FDI and Female Employment in India

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Abstract

We study the impact of liberalization of FDI rules on female employment. Using the change in FDI rules in India in the 2000s for identification and combining data from the Annual Survey of Industries for over 15 years, we find that the liberalization of FDI rules lead to a decrease in the share of female employment, workdays and the wage-bill. Total employment and the wage bill for female workers also decreased. Suggestive evidence indicates that the effects are driven by the substitution between capital and female labour and adoption of technology.

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1 Introduction

Does the impact of technology driven employment transition differ by gender? Capital intensive and skill-biased technological change increases labour productivity and, therefore, employment. It is usually assumed that these benefits are shared equally by across gender. However, women tend to have a comparative advantage in brain-intensive tasks. Skill-biased technological change increases returns for brain-based tasks and should, therefore, have higher benefits for female employment. On the other hand, it is possible that capital and technology are substitutes for female employment, and destroy jobs that were typically female. Further, employment transition into these new roles that the technological change creates may require training and skills upgrading. Women may face institutional and social barriers to access avenues for upgrading their skills.

We examine the gendered impact of technology driven employment transition in the context of FDI liberalization policies in India. Firms in developing countries often face capital, informational, and skill constraints to adopt productive technologies and operate at the technology frontier. Access to foreign capital and the technological know-how can alleviate these constraints. Foreign Direct Investments (FDI) can lead to adoption of productive technologies through several channels (Pant and Mondal, 2010). First, foreign equity investments in domestic firms can alleviate constraints to capital that firms face to invest in new technology. Second, investments by foreign firms in domestic firms creates intra-firm linkages like employee training, output standardization, production process standardization that causes technology spillover and transfers from foreign to domestic firms. Third, technical know-how from domestic firms that have received foreign investment may spillover to other domestic firms in the same industry (employees leaving to start new firms, learning from the production processes, competition effects) creating intra-industry inter-firms spillovers. These technological changes may also impact the labour market by increasing the demand for skilled labour, changing the demand of specific skills

(making some skills redundant) and changing the nature of the tasks.

The context of India is important for several reasons. First, FDI liberalization polices were a sharp departure from previous policies. FDI into Indian industries was heavily restricted until the reforms of the 1991. The restrictions limited the sectors into which FDI was allowed, put a strong cap on the equity that foreign firms could hold, and required all FDI to go through complicated bureaucratic approvals. The reforms opened many previously restricted sectors to foreign investments, increased the cap often to above 50 percent allowing for majority stake and streamlined the approval process. Second, several studies have documented that Indian firms faced significant capital constraints prior to the reforms. This lead to misallocation that was much higher than what is observed in advanced economies (Hsieh and Klenow, 2009, 2014; Bau and Matray, 2023). Using a panel data of firms from the CMIE, Bau and Matray (2023), shows that the relaxation of the FDI rules lead to reduction in dispersion of marginal product of capital. Firms that had high marginal product of capital before the reforms benefited the most by getting access to capital after the reform. The authors also document that the policy lead to a substantial rise in FDI. Several papers have also studied the impact of these reform on technological change (through transfers or other mechanisms) and have found that FDI has lead to technological growth and capital investments (Pant and Mondal, 2010; Kathuria, 1998; Fujimori and Sato, 2015). Finally, female labour force participation in India is declining and is much lower (except for other South-Asian countries and Middle East and North African countries) than other regions of the world. A large literature has documented the social and institutional constraints that women face in India to participate in the labour market and upgrade their skills (Afridi et al., 2018; Sarkar et al., 2019). Thus, evidence from other contexts, especially developed countries, may not apply to India.

In this paper, we use information on the phased rollout of the FDI rules relaxation across

industries (5 digit NIC code level) between 2000 and 2006. A limited number of industries were liberalized (in terms of FDI rules) during this time period. We combined this information and firm-level data from the Annual Survey of Industries (ASI) from 1998 to 2014 to study the impact of the reforms on female employment in these industries. We find that the FDI liberalization leads to large increases in capital and increase in technology intensive investments such as information technology. We also find a positive increase in total employment, wage bill, and workdays. However, we find the opposite effect for women. We find that the employment, workdays, and the total wage bill for women decrease. In addition, we see the share of workdays, employment, and wage bill decrease for women as well. These effects are primarily driven by reduction in manufacturing production related work for women. We can rule out that these effects are not driven by new firms, intensification of work or rising income of men leading to women leaving the labour market.

