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Gender Empowerment, Supply-Chain Linkages and Foreign Direct Investment: Evidence on Bangladesh

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Abstract

This paper studies foreign direct investment (FDI) spillovers on gender labor market practices of domestic firms, based on a unique firm-to-firm dataset of Bangladesh's textiles and garment sectors. We look at the female employment of domestic firms that are directly and indirectly related to the FDI firms through supply chain linkages. These domestic firms are either the local suppliers or customers of FDI firms or they share local suppliers and customers with the FDI firms. The estimates show that domestic firms related to FDI firms have significantly more female administrative workers, but not necessarily female non-administrative workers, due to more firm-to-firm interactions participated by the former.

JEL-Codes: F1, F2, F6, J2.

Keywords: foreign direct investment, women, female labor force participation, supply chain linkages, Bangladesh.

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1. Introduction

Foreign direct investment (FDI) may affect gender development and gender inequality through increased economic growth and new employment opportunities. Jobs in FDI firms are shown to be "good" jobs associated with higher wages, more stability and training than jobs in domestic firms, especially in developing countries (Javorcik, 2015). In addition to direct effects, FDI can have indirect spillover effects through supply chain linkages. Technological spillovers from foreign affiliates to their suppliers or customers may allow them to increase the wage premiums they pay to workers.[1] And if the technology diffused is more complementary to the female workforce it can lead to relative increases in female labor demand. Additionally, FDI may affect female labor outcomes via corporate social responsibility efforts to improve working conditions, health, and safety in the workplace. Foreign investors (especially those from advanced economies) may push for more gender-equal norms and less discrimination against females in the workplace and these practices may spill over to their suppliers or customers in the host country (as well as to other domestic firms) (UNCTAD, 2014).

This paper examines how FDI affects gender-related labor outcomes directly, but especially via supply chain linkages, focusing on firms in Bangladesh's apparel and textiles sectors. The ready-made garments sector in Bangladesh has been a key contributor to the country's robust economic growth, poverty reduction, and women's empowerment over the last three decades. Bangladesh is the world's second largest exporter of ready-made garments after China, with the sector accounting for more than 80 percent of the country's exports as of 2015 and

[1] See Havránek and Iršová (2011) for a review and meta-analysis of the evidence on spillovers from FDI through supply chain linkages on firm productivity.

providing jobs to over 4 million low and semi-skilled workers (Farole et al., 2017). We exploit a unique firm-level survey collected by the World Bank covering representative samples of firms in apparel and in textiles sectors and including information on each firm's suppliers and customers which allows the construction of novel measures of supply chain linkages to FDI firms in the country. We follow and extend the approach proposed by Kee (2015) by relating FDI firms with domestic firms that share their local input suppliers. She designates as FDI siblings those domestic firms that share local input suppliers with an FDI firm in the same sector. Using a natural experiment generated by the Everything-But-Arms Initiative of the European Union that increased market access for Bangladeshi exporters, she shows that one quarter of the product scope expansion and one third of the productivity gains of domestic firms in Bangladesh that were FDI siblings can be attributed to the presence of the related FDI firms.

In this paper, we first examine whether there are significant differences in terms of gender labor practices of FDI firms relative to domestic firms in Bangladesh. We show that FDI firms hire significantly more female administrative workers and production workers than domestic firms. This is true even after controlling for firm size and for location and industry fixed effects. We then exploit the unique firm-to-firm relationships present in our dataset. We study whether domestic firms that are related to FDI firms as their suppliers or customers are different from other domestic firms in terms of gender labor market practices. The estimates show that these suppliers or customers of FDI firms exhibit significantly more female administrative workers. Finally, we explore the gender labor practices of domestic firms that share local suppliers or customers with FDI firms. We show that these related firms employ a significantly higher number of female administrative workers. Overall, these results suggest that domestic firms that are associated with

FDI firms through backward and forward linkages in the supply chain have similar gender practices as FDI firms.

