The impact of foreign direct investment on gender inequality in India[+]

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This paper examines the effect of foreign direct investment (FDI) on female employment and wages in India. Using both household-level and plant-level data, it estimates the impact of industry-level FDI inflows on employment, wages and the gender wage gap for skilled and unskilled female workers. Further, it estimates whether there are any "cultural transfers" or spillovers in terms of gender norms from more gender-equal countries through this FDI. In order to estimate this, a weighted industry-level Gender Inequality Index (GII) is created. The main findings are that although FDI leads to an increase in employment of unskilled female workers, it worsens the gender wage gap. Further, there is no strong evidence of cultural spillovers to skilled female workers. This may be explained by the fact that multinational enterprises choose to adopt local institutions in order to be successful in developing-country markets, thereby losing some of their ownership advantages.

Keywords: FDI, foreign direct investment, gender inequality, India

1. Introduction

The impact of foreign direct investment (FDI) on the employment and wages of workers has been extensively investigated in various economic studies (Aitken et al. (1996), Hijzen et al. (2013), Lipsey et al. (2013), Poole (2013)). More recently, there has an been an emphasis on examining the impact of FDI on social development in developing countries. One dimension that has been examined is the impact of FDI on gender equality, more specifically, the impact of FDI on the employment and relative wages of women participating in the labour force in developing countries.

The studies examining these effects of FDI on gender outcomes can be divided into two main categories. The first set of studies focuses on the role of increased competition experienced by globalized firms in reducing costly discriminatory practices, as highlighted by Becker (1971), Chen et al. (2013), Heyman et al.

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(2013) and Meng (2004). The other, more recent set of studies highlights the role of "cultural transfers" from more gender-equal home countries to their foreign affiliates in host countries (Kodama et al., 2018; Tang and Zhang, 2017).

This paper examines the impact of FDI on employment of female workers in India and on the gender wage gap there. It estimates both the average effects of industry-level FDI, and the differential effect of this FDI on the basis of the country of origin. Since India opened its borders to trade and investment, studies have investigated how tariff liberalization in the country has played a role in creating a demand for skilled workers (Sharma, 2018) and improved firm-level productivity (Topalova and Khandelwal, 2011) and product variety (Goldberg et al., 2010a, Goldberg et al., 2010b). Although India has experienced significant growth in its FDI inflows, it continues to rank poorly in terms of gender equality — 127 out of 200 countries, according to the United Nations Development Programme (UNDP), measured on reproductive, empowerment and labour market dimensions.[1] An important question to investigate, therefore, is how does FDI impact gender outcomes in India? This paper starts by examining the average effects of industry-level FDI on female employment, employment relative to male workers, and wages of female workers, along with the gender wage gap. Do the competitive pressures of globalization through FDI lead to less discrimination in Indian labour markets?

Further, following Tang and Zhang (2017), this paper uses the Gender Inequality Index (GII) to examine whether there are any "cultural spillovers" from more gender-equal countries to industries that receive FDI from these countries. The paper uses two main data sets — a household-level data set from the National Sample Survey (NSS), and a plant-level data set from the Annual Survey of Industries (ASI). The latter makes it possible to control for various plant-level characteristics while examining the relationship between FDI inflows and gender outcomes but does not contain information on the gender breakdown of the skilled workers at these plants.[2] Further, it mainly covers the manufacturing sector. In order to overcome these shortcomings, this paper mainly considers the employment-unemployment rounds from household-level data available from the NSS for the years 2006, 2008, 2010 and 2012. The impact of industry-level FDI on employment and wages is studied for female and male workers. Further, a weighted industry-level GII[3] is constructed so as to be able to capture the cultural transfers and spillovers of FDI.

[1] India's FDI inflows increased by 167 per cent from 2005 to 2006 and have increased by 19 per cent from 2006 to 2012, the period of analysis in this paper (author's calculations, data from UNCTAD World Investment Report 2020, Annex table 01. FDI inflows, by region and economy, 1990—2019).

[2] Additionally, there is no information on the foreign ownership or export status of the plant.

[3] Data on the GII is available from the UNDP's Human Development Report: http://hdr.undp.org/en/indicators/68606.

The main finding is that FDI does improve gender outcomes in terms of employment. There is a positive impact of FDI — in both absolute and relative terms — on the employment of female workers. This result is confirmed from both the household-level and the plant-level panel data. The increase in employment of female workers is mainly driven by the increase in employment of unskilled female workers. However, FDI has a negative impact on the absolute wages for these female unskilled workers and on the gender wage gap. There is no impact of FDI on the absolute wages or relative wages of skilled female workers.