We contribute to three distinct strands of the literature. First, we further our understanding about the relationship between technological change and gender inequality. Previous studies have examined the gendered effects of technological changes like computerization and automation and has found mixed results. For example, while computerization has had positive effect on women's labour market outcomes, the impact of automation for women's labour market outcome is still unclear (Cortés et al., 2024; Aksoy et al., 2021; Zuazu-Bermejo, 2022). The majority of the evidence in this space comes from economically developed countries that operate much closer to the technology frontier and have gender norms substantially different from those of developing countries. We contribute to the literature by studying the impact of technological change from foreign investments in a developing country.

Second, our study contributes to the literature on trade openness and gender inequality in the labour market. There exists no clear consensus on the impact of trade openness on

gender inequality (Pieters, 2018). Trade openness can increase competition and reduce rents of firms that discriminate for taste, forcing these firms out of the market or to not discriminate (Black and Brainerd, 2004; Hirata and Soares, 2020). Increased competition from reduction in tariffs may also force firms to invest in new technology and women may have a comparative advantage in these technology-driven roles (Juhn et al., 2014). On the other-hand, the impact of policies like tariff reduction on gender inequality in the labour market depends on relative comparative advantage of the male- and female-dominated sectors (Kis-Katos et al., 2018; Sauré and Zoabi, 2014; Do et al., 2016; Gaddis and Pieters, 2017). In contexts where female-dominated protected sectors face more competition, it leads to adverse impact on gender inequality. Evidence also suggests that increase in competition from trade often leads to intensification of work, adversely impacting women (Gupta, 2021). As compared to reduction in tariffs, our study focuses on a separate aspect of trade - foreign capital investments and consequent technological changes.[1]

Finally, argubly we contribute to a better understanding the reasons behind the declining female labour force participation rates in India. Since the early 1990s, female labour force participation in India has been declining. Several factors, like increasing income of the husband, rising returns to human capital of children, and social norms, have been proposed as potential explanations (Afridi et al., 2018; Sarkar et al., 2019). On the demand side, factors like poor matching, lack of skilled jobs, and labour regulations that restricts women from being employed for night shifts have also contributed to this decline (Fletcher et al., 2017; Gupta, 2021). Our study contributes to this strand of literature by studying the role of technological change from FDI deregulation.

[1]See Helble and Takeda (2020) for impact of FDI on female wages in Cambodia and Braunstein and Brenner (2007) for impact in China. Poole and Sharma (2024) looks at the impact of FDI flows on female employment outcomes in India. However, they do not account for the fact that the FDI flows may be related to unobservables that also determine employment outcomes.

2 Data

We combine data from several sources.

1. Annual Survey of Industries - The establishment-level data are taken from the Annual Survey of Industries (ASI) made available by the Department of Commerce in India for the years 1998-99 to 2014-15. The unit of observation is an establishment or a plant, for the fiscal year from April 1st to March 31st. ASI covers all registered establishments in the manufacturing sector which is also known as the formal sector. The share of formal sector was around 60% of manufacturing GDP in 1989 (Gupta, 2021).

   The ASI data are split in two schemes. The census scheme includes all establishments which have more than 200 workers. All establishments below that cutoff belong to the sample scheme where one-third of all establishments are sampled on a rotating basis. For establishments below this size cut-offs, a stratified sampling procedure was used where the stratification was done at the state and 4-digit industrial classification level.

   The ASI data contains detailed information on employment. It reports separately different categories such as directly employed, contract workers, supervisory and other workers. Workdays (corresponding to an 8-hour shift) worked over the year by males, and females are reported separately for directly employed (production) workers. Unfortunately, there is no break-down by gender for supervisory and other (non-production) workers. In addition to workdays worked, we also have the daily average numbers of workers on payroll, averaged over a year, which we refer to as employment of workers. The ASI data also contain information on plant ownership (government or private), age and location of the plant.

We winsorize our data at the 5% level at 4-digit industry-year level. Also we drop firms with year of establishment before 1800 or with year of establishment not properly reported.