Two caveats should be made regarding our study. Our analysis is able to exploit novel and unique data rarely available which captures firms' suppliers and customers, but the information is available for only a cross-section of firms in one year. Thus, our results are robust cross-sectional correlations but cannot be given a causal interpretation. The fact that the data covers year 2005 implies that our evidence provides a historic perspective on an earlier stage of the development of apparel and textiles sectors in Bangladesh before many changes to working conditions have been made following the Rana Plaza accident in 2013.

The paper relates to two strands of literature. A first growing literature examines the role of FDI for gender labor outcomes and work practices. At a cross-country level, stronger FDI inflows are shown to be linked to better welfare for women and lower gender inequality across countries, in particular through decreases in informal employment and the gender wage gap, as well as improved life expectancy and school enrollment (Ouedraogo and Marlet, 2018). Evidence also shows that the within-occupation gender wage gap tends to decrease with FDI net inflows but only in richer countries, with no clear link identified for poorer countries (Oostendorp, 2004).[2] From a micro perspective, the evidence on how foreign affiliates affect gender inequalities in the labor market is just emerging. Chen et al. (2013) show that foreign-owned firms in China hire

[2] UNCTAD (2014) argues that the impact of FDI on the gender wage gap is not one-sided but rather it varies over time and is country- and context-specific depending on the level of education and work experience of women and their bargaining power but also the nature of the industry where they work, the degree of international competition, and the technological spillovers.

more female workers but exhibit a larger gender wage gap than domestic firms, based on a census of firms. The lower wages offered to females are reflective of their assignment to low-tech and low-training jobs and their lower productivity, so they do not indicate gender discrimination. Coniglio et al. (2017) show that foreign affiliates in Vietnam create more employment opportunities for female workers than domestic firms, based on a cross-sectional representative sample of firms. But most of those jobs are in low-skilled occupations whereas job opportunities for high-skill female workers created by foreign firms are limited, likely due to Vietnam's comparative advantage in labor-intensive low-tech manufacturing. The wage premia of foreign affiliates decrease if firms have a higher share of female workers. Rocha and Winkler (2019) show a female labor share premium for firms engaged in global value chains, and in particular for foreign-owned firms, based on a cross-section of more than 29,000 manufacturing firms in 64 developing countries from the World Bank's Enterprise Surveys. The female labor share premium is much higher for production workers compared to non-production workers, implying that women specialize in low-skill production. The evidence also shows that while average wage rates are lower for firms with higher female labor shares, this negative correlation is smaller for foreign-owned firms. Kodama et al. (2018) show that foreign affiliates are more gender-equal in Japan in the sense that they exhibit higher proportions of females among workers, managers, directors, and board members than domestic firms of comparable size operating in the same industry in the same year, based on repeated cross-sections of firms over the period 2004-2014. Foreign affiliates create more female-friendly conditions in the workplace relative to domestic firms in that they offer

flexible working hours, telecommuting, childcare facilities, or subsidies.[3] Based on firm panel data for Japan and a rigorous causal approach (propensity score matching difference-in-differences) they show that foreign acquisitions are associated with a 9-10 percentage point increase in the share of female workers, although this effect takes place with a delay.

A second literature focuses on Bangladesh's ready-made garment sector's gender outcomes and working conditions. Heath and Mobarak (2015) show that the new employment opportunities brought by the ready-made garment sector in Bangladesh had sizeable effects on female welfare as they delayed marriage, decreased fertility, and led to a rapid increase in girls' educational attainment over the last 30 years (in absolute terms and relative to boys). These attractive manufacturing jobs were the first large-scale employment opportunities for women in a country with very traditional social values whereby women generally did not have paid jobs outside the home. The expansion of light manufacturing activities such as garments is associated with an increase in female labor force participation (Heath and Jayachandran, 2017). Manufacturing jobs require basic literacy, numeracy, and cognitive skills thus increasing the returns to education and they raise the opportunity cost of being married and having children. Garment jobs can be good for women providing them with steady income that is better than any of the women's alternative options but working conditions in the garment sector are far from perfect. High-profile factory disasters such as the Rana Plaza accident in 2013 that killed more than 1000 garment workers raised concerns about worker safety and growth of this sector in Bangladesh. Bossavie et al. (2019) study the impact of direct reforms and indirect responses by

