Source(s): Author’s calculations

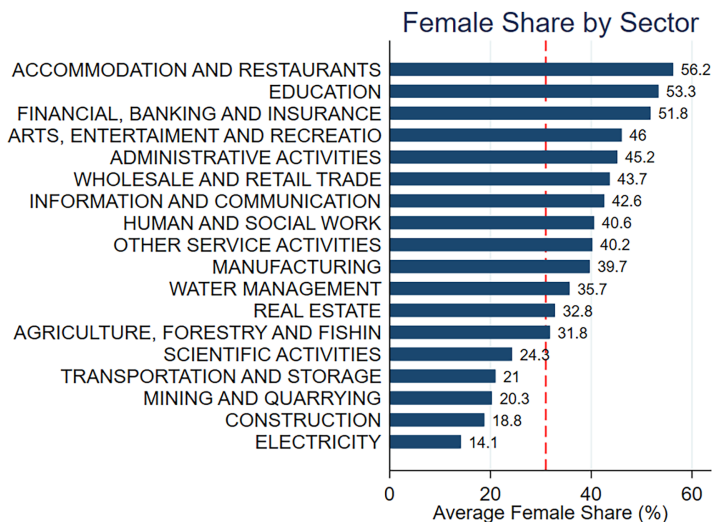


Figure 1. The share of female employment across broad sectors (full sample). Note: Red line indicates sample's median. Source: Author's calculation

5. Identification strategy

Recent advancements in econometric literature have highlighted that conventional two-way fixed effect (TWFE) ordinary least square (OLS)-based DID methods can produce biased or misleading estimates of treatment effects when treatment timing varies across units (see, for instance, [Borusyak et al., 2021](#); [De Chaisemartin and d'Haultfoeuille, 2020](#); [Goodman-Bacon, 2021](#)) [17]. Therefore, to improve accuracy, in addition to reporting the estimates from the traditional TWFE in [Table 2](#), the study also estimates the causal effects using a more robust staggered DID method following the steps outlined by [Callaway and Sant'Anna \(2021\)](#). The Callaway and Sant'Anna difference-in-differences estimator (CS-DID) is defined as follows:

$$ATT(g, t) = E[Y_i(g) - Y_i(0) | G_g = 1]$$

Table 2. Impact of privatization on female employment: two-way fixed effects (TWFE) regressions

	(1)	(2)	(3)	(4)	(5)
post	0.102 (0.213)	0.565** (0.260)	-1.073*** (0.346)	-1.078*** (0.346)	-0.882** (0.363)
Assets (log)				0.144 (0.293)	0.381 (0.348)
Profit (log)					-0.006 (0.062)
Constant	33.804*** (0.066)	23.644*** (0.080)	49.392*** (0.108)	47.843*** (3.153)	45.364*** (3.862)
Observations	40,575	24,469	16,106	16,100	12,784
r2	0.872	0.795	0.800	0.802	0.829

Note(s): This table reports estimates from TWFE regressions with firm and year fixed effects. Standard errors clustered at the firm level. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source(s): Author's calculations

Here, $ATT(g, t)$ represents the average treatment effect on a specific group g at time t . The ATTs can be aggregated into interpretable parameters: by group, by event and total (simple) ATT. For instance, to capture dynamic treatment effects within CSDID, the event study specification is:

$$ATT_k = E[E_{it} = k]$$

where ATT_k is the treatment effect at event time. $E_{it} = k$ is the event time relative to treatment adoption (e.g. T+0, T+1, T+2, T+3 . . .).

For robustness checks, the study uses never-treated and not-yet-treated firms as control units. It also uses conditional parallel trends (inclusion of covariates) to strengthen the validity of empirical results.

6. Results

The testable hypothesis of this paper posits that the share of female employment decreased after privatization in firms where female employees were initially overrepresented. It is also possible that privatization may exert a similar downsizing effect on male employment in firms with a predominantly male workforce. Therefore, the study examines not only the main hypothesis using the sample of initially female-dominated firms but also extends to the full sample and to firms with a below-median baseline female share (initially male-dominated firms). The regression results, estimated using the TWFE approach, are presented in [Table 2](#).

In the full sample (Model 1), privatization has no statistically significant effect on gender composition. In firms with below-median baseline female employment (Model 2), privatization increases the female share by 0.57 percentage points (statistically significant at the 5% level). Firms with above-median female shares (Model 3) experience a decline of 1.07 percentage point (statistically significant at the 1% level). The results in Model 3 remain robust when controlling for firm size (Model 4) and firm profitability (Model 5).