When considering the weighted industry-level GII to measure the cultural transfers and spillovers, the analyses from the household-level data reveal that FDI from more gender-equal countries has a negative and significant impact on the absolute and relative employment of skilled female workers, while there is no absolute or relative impact on wages. Although this is counter-intuitive to our expectations based on the hypothesis of cultural transfers, it might also be because a significant percentage of the FDI in India is rerouted through Mauritius.[4] When excluding Mauritius from the data, the analysis shows that there are no significant cultural transfers in terms of gender norms for FDI. There might be possible explanations as to why these transfers do not occur in the Indian context, but it is also important to keep in mind that the unavailability of the data about the countries of origin rerouting FDI is also possibly impacting the results obtained in this study.

The fact that FDI in India causes an increase in employment of unskilled female workers can be explained by the fact that the main motivation for FDI in developing countries such as India is to obtain low-cost resources. The resource in India is low-cost unskilled labour. Female unskilled workers earn lower wages than their male counterparts (see section 2), which is why resource-seeking FDI can be expected to increase demand for and thus employment of these workers. However, perhaps because of an excess supply and the weak bargaining power of female unskilled workers, there is no positive impact of FDI on wage outcomes.

A recent study by Coniglio et al. (2017) investigates the differences between foreign-owned and domestic firms in Viet Nam and finds that although foreign firms increase employment opportunities for female unskilled workers, they also widen the gender wage gap. The study, however, considers only a cross-section of Vietnamese firms. In Mexico, in contrast, Juhn et al. (2014) find that tariff reductions in the North American Free Trade Agreement that led to the adoption of modern technologies benefited both the employment and the wages of female workers. However, they are not able to find any positive outcomes in terms of employment or

[4] For 2017, the share of FDI from Mauritius was 39 per cent. Most foreign companies route investments into India through Mauritius-based shell companies to avoid paying capital taxes as a result of the Double Taxation Avoidance Agreement that India signed with Mauritius.

wages for female white-collar workers. Studies by Kodama et al. (2018) and Tang and Zhang (2017) find evidence of cultural transfers and spillovers of FDI to foreign affiliates and firms within the domestic industry for Japan and China, respectively. In this study cultural transfers in the form of higher wages or employment for female skilled workers have not been identified, and while there are some shortcomings in the data, there may be other reasons as to why these effects have not been observed. China and Japan have been recipients of FDI for a much longer time than India (which liberalized only in 1991). A longer, more sustained period allows for better conditions to do business and establish the presence of foreign affiliates to better allow for such transfers. In fact, Kodama et al. (2018) emphasize that they mainly find effects in older affiliates with a larger foreign share, suggesting that time plays an important role in transplanting culture.

In a developing country such as India, where most of the FDI is still market and resource seeking, and it is not as easy to establish a foreign company as in other countries, Halaszovich and Lundan (2016) show that a certain level of "embeddedness" is required for multinational firms to be successful. Thus, in order to be successful initially and to perform better in developing countries, multinational firms need to adopt local institutions. This means multinational enterprises are more likely to hire more-experienced managers to better adapt to local market conditions; thus, they are more likely to hire male managers who have experience working in these countries, than to provide more opportunities to female managers. This embeddedness theory offers an explanation — aside from the shortcomings in the data — for why this study is not able to find a strong presence of cultural transfers and spillovers in terms of gender norms.

The rest of the paper is structured as follows. Section 2 describes the data sets used for this analysis. The empirical estimation models are presented in section 3. A discussion of the estimates obtained from these models is provided in section 4. Section 5 concludes.

2. Data

Four main sources of data were used in conducting this study: household-level data from the NSS of India, plant-level data from the ASI, data on FDI from the Ministry of Statistics and Planning and the Reserve Bank of India, and data on the GII from the UNDP.

The household-level data are obtained from the employment-unemployment rounds of the NSS of India. The data used in this study are from 2006, 2008, 2010 and 2012. The household-level data contain information on the state, occupation, industry, wages, education, age, gender and training of the workers in the data set. The data are mainly available as a repeated cross-section. Summary statistics

on these household-level data are presented in tables 1 and 2. Table 1 provides summary statistics for employment across various worker categories, whereas table 2 provides summary statistics for wages across various worker categories. From table 1, we gather that in the data there are more male workers than female workers, and more unskilled workers than skilled workers. Table 2 shows that skilled workers (both male and female) earn higher average weekly wages than unskilled workers, and that on average male workers earn higher average weekly wages than female workers.