We use the data for our analysis available as representative cross sections. Since the government-owned establishments might have equity concerns apart from maximizing profits, private establishments should be more impacted by market-forces. Following Gupta (2021), we mainly look at "big" private establishments (meaning privately-owned establishments reporting more than $60,000$ yearly workdays) as these are the most representative of establishments of this category.[2]

2. FDI reforms data and controls - Bau and Matray (2023) collected data on the sectors that were allowed FDI above 50 percent between 2000 and 2006 from the Handbook of Industrial Policy and Statistics and mapped that to the 5-digit 2008 NIC codes. The data is publicly available from the authors and the journal's website and we have accessed the data.

3. National Sample Survey - National Sample Surveys are nationwide household surveys conducted by the National Sample Survey Organization (NSSO) at a typical interval of 2 years. The surveys are of two types - consumption surveys and employment surveys. We use all rounds of the employment survey from the 1998 to 2014. Individual members in the survey are asked about their primary and secondary employment status. If they are employed, then they are also asked about the sector of their employment, coded as a 5-digit NIC code. The employment survey prior to 1998 does not provide the 5-digit NIC codes, but instead a 3-digit NIC codes.

Table 1 documents summary statistics for the baseline manufacturing sample from the An-

[2]In 1989, around 10% of the establishments were publicly owned (Gupta, 2021)

nual Survey of Industries (ASI) used in our analysis. It consists of industries which were not liberalized between 2000 and 2006. As the table shows, the typical control firm in our analysis does not invest a substantial amount in modern technology as is represented by investment in IT, relative to total investments. Also, the presence of female workers is substantially lower. Only 15.5 percent of all employees (extensive margin) are women. Only 15.1 percent of workdays (intensive margin) come from women and women earn only 8.7 percent of the wage bill.

3 Empirical Strategy

Our empirical strategy uses liberalization of FDI rules in the 2000s in India. Until 1991, FDI in India was highly regulated. In 1991, the government liberalized the FDI rules for a set of industries as well as revised trade tariffs and quotas as part of a major economic overhaul to solve the balance of payment crisis. A decade later the government further liberalized the FDI rules for another set of industries that allowed majority stake holding for foreign investors and automatic approval.

Bau and Matray (2023) collected data on industries (at the 5 digit NIC code level) from the Handbook of Industrial Policy and Statistics that were liberalized between 2001 to 2006. We combine this information, the Annual Survey of Industries (ASI) data and the NSS data from the between 1999 and 2015. The Annual survey of Industries data provide information on capital stock and adoption of modern technology as is measured by investment in IT capital. The NSS data provide information on employment for each individual at the 5 digit NIC code level. We use this information to create an industry-year panel over this period.

Our baseline specifications are -

$$Y_{jt} = \alpha + \beta FDI_{jt} * (t - ReformYear_j) + \mathbf{\Gamma X}_{jt} + \delta_j + \gamma_t + \epsilon_{jt} \tag{1}$$

$$Y_{jt} = \alpha + \sum_{k=-6}^{15} \beta_k FDI_{jt} * I(t - ReformYear_j = k) + \mathbf{\Gamma X}_{jt} + \delta_j + \gamma_t + \epsilon_{jt} \tag{2}$$

The econometric model employed in this analysis is represented by the equation above where j denotes an industry at 4 digit-level, and t denotes the year of survey. The outcome variable of interest, Y_{jt}, comprises the share of female workers, logs of physical capital, IT capital as well as logs of workdays, employment and wage bill for female and male workers. [3] The variable FDI_{jt} measures the share of 5 digit industries liberalized in either 2001 or 2006 - aggregated at the four-digit industry j during the survey. The share is zero for status-quo industries. $\mathbf{X}_{jt}$ includes industry-level controls. Our usual control is the log of number of firms in the industry during the year of survey. Additionally, industry (δ_j) and 2 digit industry by year (δ_t) fixed effects are included. We control for 2-digit industry-year fixed effects to help account for differential time trends across industries. The industry fixed effects remove time-invariant unobserved industry-level heterogeneity at 4 digit level.