Results from [Table 2](#) thus suggest that privatization had a negative impact on female employment in firms with high baseline female shares, confirming the study's hypothesis. Firms with an initially low female share (male-dominated firms) also exhibit a statistically significant increase in female share, which may be consistent with a scenario where male workers were displaced at a higher rate than female workers following privatization, resulting in an increase in the female share. Given that women often face greater barriers to re-employment ([Charles and Grusky, 2004](#); [England, 1992](#); [Goldin, 2014](#)), the analysis henceforth concentrates on firms with an initially above-median female employment share, where the risks of adverse effects are likely to be most pronounced [[18](#)].

As noted earlier in [Section 5](#) (Identification Strategy), because the TWFE estimator has been shown to produce biased estimates in the presence of treatment effect heterogeneity ([Borusyak et al., 2021](#); [De Chaisemartin and d'Haultfoeuille, 2020](#); [Goodman-Bacon, 2021](#)), the study employs the CS-DID estimator as a more robust alternative to TWFE for causal inference of the privatization effect on gender composition [[19](#)].

[Table 3](#) presents the results, focusing on the sample of firms with above-median baseline female employment share, estimated using the CS-DID method. In the first model specification (column 1), which uses never-treated firms as the control group and assumes unconditional parallel trends, the average treatment effect is -1.33% points (statistically significant at the one percent level) [[20](#)]. Assuming a baseline female employment share of 40%, this corresponds to a 3.3% relative decline.

The event-study estimates reported in [Table 3](#) provide further insight into how the effect of privatization evolves over time. In the year of privatization, the female employment share dropped by roughly 1.12 percentage points (statistically significant at the one percent level). In the first year and second year following privatization, the magnitude of this decline intensified. From the fourth year onward, the negative impact of privatization on the female

Table 3. Impact of privatization on female share, initially female-dominated firms (CS-DID)

	(1)	(2)	(3)	(4)
Total ATT	-1.326*** (-3.14)	-1.340*** (-3.19)	-1.423*** (-3.12)	-1.472*** (-3.32)
T+0	-1.122*** (-3.54)	-1.095*** (-3.36)	-1.064*** (-3.09)	-1.095*** (-3.16)
T+1	-0.728* (-1.77)	-0.700* (-1.66)	-0.517 (-1.12)	-0.477 (-1.04)
T+2	-1.235** (-2.49)	-1.209** (-2.40)	-0.823 (-1.40)	-0.840 (-1.43)
T+3	-1.225** (-2.33)	-1.274** (-2.44)	-1.214** (-2.00)	-1.300** (-2.20)
T+4	-0.978 (-1.60)	-1.107* (-1.84)	-1.961*** (-2.78)	-2.204*** (-3.22)
T+5	-1.378* (-1.91)	-1.458** (-2.05)	-1.313 (-1.63)	-1.376* (-1.75)
T+6	-1.740** (-2.17)	-1.726** (-2.17)	-1.913** (-2.02)	-1.914** (-2.06)
T+7	-1.746* (-1.73)	-1.718* (-1.71)	-2.133* (-1.94)	-2.141* (-1.96)
T+8	-4.837*** (-3.46)	-4.837*** (-3.46)	-5.353*** (-3.37)	-5.353*** (-3.37)
No. of obs.	16,097	16,097	11,972	12,053
Pre-trends (χ^2)	30.9960	30.9919	37.0812	37.1227
(p-value)	0.7054	0.7055	0.4189	0.4171
Not-yet-treated	NO	YES	NO	YES
Covariates	NO	NO	YES	YES

Note(s): This table presents estimates from the Callaway & Sant'Anna Difference-in-Differences (CS-DID) method, focusing on firms with an above-median female employment share at baseline (Callaway and Sant'Anna, 2021). Covariates include log of total assets and log of profits. Improved doubly robust DID; inverse probability of tilting and weighted least squares (Sant'Anna and Zhao, 2020). Significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source(s): Author's calculations

share of employment not only persists but also becomes more pronounced after each year. By the 8th year after privatization, there was a sharp decline of nearly 4.84 percentage points [21].