For the purposes of this study, I created cohorts of workers using their age, education, gender, state, industry and occupation. I used the one-digit National Classification of Occupations (NCO) codes to create two main categories, for

Table 1: Employment summary statistics for household-level data

	Average employment	
	Employment (standard deviation)	Log (Employment) (standard deviation)
Female workers	1.94×10^8	19.0062
	(6.72×10^7)	(0.459)
Skilled female workers	1.02×10^7	16.127
	(1.35×10^6)	(0.137)
Unskilled female workers	1.84×10^8	18.940
	(7.28×10^7)	(0.539)
Male workers	5.84×10^8	20.130
	(1.77×10^8)	(0.378)
Skilled male workers	4.85×10^7	17.679
	(1.02×10^7)	(0.214)
Unskilled male workers	5.35×10^8	20.033
	(1.87×10^8)	(0.449)
All workers	7.78×10^8	20.412
	(2.35×10^8)	(0.384)
Skilled workers	5.87×10^7	17.872
	(1.06×10^7)	(0.184)
Unskilled workers	7.19×10^8	20.323
	(2.4×10^8)	(0.436)
Number of cohorts created	114, 349	

Source: Author's calculations based on data from the National Sample Survey (Employment and Unemployment rounds 2006, 2008, 2010, and 2012).

Table 2: Wage summary statistics for household-level data

	Average employment	
	Employment (standard deviation)	Log (Employment) (standard deviation)
Female workers	835.06	6.586
	(502.02)	(0.550)
Skilled female workers	2404.21	7.741
	(808.87)	(0.341)
Unskilled female workers	530.16	6.179
	(273.43)	(0.491)
Male workers	1276.01	7.045
	(662.67)	(0.476)
Skilled male workers	3516.37	8.123
	(1160.61)	(0.337)
Unskilled male workers	976.04	6.799
	(484.59)	(0.462)
All workers	1183.88	6.964
	610.56	(0.473)
Skilled workers	3226.55	8.037
	(981.08)	(0.310)
Unskilled workers	887.48	6.700
	(416.30)	(0.438)

Source: Author's calculations based on data from the National Sample Survey (Employment and Unemployment rounds 2006, 2008, 2010, and 2012).

skilled and unskilled workers. I grouped legislators, senior officials and managers (NCO 1), professionals (NCO 2), and technicians and associate professionals (NCO 3) as skilled workers, and the rest of the professional categories as unskilled workers. All the analyses were also conducted with an alternative definition of skilled workers, with only legislators, senior officials and managers, but it did not significantly change the main results of the paper. The age and education buckets used for creating the cohorts are presented in tables A.1 and A.2 of the Appendix. The occupational categories as they appear in the NSS data are presented in table A.3. There are 35 states and union territories, and 236 industries at the three-digit level. The total number of cohorts created is 114,349. An example of a cohort used for this analysis would be female workers between the ages of 25 and 34 with higher education working as professionals (NCO 2) in computer programming, consultancy and related activities (National Industrial Classification, or NIC 620) in Delhi (State code 7). Wages in the data are average weekly wages in Indian rupees.

Table 3 presents the summary statistics from the plant-level ASI data. The gender breakdown in terms of employment is available only for unskilled workers. The statistics show that on average, plants have more unskilled male workers than unskilled female workers, and those male workers make higher wages than those female workers.

Table 3: Summary statistics for plant-level data

	Mean	Standard deviation
Log (Employment)		
Total workers	5.128	(1.674)
Female unskilled workers	3.269	(1.736)
Male unskilled workers	4.401	(1.748)
Log (Average daily wage) (INR)		
Total workers	15.91	(2.168)
Female unskilled workers	13.64	(1.745)
Male unskilled workers	15.09	(2.236)
Log (Fixed capital)	18.95	(1.859)
Log (Working capital)	16.32	(2.795)
Log (Total sales)	18.52	(2.497)
Log (FDI)	16.42	(2.122)
Observations	5,425	

Source: Author's calculations based on data from the Annual Survey of Industries (plant data, 2000–2006).

For robustness checks for the impact of FDI on female workers, I consider plant-level data from the ASI. Panel data of firms in the manufacturing sector for the time period 2000—2006 were used. The data contain detailed information on various plant-level characteristics, including employment and wages of workers; however, they provide the gender decomposition only of a firm's unskilled workers, not its skilled workers. Thus, the data have been used to verify the effects for unskilled female workers that were obtained from the household-level data. Details on foreign ownership or exports are not available for the years considered in this study.