[3] The study shows that these differences are more pronounced in affiliates with a higher foreign ownership share, suggesting that control is essential for ability of the foreign parent to affect the corporate culture in the overseas affiliate.

foreign buyers to the Rana plaza accident in Bangladesh which included a minimum wage increase, voluntary audits, and an increased reluctance to sub-contract to smaller factories. They show that overall working conditions did improve in the garment sector with its workers being more likely to receive sick leave and maternity leave and some measures of safety improving. But at the same time, they show that such workers were less likely to get written contracts and average hourly wages worsened for female workers. Thus, gains in working conditions came at the expense of wages, possibly due to the very globally competitive nature of the garment sector. Boudreau (2020) studies the role of multinationals in being accountable for labor rights and working conditions upstream in their supply chains in Bangladesh. Partnering with U.S. multinational retail and apparel firms that import from Bangladesh (the 'Alliance') she implemented a randomized control trial (RCT) where half of 84 Bangladesh garment factories are randomly assigned to receive a 6-month intervention to become compliant with Bangladesh's labor law which requires factories to have worker-manager safety committees. The study estimates that the RCT resulted in factories' increasing their compliance with the labor law and that this came with no adverse consequences for factory competitiveness including labor productivity, wages, and employment. A positive spin on these findings is that they prove the ability of private enforcement to improve labor standards in developing countries where government enforcement is likely to be lacking.

The contribution of our paper is two-fold. We document differences in gender-related labor market outcomes for firms in Bangladesh depending on their links to foreign affiliates in the country through supplier or customer relationships. Studies of supply chain linkages and gender impacts are not available in the literature due to the difficulties in measuring such linkages that our unique dataset allows to circumvent. We contribute to the broader debate on the link between globalization and gender inequality in developing countries.

This paper is organized as follows. In Section 2, we describe the data and provide summary statistics. Our empirical approach is described in Section 3 while regression results are shown in Section 4. Section 5 concludes.

2. Data

Our analysis uses data from a firm-level survey conducted by the World Bank in Bangladesh during November 2004–September 2005 covering apparel and textiles sectors.[4] For each sector the sample was drawn resorting to a different data source. For the apparel sector, a stratified random sample was drawn based on the rich Bangladesh Garment Manufacturers and Exporters Association directory covering 350 firms, which corresponded to about 10 percent of the total population of the domestic firms and 100 percent of FDI firms operating in the sector as of 2004 were covered. The sample of apparel firms was stratified to reflect the population distribution of firms by size, by industry (woven garments versus non-woven garments), and by location (Chittagong, Chittagong-Export Processing Zone, Dhaka, and Dhaka-Export Processing Zone). For the textiles sector, the random sample was drawn based on the most recent list of firms from the corresponding business association also stratified by size. Strict quality control criteria were applied during the data collection and data processing phases. The survey collected a wealth of firm characteristics, in particular related to foreign ownership and exports, as well as several labor market-related variables. Most importantly, the apparel firms were asked to list the names and addresses of their top three local suppliers and the textiles firms were asked to list the names

[4] See Fernandes (2009) and Kee (2015) for studies on firm productivity based on the Bangladesh survey data.

and addresses of their top three local customers. Based on this information and on information on firms' foreign ownership, we are able to identify which firms are suppliers or customers of FDI firms as well as to relate domestic firms to FDI firms through their common local suppliers or their common local customers.

In our analysis we use as firm outcome variables the following gender employment practices variables: the total number of female workers, the number of female administrative workers, and the number of female non-administrative workers (which includes in particular female production workers).[5] Our main regressors of interest are variables related to FDI. An FDI dummy variable is defined as being equal to one for firms with any degree of foreign ownership and zero otherwise. An FDI supplier dummy variable equals one for textiles firms that sell to an FDI apparel firm and zero otherwise. An FDI customer dummy variable equals one for apparel firms that buy from a textiles FDI firm and zero otherwise. An FDI sibling dummy variable equals one if the firm shares a local input supplier with an FDI firm and zero otherwise and it is defined for apparel firms only. An FDI partner dummy variable equals one if the firm shares a local customer with an FDI firm and zero otherwise and it is defined for textiles firms only. We use several firm controls including firm size defined as the log of total sales, a dummy for being an exporter, and a dummy for being located in an Export Processing Zone (EPZ).