Overall, these results support the study's hypothesis that privatization led to a decline in the female employment share in firms where women were more strongly represented prior to privatization. Moreover, this decline is not temporary; rather, it persists and intensifies in the years following privatization. The pattern observed in the event-study estimates, in fact, suggests a fundamentally structural shift in the gender composition of the workforce after privatization.

7. Mechanisms

The empirical evidence of this study confirms the hypothesis that the female employment share decreased in firms where women were previously overrepresented. Privatization, through its well-known efficiency-enhancement labor restructuring effects (Vickers and Yarrow, 1991; Cavaliere and Scabrosetti, 2008; Earle and Shpak, 2019), could have dismantled well-established labor structures within SOEs that historically provided employment opportunities for certain types of workers, including women. Consequently, privatization may reduce the share of female workers in firms with a higher female share.

While theoretical frameworks may anticipate this phenomenon, a more critical issue that may help explain the source of this change concerns which categories of female employment

are more affected by labor restructuring. According to [Fernandez et al. \(2006\)](#), women, often working as non-core, reserve workers in peripheral, “less essential” roles, are more easily dismissed due to their lower skill specialization [22]. On the other hand, the core production labor force that has higher skill specificity is more likely to be kept in order to improve efficiency. In other words, as privatization unfolded, firms might have optimized costs by substituting a non-essential labor force with more skilled labor that is more “core” to firm operational efficiency. Thus, to explore the mechanism through which privatization affects the female employment share, one approach could be to decompose the total female workforce by role: female production vs female non-production workers.

The GSO’s Enterprise Survey includes a question asking firms to report *the number of female employment in main economic activities*, which can serve as a close proxy for “female production workers” in this research. By subtracting this number from total female employment, the number of “female non-production workers” is obtained; that is, female employees engage in non-production, secondary roles. Both dependent variables are log-transformed [23].

Tables 4 and 5 present the estimates of the average treatment effect for the log number of female production workers (Table 4) and non-production workers (Table 5) as a result of privatization. For female production workers (Table 4), after privatization, the average treatment effect declines modestly, reaching approximately -0.122 in log points. In percentage, the estimate corresponds to an average decline of about 11.5% [24]. In contrast, for female non-production workers, the average treatment effect is -0.215 log points, which translates into a 19.3% decrease, reflecting a substantially larger reduction [25]. The disproportionate concentration of female workers in non-production roles relative to production roles helps explain why privatization had a stronger adverse impact on this group [26].

Figure 2 indicates that this mechanism does not extend to the initially male-dominated firms. In this sub-sample, privatization led to a substantial reduction of around 20–50% in male production workers (left-hand side), while the number of male non-production workers (right-hand side) remained largely unaffected. These results suggest that the mechanism through which privatization affects gender composition differs substantially across firms depending on their pre-privatization labor structure. While this study focuses on the sample of female-dominated firms, as women often represent a more disadvantaged group in the labor market, it cannot be overlooked that privatization may also generate adverse effects on male workers, particularly in sectors where men constitute the majority. Nevertheless, within the scope of this paper, examining the gendered impacts of privatization on male-dominated firms is left for future research.

Table 4. Impact of privatization on female production workers, CS-DID

	(1)	(2)	(3)	(4)
ATT	-0.124^{***} (-3.73)	-0.115^{***} (-3.52)	-0.135^{***} (-4.00)	-0.122^{***} (-3.75)
No. of obs.	15,886	15,888	15,880	15,882
Pre-trends (χ^2)	50.8193	50.8224	47.4708	47.2147
(p-value)	0.0518	0.0517	0.0956	0.1000
Not-yet-treated	NO	YES	NO	YES
Covariates	NO	NO	YES	YES

Note(s): This table presents estimates from the CS-DID method, focusing on firms with an above-median female employment share at baseline to examine the cohort-specific effects of privatization on female production workers. Covariates include log of total assets and log of profits. Improved doubly robust DID; inverse probability of tilting and weighted least squares ([Sant’Anna and Zhao, 2020](#)). Significance level: $*p < 0.1$, $**p < 0.05$, $***p < 0.01$

Source(s): Author’s calculations

Table 5. Impact of privatization on female non-production workers, CS-DID

	(1)	(2)	(3)	(4)
ATT	-0.231** (-2.51)	-0.215** (-2.35)	-0.229** (-2.57)	-0.215** (-2.43)
No. of obs.	5,516	5,581	5,515	5,580
Pre-trends (χ^2)	43.1396	43.0620	46.5742	46.3722
(p-value)	0.1925	0.1947	0.1115	0.1154
Not-yet-treated	NO	YES	NO	YES
Covariates	NO	NO	YES	YES