The FDI data are obtained from the Department of Industrial Policy and Promotion in the Ministry of Statistics and Planning. I mostly use the industry-level inflows of FDI provided at the three-digit NIC. The FDI measure is a flow variable, and the unit of measurement considered is millions of Indian rupees. With the relaxation of FDI policies in India, the share of majority-owned or wholly owned companies has increased significantly and was 85 per cent in 2015 (Aggarwal, 2018). Summary statistics from the FDI data are presented in tables 4 and 5. In order to obtain information on the country-level breakdown of these industrial inflows for the GII analysis, I use the company-level information provided by the Reserve Bank of India. These data provide the name of the company and the inflow of FDI, the main

product description, and the country of origin. There were 12,538 entries for 6,106 unique companies in this data. I created a convergence table to match the product description to the three-digit NIC classification. The most accurate matching was obtained for 2017, and I have used data from that year to obtain an industry-level country classification of inflows of FDI. From these data, I obtain the share of various countries' FDI for each industry.

Table 4: FDI Summary for household-level data

Year	Total FDI (INR)	Industry-level FDI (INR)	Log (Industry-level FDI)
2006	3.96×10^{10}	1.98×10^{9}	19.170
		(4.72×10^{9})	(3.428)
2008	8.20×10^{11}	4.06×10^{9}	20.438
		(1.03×10^{10})	(2.531)
2010	6.18×10^{11}	3.22×10^{9}	19.672
		(8.81×10^{9})	(2.414)
2012	8.28×10^{11}	4.16×10^{9}	19.513
		(1.40×10^{10})	(3.192)

Source: Author's calculations based on data from the Department of Industrial Policy and Promotion, Ministry of Statistics and Planning.
Note: Inward FDI presented in these data is measured as a flow.

Table 5: FDI Summary for plant-level data (manufacturing sector only)

Year	Total FDI (INR)	Industry-level FDI (INR)	Log (Industry-level FDI)
2000	2.24×10^{9}	1.51×10^{7}	15.058
		(3.30×10^{7})	(2.642)
2001	3.47×10^{9}	2.35×10^{7}	14.691
		(6.38×10^{7})	(2.924)
2002	3.34×10^{9}	2.25×10^{7}	14.787
		(6.33×10^{7})	(2.746)
2003	2.05×10^{9}	1.38×10^{7}	15.290
		(2.30×10^{7})	(1.850)
2004	3.20×10^{9}	2.16×10^{7}	15.220
		(5.47×10^{7})	(2.163)
2005	4.33×10^{9}	2.92×10^{7}	15.421
		(6.84×10^{7})	(2.178)
2006	1.11×10^{10}	7.49×10^{7}	16.402
		(1.58×10^{8})	(2.164)

Source: Author's calculations based on data from the Department of Industrial Policy and Promotion, Ministry of Statistics and Planning.
Note: Inward FDI presented in these data is measured as a flow.

These shares are used as weights to compute a weighted GII for each industry. As data on the country of origin of FDI inflows is accurately available only for 2017, the GII data has also been used from 2017 on. It was obtained from the UNDP Human Development Reports. The index considers three main dimensions to measure gender inequality: reproductive health, empowerment and the labour market. A low index (close to 0) reflects low gender inequality, whereas a high index (close to 1) indicates greater inequality in the country. The top three countries with the lowest GII in 2017 were Switzerland (0.039), Denmark (0.040) and Sweden (0.044), whereas those with the highest GII were Yemen (0.834), Papua New Guinea (0.741) and Chad (0.748). India falls in the category of countries with "medium human development" according to the UNDP, with a GII of 0.524 but a very low rank of 127. The labour force participation rate in 2017 of female workers was 27.2 per cent whereas for male workers it was 78.8 per cent.

3. Empirical Strategy

I first consider the average effects of FDI on outcomes such as female employment and wages earned by women. I start with the household-level data where I created cohorts based on age, education, gender, state, skill and industry of occupation. The following estimation measures the impact of industry-level FDI on the employment of the cohorts:

$$y_{it} = \beta_0 + \beta_1 FDI_{jt} + \theta_i + \theta_{st} + \epsilon_{it} \quad (1)$$

where *i* refers to the cohort, and *j* refers to the three-digit NIC industry. The specification controls any unobserved time-invariant cohort-level characteristics that might affect the relationship between FDI and the dependent variable by including θ_i. Further, the specification also controls for state-level time-variant effects that could affect this relationship such as state-level FDI policies, by including θ_{st}. The standard errors in this specification are robust and clustered at the industry-year level.

This estimation is carried out for various subcategories — skilled male workers, unskilled male workers, skilled female workers, and unskilled female workers. Two main dependent variables are considered: average total employment and average daily wages of the cohorts. A positive coefficient on FDI suggests that higher FDI inflows increase the total employment and the daily wages of cohorts in each of the subcategories considered.