[5] Another potential outcome variable would be the gender of the manager of each firm. The survey collected information on the name of the manager and we manually categorized each name as female or male. But we do not use this outcome variable in our analysis given the lack of variability across firms, out of all 350 apparel firms only 3 have a female manager and out of all 144 textiles firms only 2 have a female manager.

After data cleaning to exclude firms with incomplete information, the samples used in the econometric estimation include 350 firms in apparel and 144 firms in textiles as shown in Table 1. Within apparel, 65 percent of firms belong to the woven sub-sector, 34 percent belong to the knitwear/sweater sub-sector, and 1 percent belong to other apparel sub-sectors (e.g., linens).

Table 1: Sectoral distribution of firms

		Number of firms
Apparel	Knitwear	119
	Woven	226
	Other	5
Textiles		144

Table 2 shows summary statistics for our sample. On average, firms in our sample are large having have more than 700 workers, of which 384 are women. About 77 percent of the firms are exporters and 12 percent are located in an EPZ. Within our sample, 11 percent of firms are FDI firms, 5 percent are suppliers to FDI firms, and 15 percent are customers of FDI firms. Moreover, 37 percent of firms are FDI siblings (which share local suppliers with FDI firms), while 4 percent of firms are FDI partners (which share local customers with FDI firms).

Table 2: Summary statistics

	Number of observations	Mean	Standard deviation	Minimum	25th percentile	Median	75th percentile	Maximum
Panel A. Total employment and female labor-market outcomes								
Total number of workers	493	700	815	1	291	450	780	8200
Total number of female workers	456	384	541	0	128	252	443	7259
Number of female administrative workers	409	3	7	0	0	2	4	102
Number of female non-administrative workers	388	399	571	-3	127	250	480	7253
Panel B. FDI variables								
FDI dummy	494	11%	31%	0%	0%	0%	0%	100%
Supplier to FDI firm dummy	494	5%	21%	0%	0%	0%	0%	100%
Customer of FDI firm dummy	494	15%	35%	0%	0%	0%	0%	100%
FDI sibling dummy	494	37%	48%	0%	0%	0%	100%	100%
FDI partner dummy	494	4%	20%	0%	0%	0%	0%	100%
Panel C. Firm controls								
Firm size (log of total sales)	489	18.6	1.3	12.6	17.9	18.6	19.5	22.0
Exporter dummy	494	77%	42%	0%	100%	100%	100%	100%
EPZ dummy	494	12%	33%	0%	0%	0%	0%	100%

3. Empirical specifications

3.1 Impact of FDI

To examine the impact of foreign ownership per se on firm-level gender labor market outcomes, the following regression is estimated on the full sample of apparel and textiles firms:

$$\boldsymbol{Y_{ij} = \beta_{FDI} FDI_i + \beta_X X_i + \mu_j + \varepsilon_{ij}} \qquad \textbf{(1)}$$

where $\boldsymbol{Y_{ij}}$ is one of the outcome variables for firm *i* in sector *j*, $\boldsymbol{FDI_i}$ is the dummy variable for FDI firms, $\boldsymbol{X_i}$ is the vector of firm controls (size, exporter status, and EPZ location), $\boldsymbol{\mu_i}$ is an industry fixed effect, and $\boldsymbol{\varepsilon_{ij}}$ is an independent and identically distributed error term. Standard errors are clustered by industry and location.[6]