Note(s): This table presents estimates from the CS-DID method, focusing on firms with an above-median female employment share at baseline to examine the cohort-specific effects of privatization on female non-production workers. Covariates include log of total assets and log of profits. Improved doubly robust DID; inverse probability of tilting and weighted least squares (Sant’Anna and Zhao, 2020). Significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source(s): Author’s calculations

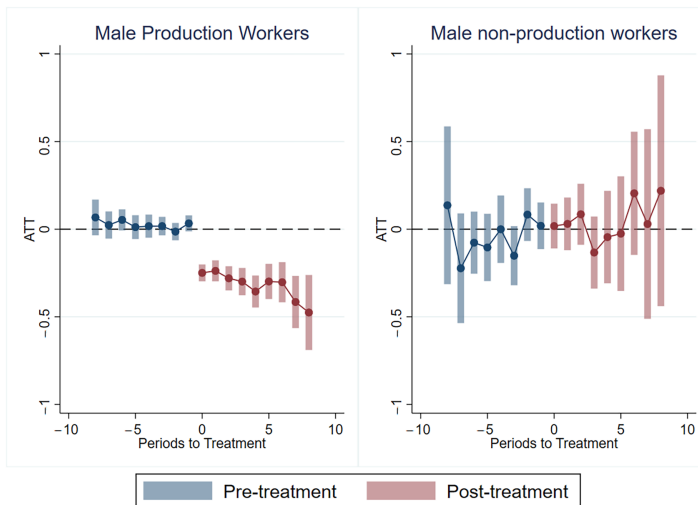


Figure 2. Dynamic effects of privatization on male production workers and male non-production workers in initially male-dominated firms (CS-DID). Improved doubly robust DID; inverse probability of tilting and weighted least squares (Sant’Anna and Zhao, 2020). Source: Author’s calculations

In general, the findings suggest that the reduction in the overall female employment share following privatization is driven by a more significant decline in female non-production workers. The steeper decline in non-production employment compared to production employment among female workers implies that privatization disproportionately affects secondary roles that are often held by female workers, potentially due to labor restructuring, cost-cutting and/or shifts in firm priorities that target these positions more heavily.

8. Conclusion

Privatization often introduces market-driven pressures for efficiency and profitability. As firms go through privatization, there is typically a push to streamline operations, eliminate inefficiencies and optimize resource utilization. In this process, activities deemed “non-essential” may be outsourced, streamlined, or removed entirely, leading to workforce

reductions. Due to the pre-existing gender segregation (i.e. the concentration of female workers in certain job categories or industries) in SOEs, they may face a higher risk of job losses during these post-privatization labor restructuring efforts, as proposed in this study.

The empirical evidence confirms the study's hypothesis that privatization led to a decline in the female employment share in firms where women were overrepresented prior to privatization. In these firms, the female share of employment decreased by an average of 1.3 percentage points. Assuming a baseline mean female employment share of 40%, this corresponds to a 3.3% relative decline. Furthermore, privatization appears to have a more pronounced impact on non-production roles (e.g. administrative and clerical roles), positions often held by female workers.

The targeting of these positions during labor restructuring may stem from the past tendency that the labor force in non-production roles was often held by women when the firm was still state-owned (Anker, 1997; Funk and Mueller, 1993). Although this pattern is also observable in private firms in capitalist systems, it may have been more pronounced in SOEs under socialist systems due to the social and political objectives of SOEs prior to privatization, which prioritized employment maximization over firm performance (Boycko *et al.*, 1996; Niskanen, 2001). Upon privatization, restructuring efforts often aim to enhance operational efficiency by reducing excess labor (Cavaliere and Scabrosetti, 2008). As a result, female SOE workers in non-production roles, positions historically dominated by women, are likely to be more affected than those in production roles. In the long run, the short-term effect can lead to a persistent shift in occupational structures, employment security and wage hierarchies (Dong and Bowles, 2002).