Further, to estimate the differential effects between male and female workers, I estimate the following specification:

$$y_{it} = \beta_0 + \beta_1 FDI_{jt} + \beta_2 FDI_{jt} * Gender_{it} + \beta_3 Gender_{it} + \theta_i + \theta_{st} + \epsilon_i \quad (2)$$

where $Gender_{it}$ is a dummy variable that takes a value of 1 for female workers and a value of 0 for male workers. Again, the main dependent variables

considered are cohort-level average total employment and average daily wages of workers. In this specification, a positive and significant coefficient on the interaction term would suggest that the gains in employment and wages due to increased inflows of FDI are significantly higher for female workers than for male workers.

As a robustness check, I run the same specifications for plant-level data and control for plant-level fixed effects. These are time-invariant plant-level characteristics that may impact the relationship between FDI and the main dependent variable — the plant-level employment of workers. Since the plant-level data have the gender decomposition only for unskilled workers, we are unable to conduct this analysis for skilled workers.

To better estimate cultural spillovers from more gender-equal countries through FDI, I move on to the analysis with GII. As there is not a lot of variation in the GII across time, I consider the cross-section from the latest year that I could obtain from the NSS (2012):

$$y_i = \beta_0 + \beta_1 GII_j + \theta_{st} + \epsilon_{it} \quad (3)$$

where

$$GII_j = \sum_k shareFDI_{jk} * GII_k$$

Here *GII* is weighted by the shares of each country in the total FDI inflows of an industry. Higher values reflect higher gender inequality, and lower values reflect lower gender inequality. The specification controls for state fixed effects, to control for any state-level variation that might impact the relationship between GII and the dependent variables of interest. As mentioned in the data section, the most accurate company data providing information on the country of origin of FDI is from 2017, thus the GII can only be computed for 2017. This has been merged with our latest round of household-level data (2012), with the assumption being that while inflows of FDI might have changed, the rough composition in terms of the country of origin in each industry is more or less the same. The dependent variables are employment and wages of workers. This is estimated for the four sub-populations — skilled male workers, unskilled male workers, skilled female workers, and unskilled female workers.

A negative coefficient on GII when considering the employment and wages of female workers would indicate that FDI from more gender-equal countries leads to higher employment and wage outcomes for female workers in India. This would support the hypothesis that there are cultural spillovers from developed countries through FDI to developing countries.

4. Estimation results and discussion

This section presents the estimation results of the empirical analyses discussed in the previous section. The results of the first specification, which examines the impact of *log(FDI)* on *log(employment)* of female and male workers, appear in table 6. On average, higher flows of FDI are associated with an increase in employment, but this is mainly driven by the employment of unskilled workers. The impact on unskilled female and male workers is positive and significant; however, there is no impact on the employment of skilled female and male workers. The coefficients estimated suggest that a 100 per cent increase in FDI inflows in a particular period will lead to an increase in employment of 13.8 per cent on average, driven mainly by an increase in employment of unskilled male workers (11.8 per cent) and unskilled female workers (22.6 per cent). Although the literature does not provide comparisons of these estimates based on the estimation strategy used in this paper (the impact of industry-level inflows on cohorts of workers), these effects might be compared with those obtained by Lipsey et al. (2013). They find that in Indonesia, takeovers by foreign firms led to 10 per cent faster growth in employment than in domestically owned firms.

Table 6: FDI and employment (various populations)

	(1)	(2)	(3)	(4)	(5)
	All workers	**Male unskilled**	**Male skilled**	**Female unskilled**	**Female skilled**
Log (FDI_{ind})	0.138***	0.118***	0.0345	0.226***	0.0487
	(0.0380)	(0.0352)	(0.0270)	(0.0525)	(0.0932)
Constant	5.789***	6.259***	7.412***	4.648***	7.053***
	(0.807)	(0.742)	(0.570)	(1.087)	(1.930)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	16,515	11,533	1,843	2,092	1,047
Adjusted R^2	0.077	0.086	0.075	0.244	0.058

Note: All regressions include cohort fixed effects.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

Table 7 shows the relative effects for female workers by including a gender dummy, which takes on a value of 1 if the gender is female. When we consider all workers, an increase in industry-level FDI has a significantly bigger impact on female workers than male workers. When considering unskilled workers only, increased FDI has a bigger impact on employment of unskilled female workers than on employment of unskilled male workers. There is no differential gender-based impact of FDI for skilled workers.