3.2 Impact of being suppliers or customers of FDI firms

To examine the impact of directly buying from an FDI textiles firm or the impact from directly selling to an FDI apparel firm on firm-level gender labor market outcomes, we estimate the specification below on the sample of domestic apparel and textiles firms:

$$\boldsymbol{Y_{ij} = \beta_{FDI} FDI_supplier_i + \beta_X X_i + \mu_j + \varepsilon_{ij}} \qquad \textbf{(2a)}$$

$$\boldsymbol{Y_{ij} = \beta_{FDI} FDI_customer_i + \beta_X X_i + \mu_j + \varepsilon_{ij}} \qquad (\textbf{2b})$$

where all variables are defined as above, $\boldsymbol{FDI_supplier_i}$ is the dummy variable for domestic firms which are selling to FDI apparel firms, and $\boldsymbol{FDI_customer_i}$ is the dummy variable for domestic firms which are buying from FDI textile firms.

[6] The industries considered are woven, knitwear/sweater, other apparel and textiles.

3.3 Impact of being FDI siblings or partners

To examine the impact of sharing a local input supplier with an FDI apparel firm or the impact of sharing a local customer with an FDI textiles firm on firm-level gender labor market outcomes, we estimate the following two specifications, respectively, on the sample of domestic apparel or textiles firms:

$$\boldsymbol{Y_{ij} = \beta_{FDI} FDI_sibling_i + \beta_X X_i + \mu_j + \varepsilon_{ij}} \quad \textbf{(3a)}$$

$$\boldsymbol{Y_{ij} = \beta_{FDI} FDI_partner_i + \beta_X X_i + \mu_j + \varepsilon_{ij}} \quad \textbf{(3b)}$$

where all variables are defined as above, $\boldsymbol{FDI_sibling_i}$ is the dummy variable for domestic apparel firms which share a local input supplier with an FDI firm, and $\boldsymbol{FDI_partner_i}$ is the dummy variable for domestic textiles firms which share a local customer with an FDI firm.

4. Results

Table 3 presents the regression results examining whether FDI firms are different from domestic firms in terms of their gender-labor practices. The estimates of Equation (1) show that FDI firms in Bangladesh consistently employ more female workers across all worker categories. However, some of these results are driven by firm size. Once we control for firm size, exporter status, location and industry fixed effects, the only results that are robust are the significantly higher numbers of female administrative workers in FDI firms relative to domestic firms.

Table 3: Do FDI firms exhibit different gender labor practices?

	Dependent variable is firm-level:					
	number of female workers	number of female workers	number of female administrative workers	number of female administrative workers	number of female non-administrative workers	number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI dummy	556.0**	95.22	5.706**	3.095*	608.2***	115.1
	(199.5)	(134.7)	(2.617)	(1.562)	(185.0)	(166.5)
Firm size (log of total sales)		162.7***		1.836***		163.3**
		(55.44)		(0.318)		(59.77)
Exporter dummy		-74.43		-0.537		-65.86
		(85.81)		(0.663)		(83.92)
Other apparel dummy		-269.4		1.373		-491.0*
		(312.1)		(2.907)		(266.9)
Apparel woven dummy		129.7		2.048**		132.7
		(80.29)		(0.883)		(92.21)
Textiles dummy		-306.0***		-0.0533		-316.5***
		(91.40)		(0.589)		(94.64)
EPZ dummy		354.0*		0.547		357.2
		(202.7)		(1.353)		(217.8)
Number of observations	455	451	408	404	387	383
R-squared	0.102	0.340	0.056	0.163	0.110	0.339

Notes: robust standard errors in parentheses clustered by industry-location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Tables 4 and 5 present the results from estimating Equations (2a) and (2b) to examine whether domestic firms who are the suppliers and customers of FDI firms have different gender labor practices, respectively. The estimates show that customers of FDI firms have significantly more female administrative workers, once we control for firm size, exporter status, location and industry fixed effects. For suppliers to FDI firms we find no significant differences in gender labor practices relative to other domestic firms.

Tables 6 and 7 present the results from assessing whether FDI siblings and partners have different gender labor practices than other domestic firms, by estimating respectively Equations (3a) and (3b). These are the domestic firms that share local suppliers or local customers with the FDI firms. The estimates in Table 6 show that, all else equal, FDI siblings employ significantly

more female administrative workers than other domestic firms. In contrast, the estimates in Table 7 show that FDI partners are no different from other domestic firms on their female hiring practices.