Our main coefficient of interests are β from equation 1. The key identification assumption is that in absence of the reform the reformed industries would have evolved in the same path as the status-quo industries. This assumption is not directly testable. However, β_k from equation 2 will allow us to indirectly comment on this assumption. The test would be that if β_ks are insignificant and closer to zero for all pre-reform years, then this suggests that in the pre-reform period the reformed industries and the status-quo industries were not on a different path. Thus, absent any other concurrent or post-reform changes specific to the reformed industries that are unrelated to the original reform, any change in path

[3] Staff in managerial and supervisory role and in any other capacity is not available by gender. Gender-wise employment data is available only for workers in the ASI data.

between the reformed and status-quo industries after the reform period can be attributed to the reform itself.

4 Results

The relaxation of rules for making foreign investments will primarily impact capital constraints that firms face. What impact did the FDI liberalization have on capital investments? In Figure A3a, we look at the impact of the FDI liberalization on total capital at the industry level. As the figure indicates, total capital starts increasing at a steady rate 6 years after reform in the liberalized industries. In Table 3 (Column 1), we show the same result where we use years since treatment as a continuous variable of exposure. The mean of share of industries liberalized is 0.09. As the results indicate, 10 years after the reform, for average 4 digit industry this leads to an increase in total capital by 4.3 percent.

Did the increase in capital investments lead to an increase in investments in technology? The answer to this question is critical as the impact on labour from increased FDI can operate through the channel of technology. Investments in technology can be labour substituting. In that case, FDI can reduce labour demand. Furthermore, technological investments may make tasks (and consequently jobs) more skill intensive. There may be differences in supply of skilled labour between gender. A skill biased technological change may impact female employment differently than men. In Figure A3b, we show the effect of FDI liberalization on investments in total IT capital. Annual Survey of Industries records the stock of capital that can be classified as being related to information technology. Investments in IT capital can be thought of as a broad class of investments for improving the technology of production. In manufacturing, investments in IT technology could imply investments in process improvement such detection of defects, automation and effective communication between different stages of production. As Figure A3b indicates, FDI liberalization lead to

sharp investments in IT capital immediately after the reform that kept steadily increasing over time. As before, in Table 3 (Column 1), we show the same result where we use years since treatment as a continuous variable of exposure. The mean of share of industries liberalized is 0.09. As the results indicate, 10 years after the reform, for an average 4 digit industry, this liberalization leads to an increase in IT capital by 8.3 percent.

Did the liberalization of FDI rules and the consequent investments in technology impact men and women differently? In Figure 2, we present results for a range of employment outcomes for women.[4] In Figure A4a, we show the impact on share of female work days out of total workdays. As the results indicate, we see a drop in the share of female workdays over time in FDI liberalized industries. In Figure A4b and Figure A4c, we show the impact of the FDI liberalization on the share of female employment out of total employment and the share of female wage bill out of the total wage bill. The impact mirrors that of the share of workdays - we see a drop in both the share of female employment and as well as fall in the share of the wage bill. One concern in interpreting the results of share of employment outcomes is that the though the share may fall, the total female employment may even increase. In that case, the reform would have benefited both men and women, though disproportionally. On the other hand, a fall in total female employment would indicate an adverse effect on female employment in absolute terms. In Figure A4d to Figure A4f, we show the impact of the liberalization on female employment outcomes in absolute terms. Mirroring the share results, we find that total female workdays, total female employment, and total female wage bill all declined as a result of the FDI liberalization. In Table 4 we corroborate these results as Table 3. As the results indicate, we find persistent and substantial negative effects on both share and total female employment outcomes. The mean of share of industries liberalized is 0.09. This would imply that 10 years after liberalization for an average 4 digit industry, the share of female workdays would de-

[4]Here we focus only on production employees - regular employees who work in the plant in a non-managerial and non-supervisory capacity.

cline by 26.46 percent, share of female employment would decline by 25.83 percent and the share of wage bill would decline by 31.5 percent. Similarly, total workdays would decline by 43.38 percent, total employment would decline by 30.78 percent and total wage would decline by 70.74 percent.