These potential long-term consequences of privatization emphasize the necessity of integrating gender considerations into public-sector labor restructuring policies to ensure that the process does not exacerbate gender inequality in the labor market (Rubery, 2010; Elson, 1999). For instance, Slovenia deliberately preserved key features of its socialist-era heavily subsidized childcare system and generous paid parental leave during the post-transition market reforms, which kept mothers in full-time work and blunted the typical post-privatization drift of women into precarious jobs (Orazem *et al.*, 2005). Moreover, the government may also incorporate skill-building programs for women, especially for those in secondary, supportive roles, who may face greater displacement risk and barriers to reemployment (Charles and Grusky, 2004; England, 1992). UNDP's Transforming the Future of Work for Gender Equality (TFoW4GE) is one such initiative aimed at providing essential skills training for women in Asian countries, although the extent of its success has not yet been evaluated [27].

In the current Vietnamese institutional context, where labor restructuring in the public sector remains a policy priority [28], gender-sensitive approaches to privatization are both necessary and feasible. The Vietnamese government has incrementally developed the institutional and administrative capacity to implement targeted social programs, and such interventions typically require fewer financial resources relative to large-scale industrial reforms (World Bank, 2019). For example, recent Vietnamese laws stipulate that women are among the priority groups when renting or purchasing social housing in Vietnam [29]. Such a gradual institutional change suggests that minor steps toward gender-sensitive approaches to transition (e.g. job placement programs, reskilling or transitional support) can be highly practical in Vietnam and other countries facing comparable challenges, especially when aligned with broader social welfare objectives.

Notes

1. Brasil de Fato (2023): *In 2023, workers have already organized 14 strikes against privatization in 7 Brazilian states*. Available at: <https://www.brasildefato.com.br/2023/10/24/in-2023-workers-have-already-organized-14-strikes-against-privatization-in-7-brazilian-states> (Accessed: 27 June 2025).
2. World Socialist Web Site (2023): *Sri Lankan telecom workers stage one-day strike against privatization*. Available at: <https://www.wsws.org/en/articles/2023/11/30/vtkm-n30.html> (Accessed: 27 June 2025).

3. See [Hermann and Flecker \(2012\)](#) for a comprehensive review of the impact of privatization and liberalization on workers in European countries.
4. To put this into perspective, [Gupta \(2021\)](#), for instance, shows that large output-tariff cuts in Indian manufacturing reduced women's share by about 2 percentage points, about 5% relative decline, whereas [Korwatanasakul \(2020\)](#) document that during the 2007–2009 financial crisis, the female share of manufacturing employment in Thailand dropped from 20.2% to 16.8%, or a 3.4 percentage point decline.
5. This debate can be traced back to the seminal work of [Blau and Kahn \(1981\)](#). See also [Wilkins and Wooden \(2013\)](#), [Abrahams \(2024\)](#).
6. In the Vietnamese context, [Rama \(2002\)](#) provides the only study to date, documenting that public sector downsizing in the early 1990s disproportionately affected women, with nearly 70 percent of displaced workers being female. However, given the historical context of the early transition period, these findings may no longer reflect current dynamics of the Vietnamese labor structures.
7. European Institute for Gender Equality (EIGE) (n.d.) Gender segregation. Available at: https://eige.europa.eu/publications-resources/thesaurus/terms/1210?language_content_entity=en (Accessed: 27 June 2025).
8. [Orazem et al. \(2005\)](#) showed that Slovenian displaced workers were more likely to be female, reflecting the higher female labor force participation rates in Slovenia.
9. See also, [Becker \(1964\)](#) for a more foundational analysis of human capital theory.
10. Gender segmentation theory also helps explain why female workers are often concentrated in certain departments of a private company, such as office work, accounting, human resources, and administration ([Ainsworth and Pekarek, 2022](#)). Closely related is the gendered division of labor theory, which highlights how women are disproportionately concentrated in supportive and administrative roles ([Anker, 1997](#); [Walby, 1997](#)).
11. For instance, women can be expected to do less demanding jobs, such as administrative roles or light manufacturing, while men are placed in more physically demanding or time-consuming jobs ([Elson, 1999](#)).
12. VietNamNet (2025) *Vietnam kicks off 2025 nationwide business survey for GDP and policy planning*. Available at: <https://vietnamnet.vn/en/vietnam-kicks-off-2025-nationwide-business-survey-for-gdp-and-policy-planning-2386816.html> (Accessed: 27 June 2025).
13. It is important to note that this full sample includes all firms regardless of their initial female employment share. In the results section, the number of observations decreases significantly, as the analysis focuses on a subsample of firms with above-median female employment at baseline, consistent with the study.
14. The study sample has an average Profit After Taxes of 11 billion VND and Total assets of 425 billion VND. Moreover, firms employ an average of 361 workers, of which 127 employees are female. This implies a female share of approximately 35.2%, on average. [Figure A1](#) in the [Supplementary File](#) further shows the sectoral distribution of the firms in the sample.
15. [Quốc hội \(2003\) Luật Doanh nghiệp Nhà nước năm 2003, số 14/2003/QH11](#). Available at: <https://thuvienphapluat.vn/van-ban/Doanh-nghiep/Luat-doanh-nghiep-nha-nuoc-2003-14-2003-QH11-51698.aspx> (Accessed: 27 June 2025).
16. Since 2006, the GSO dataset has included a question on whether a firm has a state-controlled stake when state ownership falls below 50%, allowing for a more refined classification of privatization.
17. For example, [Goodman-Bacon \(2021\)](#) shows that TWFE assumes treatment effect is constant across all groups and time periods. When treatment is introduced at different times, late-treated groups may serve as “controls” for earlier-treated groups, leading to biased and misleading estimates.
18. While the present analysis focuses on female-dominated firms, the consequences of labor restructuring for male workers in male-dominated industries remain an important and also understudied dimension. Examining these dynamics represents a promising avenue for future research on privatization and labor restructuring.