Table 4: Are gender labor practices of suppliers of FDI firms different from those of other domestic firms?

	Dependent variable is firm-level:					
	number of female workers	number of female workers	number of female administrative workers	number of female administrative workers	number of female non-administrative workers	number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI suppliers dummy	-46.66	-46.17	0.761	1.099	-47.12	-46.07
	(58.37)	(67.79)	(1.515)	(1.292)	(60.45)	(69.90)
Firm size (log of total sales)		44.61***		1.534***		42.26**
		(7.005)		(0.0812)		(7.239)
Exporter dummy		21.94		0.648**		13.16
		(15.71)		(0.177)		(17.90)
Other apparel dummy						
Apparel woven dummy						
Textiles dummy						
EPZ dummy		-63.91		-3.216		-58.25
		(67.77)		(2.094)		(67.45)
Observations	113	112	117	116	106	105
R-squared	0.002	0.043	0.004	0.286	0.003	0.039

Notes: robust standard errors in parentheses clustered by industry-location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Table 5: Are gender labor practices of customers of FDI firms different from those of other domestic firms?

	Dependent variable is firm-level:					
	number of female workers	number of female workers	number of female administrative workers	number of female administrative workers	number of female non-administrative workers	number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI customers dummy	253.7*	154.7	2.584*	2.054*	276.3*	161.7
	(127.3)	(107.3)	(1.345)	(1.071)	(145.1)	(116.3)
Firm size (log of total sales)		194.6**		1.466***		205.0**
		(67.07)		(0.249)		(81.25)
Exporter dummy		-250.5		-1.311**		-244.5
		(141.1)		(0.566)		(176.7)
Other apparel dummy		-102.4		5.100***		-328.5
		(309.8)		(1.194)		(335.3)
Apparel woven dummy		58.21		1.126*		64.41
		(56.28)		(0.568)		(73.68)
Textiles dummy						
EPZ dummy		484.7		-0.532		509.1
		(292.3)		(0.696)		(332.2)
Observations	293	290	248	245	239	236
R-squared	0.041	0.259	0.036	0.120	0.044	0.255

Notes: robust standard errors in parentheses clustered by industry-location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively

Table 6: Are gender labor practices of FDI siblings different from those of other domestic firms?

	Dependent variable is firm-level:					
	number of female workers	number of female workers	number of female administrative workers	number of female administrative workers	number of female non-administrative workers	number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI siblings dummy	101.9	43.00	1.919***	1.405**	102.4	38.49
	(70.83)	(51.57)	(0.471)	(0.468)	(88.10)	(62.75)
Firm size (log of total sales)		200.0**		1.505***		212.0**
		(69.35)		(0.331)		(84.16)
Exporter dummy		-245.5		-1.380**		-237.3
		(139.3)		(0.480)		(173.1)
Other apparel dummy		-125.5		4.442**		-373.0
		(310.8)		(1.661)		(329.9)
Apparel woven dummy		54.87		0.907**		62.11
		(49.87)		(0.400)		(66.54)
EPZ dummy		503.0		-0.322		529.2
		(295.1)		(1.054)		(336.5)
Observations	293	290	248	245	239	236
R-squared	0.011	0.246	0.030	0.114	0.009	0.242

Notes: robust standard errors in parentheses clustered by industry-location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Table 7: Are gender labor practices of FDI partners different from those of other domestic firms?