What impact did the reforms have on male employment? In Figure 3a to Figure 3c we show the results on shares - share of male workdays out of total workdays, share of male employment out of total employment, and share of male wage out of the total wage bill.[5] As the figures indicate, we see very mild positive changes in male share of employment outcomes. In Figure 3d to Figure 3f we look at the total male workdays, total male employment and total male wage bill. As the figures indicate, we see a modest positive increase in male employment outcomes in absolute terms. This is further reflected in Table 5. As the results indicate, this leads to a 2.9 percent increase in total male workdays and an increase in total male employment by 3 percent.[6]

What type of jobs were most impacted by the liberalization of the FDI rules? The Annual Survey of Industries (ASI) data allows us separate labour hours (for non-managerial or non-supervisory production workers) into two types - manufacturing and non-manufacturing. In Table 7, we present the results separately for manufacturing and non-manufacturing jobs.[7] As the results indicate the significant impact of FDI liberalization came from man-

[5] Like for females, in these tables, we focus only on production employees - regular employees who work in the plant in a non-managerial and non-supervisory capacity.

[6] An important point to note is that both the pre-reform share and as well as in absolute terms the employment outcomes were much lower for women compared to men. Thus even a small change in share for women leads to a much larger percentage change in share for women than it would be for men. Similarly, if firms were to substitute female labour by male labour, it would lead to a larger percentage drop for female employment outcomes such as workdays than there would be an increase for males in percentage terms, because the absolute values (and as well as the share) in pre-reform period were much larger for males than for females.

[7] Please note that the ASI only surveys manufacturing firms. Manufacturing workdays would capture labour hours in manufacturing related jobs. Non-manufacturing labour hours would capture other jobs that are non-managerial. Managerial, supervisory and accounting labour hours are counted separately but not reported by gender.

ufacturing employment. Though there was a significant increase in total manufacturing workdays (2.5 percent for an average industry), there was a decline in female workdays (by 47.52 percent for an average industry) and increase in male workdays (by 2.4 percent) measure at a 4 digit industry level. This also leads to a decline in the share of female workdays by 28 percent. The impact on overall non-manufacturing workdays is statistically insignificant. That said, we observe a very small increase in female non-manufacturing employment.[8]

What impact did the liberalization have on non-production employees? In Table A9 we show the impact on non-production employees. These workers are employed in a range of non-production activities including managerial, supervisory or other roles. We do not have breakdown of this category by gender. Overall, for an average industry, 10 years after the reform, non-production workdays increased by 2.43 percent, employment increased by 2.52 percent, wage bill increased by 1.1 percent. As columns 4 to column 6 indicates, most of this increase is coming from managerial and supervisory roles. The results indicate that the liberalization lead to a general expansion of production leading to an increase in production and non-production employees. However, total number (and as well as share) of female production employees in manufacturing roles decreased despite the overall increase.

5 Robustness

All the results that we presented are on a sample of large firms that are privately owned and where total annual workdays exceeded 60000. What impact did the reform have on other firms? Table A6 shows the result. Column 1 and Column 2 shows the result on total capital and IT capital. If all firms are included the impact on total capital for an

[8]Please note that the pre-reform levels of female non-manufacturing workdays is very small and share is even smaller.

average industry, 10 years after the reform is 14.1 percent and on IT capital is 11 percent. The impact on the share of female workdays is a decline of 10.3 percent. Share of female employment and share of female wage bill declined by 8.9 percent and 14.6 percent. In Table A6, we present the results only for smaller firms. Total capital increases by 5.3 percent and IT capital increases by 6.2 percent for an average industry 10 years after the reform. Similarly, share of female workdays decreases by 7.8 percent. Share of female employment decreases by 8.5 percent and the share of female wage bill decreases by 7 percent. The results indicate that though capital increased as much or even more in smaller firms but the decline in female employment outcomes were much less in smaller firms. However, despite the heterogeneity across small and large firms, overall our results suggests that the impact of the liberalization were significant and in the same direction for both small and large firms.

In Table A2 to Table A4 we present the results as Table 3 to Table 5 using a slightly altered specification. Motivated by the event study figures, in Table 3 to Table 5 we estimated the dynamic effect as the event study figures indicated that it takes a few years after the reform to see effects on capital and employment outcomes. Table A2 to Table A4 presents results from a slightly modified specification where we do not focus on the dynamic effects and instead estimate one average effect for the after reform period. The results are very similar. IT capital increases by 5.6 percent for an average industry. Similarly, share of female workdays declines by 14.9 percent for an average industry. Share of female employment declines by 14.4 percent and share of female wage bill declines by 20.4 percent. Total female workdays declines by 26.8 percent, total female employment declines by 18.9 percent and total female wage bill declines by 51.4 percent. As in Table 5, total workdays and total employment for males increases by 1.4 percent and 1.5 percent, though the results are not significant.