Table 7: FDI and employment: gender dummy

	(1) All workers	(2) Unskilled	(3) Skilled
Log (FDI_{ind})	0.118***	0.117***	0.0270
	(0.0354)	(0.0353)	(0.0256)
Log (FDI_{ind}) x Gender	0.113***	0.0946**	0.0145
	(0.0319)	(0.0306)	(0.0620)
Constant	5.758***	6.045***	7.553***
	(0.772)	(0.761)	(0.604)
State-year FE	Yes	Yes	Yes
Observations	16,515	13,625	2,890
Adjusted R^2	0.081	0.103	0.059

Note: All regressions include cohort fixed effects.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* p < 0.10, ** p < 0.05, *** p < 0.01. Dependent variables are in logs.

As a robustness check for this result, I use plant-level data from the ASI[5]. Although these data provide detailed information on several characteristics of the plant, they do not include information about foreign ownership. Also, they include the gender breakdown of the plant-level workforce only for "production workers", or unskilled workers. The FDI data have been merged at the three-digit level NIC, and a panel was created for the years 2000 — 2006. The estimation results confirm the effects obtained from the NSS household-level data. The share of female workers at the plant level increases significantly as industry-level FDI increases. The results are presented in table 8.

Table 8: FDI and employment results using ASI plant-level data

	(1) Share of female workers	(2) Share of female workers	(3) Share of female workers
Log (FDI_{ind})	0.0252**	0.00250**	0.00244**
	(0.00101)	(0.00102)	(0.00100)
Log (Total sales)		0.000246	0.000601
	0.301***	(0.00164)	(0.00168)
Constant	(0.0166)	0.240***	0.228***
	No	(0.0319)	(0.0331)
State-year FE	Yes	No	Yes
Year FE	Yes	Yes	No
Observations	12,243	Yes	No
Adjusted R^2	0.002	0.001	0.012

Note: Plant-fixed effects are included in all regressions.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* p < 0.10, ** p < 0.05, *** p < 0.01

[5] This only considers the manufacturing sector.

The positive impact of industry-level FDI on the employment of unskilled female workers is indicative of the fact that most FDI to developing countries seeks low-cost, unskilled labour. Because female workers are paid less than male workers, the employment of this worker group that increases the most.

The next set of results presents the wage effects of FDI from the household-level data. The dependent variable in table 9 is the average daily wage paid to each worker group. There are no significant effects on workers overall; however, increased FDI inflows are associated with significant negative effects on wages for unskilled female workers, whereas there are somewhat significant positive wage effects for male skilled workers. Papers that study the impact of FDI on wages find varying effects, from a small 2–4 per cent increase in wages in cases of foreign takeover in a study for Portugal that controls for firm fixed effects (Almeida, 2007) to a much higher positive effect (between 8 and 23 per cent) in a cross-sectional study that considers Cameroon, Ghana, Kenya, Zambia and Zimbabwe (te Velde and Morrissey, 2003).

Table 9: FDI and wages (various populations)

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
Log (FDI_{ind})	-0.00740	-0.00641	0.0273*	-0.0143*	-0.0797
	(0.00470)	(0.00482)	(0.0153)	(0.00591)	(0.0632)
Constant	6.740***	6.722***	7.602***	6.485***	9.240***
	(0.0992)	(0.101)	(0.324)	(0.113)	(1.303)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	16,515	11,533	1,843	2,092	1,047
Adjusted R^2	0.335	0.353	0.273	0.450	0.256

Note: All regressions include cohort fixed effects.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

I investigate whether these effects are significant when considering the differential impact on female workers relative to male workers. The results are presented in table 10. For unskilled workers, as inflows of FDI increase, female workers make significantly lower wages than male workers. Unskilled female workers still constitute a lower share of the workforce than unskilled men, and thus have lower bargaining power. This may be why FDI is able to exploit and reinforce the lower wages paid to these workers.

When considering skilled workers, industry-level FDI significantly worsens the gender wage gap, as skilled male workers earn higher wages than skilled female workers. An explanation can be found in the embeddedness theory

Table 10: FDI and wages: gender dummy

	(1) All workers	(2) Unskilled	(3) Skilled
Log (FDI_{ind})	-0.00433	-0.00581	0.0312*
	(0.00427)	(0.00454)	(0.0168)
Log (FDI_{ind}) x Gender	-0.0172***	-0.0136**	-0.0678**
	(0.00507)	(0.00484)	(0.0315)
Gender	0	0	0
	(.)	(.)	(.)
Constant	6.750***	6.600***	7.873***
	(0.0944)	(0.0997)	(0.390)
State-year FE	Yes	Yes	Yes
Observations	16,515	13,625	2,890
Adjusted R^2	0.336	0.365	0.253

Note: All regressions include cohort fixed effects.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

of Halaszovich and Lundan (2016) — that multinational firms in developing countries might need to integrate into local institutions in order to be successful in their markets. Thus, multinational firms might prefer experienced managers – who are likely to be male, considering the existing bias in a developing country such as India, where the GII is quite high.