19. To facilitate comparison between the traditional TWFE and recent CS-DID method, estimates based on both TWFE and CS-DID models are compared in [Figure A2 \(See Supplementary File\)](#).
20. To ensure the validity of the CS-DID findings, several robustness checks were conducted, including the use of not-yet-treated firms as control units (column 2 and column 4), and conditional parallel trends (column 3 and column 4). Across all specifications, the average treatment effect remains negative and significant.
21. These effects represent a meaningful shift in workforce gender composition, as studies examining the impact of economic restructuring on female share, such as [Gupta \(2021\)](#) and [Korwatanasakul \(2020\)](#), often report effect magnitudes typically in the range of 2–3 percentage points.
22. See [England \(1992\)](#) and [Charles and Grusky \(2004\)](#).
23. By modeling the log number of female production and non-production workers, the analysis reveals the absolute magnitude of employment losses in each category and provides results that are both econometrically robust and easy to interpret in percentage terms.
24. As discussed by [Wooldridge \(2010\)](#) and [Cameron and Trivedi \(2005\)](#), coefficients from log-linear models should be interpreted in percentage terms by converting them into their exact percentage effect. This approach provides a more accurate measure than the common linear approximation, particularly when coefficients are large.
25. These results are further illustrated in [Figure A3 \(Supplementary File\)](#); for heterogeneity effects across cohorts, see [Table A2 and A3 \(Supplementary File\)](#).
26. See [Table A1 \(Supplementary File\)](#). [Table A1](#) shows that, in the full sample, women make up on average 33.9% of the workforce. Within this female workforce, only 30.3% are employed in production activities, while as many as 69.7% are concentrated in non-production roles. In the subsample of female-dominated firms, the average female employment share rises to 49.1%, of which 43.7% of female employees are engaged in production work, whereas 56.4% remain in non-production activities. Thus, female employment is disproportionately concentrated in non-production roles, which might make them more vulnerable to labor restructuring post-privatization.
27. United Nations Development Programme (n.d.) Transforming the Future of Work for Gender Equality Initiative. Available at: <https://www.undp.org/asia-pacific/transforming-future-work-gender-equality-initiative> (Accessed: 22 August 2025).
28. [Government of Vietnam \(2017\)](#). Master Plan on Streamlining and Restructuring the Government's Organizational Apparatus. Available at: <https://xaydungchinhsach.chinhphu.vn/ke-hoach-dinh-huong-sap-xep-tinh-gon-to-chuc-bo-may-cua-chinh-phu-119241207085647441.htm> (Accessed: 27 June 2025).
29. Lao Động, Women are a priority group for purchasing social housing, August 5, 2025. Available at: <https://laodong.vn/bat-dong-san/phu-nu-la-doi-tuong-uu-tien-mua-nha-o-xa-hoi-1552554.ldo> (Accessed: August 16, 2025).

Supplementary material

The supplementary material for this article can be found online.

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