	Dependent variable is firm-level:					
	number of female workers	number of female workers	number of female administrative workers	number of female administrative workers	number of female production workers	number of female production workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI partners dummy	-17.54	-67.89	1.602*	0.332	-18.80	-65.77
	(35.14)	(29.29)	(0.600)	(0.280)	(34.48)	(29.09)
Firm size (log of total sales)		48.98**		1.527***		46.65**
		(8.949)		(0.101)		(9.216)
Exporter dummy		19.79		0.651*		10.85
		(13.16)		(0.242)		(15.68)
Other apparel dummy						
Apparel woven dummy						
EPZ dummy		-87.57		-2.470		-82.13
		(101.2)		(1.228)		(101.2)
Observations	113	112	117	116	106	105
R-squared	0.000	0.045	0.017	0.280	0.000	0.041

Notes: robust standard errors in parentheses clustered by industry-location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

In summary, the regression analysis above shows that FDI firms hire more female administrative workers. Domestic firms that are related to FDI firms directly as their customers or indirectly as their siblings also employ more female administrative workers, but not necessarily more female non-administrative workers. This could be because administrative workers are involved in the intense firm-to-firm interactions between FDI firms and their related domestic firms, but other workers are not. By hiring more female administrative workers, the presence of FDI firms created a more gender-conducive environment that encouraged the related domestic firms also hire more female administrative workers. Perhaps female administrative workers are more comfortable dealing with female administrative workers of other related firms.

One concern about our results above is that they might be driven by selection bias: FDI firms may select domestic firms with more female administrative workers to be their suppliers.

Likewise, domestic firms with more female administrative workers may select domestic firms with more female administrative workers to be their suppliers. Thus, the results that FDI siblings have more female administrative workers could be driven by selection, not by spillovers of gender practice from FDI firms.

In the absence of a valid instrumental variable correlated with FDI siblings but not with the number of female administrative workers for our cross-sectional sample, we rely on a placebo exercise to address potential selection bias. First, we randomly assign FDI suppliers, customers, siblings, and partners status to the domestic firms in our sample, separately in the apparel and textiles sectors, in a way that results in new versions of the indicator variables $\boldsymbol{FDI_supplier}$, $\boldsymbol{FDI_customer}$, $\boldsymbol{FDI_sibling}$, and $\boldsymbol{FDI_partner}$ with similar averages as those shown in Table 2 for the original variables. Second, we re-estimate Equations (2a), (2b), (3a), and (3b) including these new versions of the variables. Finally, we repeat this process 100 times. We compute the average of the estimated coefficients and their standard deviations and present them in Table 8. The results of this placebo exercise show that when the linkages between FDI and domestic firms are randomly assigned, there are no statistically meaningful differences in gender labor practices of linked firms relative to other domestic firms. The coefficients are either insignificant or have counter-intuitive signs. This finding gives us some confidence that selection effects are not the driving force behind our previous findings.

Table 8: Placebo exercise

	Number of female workers		Number of female administrative workers		Number of female non-administrative workers	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
FDI suppliers	3.057	91.833	-0.110	0.931	5.839	95.029
FDI customers	-3.456	58.424	0.087	0.964	-5.583	73.038
FDI siblings	3.821	58.657	0.070	0.784	4.464	70.837
FDI partners	6.417	96.211	-0.142	0.945	7.169	98.871

Notes: this table reports the mean and standard deviation of the bootstrap coefficients on the new indicators for FDI suppliers, FDI customers, FDI siblings and FDI partners from 100 regressions, where domestic firms are randomly assigned to FDI suppliers/customers/siblings/partners status according to industry proportions.

5. Conclusion

This paper studies whether the presence of FDI firms has positive spillover effects on the gender labor practices of domestic firms in developing countries. Based on a unique linked firm-to-firm data set of apparel and textiles sectors of Bangladesh, this paper first shows that FDI firms hire more female workers, particularly administrative and production workers. Domestic firms that are directly related to FDI firms being their local customers also hire more female administrative workers, but not necessarily more female non-administrave workers. Moreover, domestic firms that share local suppliers with FDI firms, which are the FDI sibling firms also employ more female administrative workers. But the same is not verified for female production workers. This could be due to the fact that, unlike production workers, administrative workers participate more in firm-to-firm interactions. Thus, with FDI firms hiring more female administrative workers, they create a more conducive environment for domestic firms that interact with them to hire female administrative workers.

Traditionally, in the study of FDI spillovers the focus is on the impact of FDI presence on the productivity of domestic firms. However, FDI presence may provide more jobs for women and lead to gender empowerment, which through supply chain linkages may encourage domestic firms to hire more women.

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