The effects discussed so far are just the average effects of FDI. Yet, given the hypotheses on cultural spillovers, we can expect that the effects will vary depending on the country where these inflows originate. FDI from more gender-equal countries is more likely to have positive outcomes for both skilled and unskilled female workers. The next set of results is from the industry-weighted

Table 11: GII and total employment

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
GII_{ind}	0.964*	0.841	2.245**	0.0908	4.250**
	(0.567)	(0.784)	(0.923)	(1.177)	(1.539)
Constant	6.357***	6.553***	5.833***	6.134***	5.391***
	(0.133)	(0.160)	(0.168)	(0.268)	(0.350)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	20.266	11,625	4,025	3,091	1,525
Adjusted R^2	0.297	0.272	0.347	0.286	0.431

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

GII analysis. I first consider the employment effects; the estimation results are presented in table 11.

Since a higher value of GII represents greater gender inequality, the results present evidence contrary to our hypothesis of cultural spillovers when it comes to gender norms. I find that the impact of FDI from more gender-equal countries is associated with significantly lower employment of female skilled workers, as well as male skilled workers. Table 12 shows that these negative employment effects of FDI from more gender-equal countries are significantly bigger for female skilled workers than male skilled workers. Estimates obtained in table 13 show that there are no significant wage effects of FDI from countries with a lower GII on either female or male workers.

Table 12: GII and total employment: gender dummy

	(1) All workers	(2) Unskilled	(3) Skilled
GII_{ind}	1.024*	0.848	2.323**
	(0.604)	(0.780)	(0.966)
GII_{ind} x Gender	-0.0438	-0.802	1.694*
	(0.967)	(1.153)	(0.868)
Gender	-0.0768	0.0622	-0.0406**
	(0.205)	(0.246)	(0.183)
Constant	6.361***	6.481***	5.827***
	(0.122)	(0.150)	(0.169)
State-year FE	Yes	Yes	Yes
Observations	20,266	14,716	5,550
Adjusted R^2	0.297	0.276	0.372

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* p < 0.10, ** p < 0.05, *** p < 0.01. Dependent variables are in logs.

Table 13: GII and wages

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
GII_{ind}	0.920	0.806	0.341	0.436	0.250
	(0.669)	(0.496)	(0.587)	(0.847)	(1.661)
Constant	7.365***	7.233***	8.223***	6.795***	7.746***
	(0.131)	(0.0877)	(0.159)	(0.146)	(0.419)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	20,266	11,625	4,025	3,091	1,525
Adjusted R^2	0.062	0.061	0.068	0.110	0.073

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* p < 0.10, ** p < 0.05, *** p < 0.01. Dependent variables are in logs.

One possible problem from this analysis could be that FDI that flows into India is mainly re-routed from Mauritius. Thirty-nine per cent of the FDI in the data is from Mauritius. While Mauritius is considered to have "high human development" by the UNDP (its GII was 0.373 in 2017), it might be rerouting FDI from countries with higher or lower standards of gender equality. Furthermore, my assumption that the share of FDI from each country into each industry remained relatively unchanged from 2012 to 2017 may not be entirely correct.

The relationship between the GII and the employment and wages of workers is re-examined without Mauritius in the next set of results. The estimates presented in table 14 consider the employment effects. There is no evidence of significant cultural transfers in gender norms in terms of higher employment of unskilled or skilled female workers.

Table 14: GII and total employment (without Mauritius)

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
GII_{ind}	-0.0139	0.0570	0.327	0.682	0.731
	(0.654)	(0.871)	(0.755)	(1.099)	(0.973)
Constant	6.322***	6.447***	6.184***	5.696***	5.890***
	(0.115)	(0.133)	(0.199)	(0.268)	(0.344)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	10,510	6,115	2,213	1,410	772
Adjusted R^2	0.330	0.298	0.397	0.334	0.432

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

The estimates presented in table 15 consider the wage effects of the GII after removing Mauritius from analysis. No significant cultural transfers were found in the form of higher wages paid to female workers, whether skilled or unskilled.

Although issues with data might be impacting the results that are obtained here, it is worthwhile considering why the cultural transfers from more gender-equal countries might not be taking place in a country such as India. I would like to highlight again the theory of embeddedness as proposed by Halaszovich and Lundan (2016). For entry and success in developing countries, multinational enterprises might sacrifice some of their ownership advantages to assimilate into the local institutions in order to perform better in developing-country markets. Thus, it is likely that they do not differentially impact hiring practices in developing countries, especially for skilled workers. Furthermore, Kodama et al. (2018) find that cultural transfers are strongly present in older affiliates, indicating that time plays an important role in transplanting culture. Given that India has opened up its markets to FDI more recently than countries such as Japan and China, we find that enough time has not passed for cultural transfers (or spillovers) from the home country to take place.

Table 15: GII and wages (without Mauritius)

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
GII_{ind}	1.182	0.900	0.431	1.195	0.105
	(0.968)	(0.723)	(0.884)	(1.050)	(2.078)
Constant	7.382***	7.229***	8.375***	6.720***	7.910***
	(0.167)	(0.118)	(0.193)	(0.185)	(0.468)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	10,510	6,115	2,213	1,410	772
Adjusted R^2	0.058	0.060	0.071	0.109	0.051

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

5. Conclusion

This paper examines the impact of FDI on gender outcomes in India, more specifically, the employment and wages of female workers in India. I find that an increase in industry-level FDI inflows increases the employment of unskilled female workers Ð both absolute and relative to unskilled male workers. Yet, it has a negative impact on both wages and the gender wage gap of female unskilled workers. These results are confirmed by both the household-level data and the plant-level panel data used for this study. They can be explained by the fact that in addition to being market seeking, most of the FDI to developing countries is resource seeking, mainly for low-cost unskilled labour. The paper also tries to identify if there any cultural transfers of FDI in terms of the gender norms of the home countries. Given that India is more gender unequal than most countries it receives FDI from, it is likely that FDI from these more gender-equal countries brings with it a higher demand for female employees, better wages for women and a reduction in the gender wage gap. Using an industry-weighted GII, this paper examines whether countries with lower indices (more gender equality) contribute to better employment and wage opportunities for women through FDI. It finds that there is a negative impact of FDI from countries with better gender norms on both the employment and wages of skilled female workers. This result might be misleading because much of the FDI in India has been rerouted through Mauritius (rank 84 in the list of GII countries), which that might explain the counter-intuitive effects. Removing Mauritius from the analysis changes the result: there is no impact of FDI from more gender-equal countries on the employment and wages of skilled or unskilled workers in India. Again, this result needs to be interpreted with caution, because removing Mauritius from the analysis also removes almost 40 per cent of the FDI in the data, which may actually flow from more gender-equal countries.

Despite the problems posed by the data, there might be some factors explaining why we do not observe any cultural transfers or spillovers. Compared with other countries, such as Japan and China, where evidence of such transfers has been found, the time period for which India has been a recipient of inflows is shorter. Kodama et Al. (2018) find that the effects of the transfers are stronger for older affiliates, suggesting that it takes time before a country can enjoy such transfers. Furthermore, Halaszovich and Lundan (2016) show that most multinational enterprises in developing countries need to embed themselves initially in local institutions in order to be successful, especially if they seek to sell in developing-country markets. This means that it is likely that multinational firms hire corporate leaders and managers who have experience in domestic companies and, given the gender norms in developing countries, are more likely to be men. In doing this, multinational enterprises might lose their ownership advantages, making it less likely for cultural transfers to take place.

This paper provides interesting insights from a policy perspective. First, FDI does lead to positive gender outcomes in terms of employment for unskilled female workers. However, in order to allow for cultural transfers that might translate into more employment and higher wages to skilled female employees, the government needs to provide MNEs with easier access to suppliers and the market for multinational firms so MNEs do not lose their ownership advantages that might spill over as benefits to local firms.

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Appendix

Table A.1: Age buckets

Age bucket	Age range (in years)
1	< 18
2	18 — 24
3	25 — 34
4	35 — 44
5	45 — 54
6	55 — 64
7	65+

Table A.2: Education buckets

Education bucket	Label	Years of education
1	Below middle school	Up to grade 8
2	Secondary / senior secondary	Grade 9 to grade 12
3	Higher education	College or more

Table A.3: One-digit National classification of Occupations (NCO) codes

Division Code (NCO)	Division name	Skilled / unskilled
1	Legislators, senior officials, and managers	Skilled
2	Professionals	Skilled
3	Technicians and associate professionals	Skilled
4	Clerks	Unskilled
5	Service workers, and shop & market sales workers	Unskilled
6	Skilled agricultural and fishery workers	Unskilled
7	Craft and trade related workers	Unskilled
8	Plant and machine operators and assemblers	Unskilled
9	Elementary occupations	Unskilled