Another concern about our empirical strategy is that we use a staggered rollout design. The challenge in such staggered rollout is that the same industries serve as both control and treatment depending on the time of the rollout. Thus control group is not constant and keeps shifting. The solution to this is to keep a fixed control group - the never takers. In our case that group is those industries that were not part of the liberalization in either 2001 or in 2006. In Figure A1 and Figure A2, we show the impact of FDI liberalization on capital and female employment outcomes only for those industries that were liberalized in 2001 (excluding those that were liberalized in 2006) using the never taker group as control. The results are very similar to Figure 1 and Figure 2. Similarly, in Figure A3 and Figure A4 we show the results for those industries that were liberalized in 2006, excluding those that were liberalized in 2001. In these industries we also see a rise in total capital and IT capital but no consequent change in female employment outcomes. However, it is important to note that in Figure A2 the effects on female employment outcomes takes time to manifest. We do not observe the industries that were liberalized in 2006 beyond 10 years after the reform. In Table A1 we present the results separately for the industries that were liberalized in 2001 and in 2006. The results in the top panel (2001 industries) mirror Table 3 and Table 4. The results in the bottom panel (2006 industries) directionally mirror those in Table 3 and Table 4 but are not statistically significant.

A further concern could be that the industries that were chosen to be reformed are different from those that were in the status-quo group. Our identification strategy does not require random assignment of treatment to these industries. Since we control industry level fixed effects, our identification assumption allows for level difference and only requires that in the absence of the reform these industries would have been on the same path as the status-quo group. Though inherently this is a non-testable assumption, Figure 1 and Figure 2 suggests that in the pre-reform period these industries were not on any different path. Furthermore, in Table 2 we show that reform status is unrelated to

pre-reform characteristics like number of firms, average firm age, firm capital, IT capital and female employment. This suggests that these industries were not selected on the basis of these attributes.

An assumption of our empirical strategy is that there were no other concurrent reforms. Once concern could be that the reforms are related to election cycles. Both in 2001 and in 2006, there were elections in several states in India. One possibility is that these states also implemented other programs at the same time that either benefited the treated industries or put the control industries at a disadvantage. In Table 3, we show the results by dropping all firms from those states that had an election in either 2001 or 2006. As the table indicate, we get consistent results. Total capital increases by 4.5 percent and IT capital increases by 8.9 percent for an average industry, 10 years after the reform. Share of female workdays decreases by 27.36 percent for an average industry 10 years after the reform. Share of female employment decreases by 26.28 percent and share of female wages decreases by 31.86 percent. Thus, overall our results are not driven by firms in these election states allaying our concerns about other concurrent reforms.

6 Mechanism

What are the possible mechanisms that can explain these results? One explanation could be that the FDI liberalization lead to entry of newer firms that have different hiring practices, locations, and managerial policies that are adverse to women. These newer firms were contributing to the declining share of female employment. We find three pieces of evidence that goes against this possibility. First, we create a pseudo-panel of firms that were already in business before the reform. ASI is not a panel dataset and as such firms cannot be consistently identified across waves. To create a pseudo-panel, we start at the first year of the survey in our sample period and keep all firms that meet our criterion

of size. In the next year, we keep all firms that meet our criterion of size, except those that are less than or equal to one year old. In the year after, we keep all firms that meet our criterion of size, except those that are less than or equal to two year old. We repeat this process for all years in our sample period. In this way, we exclude all firms that have entered after the start of our sample period and thus exclude any new entrant. Between column 3 and column 9, in Table A5 we show the results on share of female and male employment outcomes for this sample of firms. As the results indicate, we still observe substantial and similar drop in female employment outcomes as we see in Table 4.[9] Share of female workdays for an average industry 10 years after reform declined by 19.44 percent, share of employment declined by 19 percent and share of female wage bill declined by 25.56 percent. Second, as shown in Table 9 we find that number of firms (that meet our criterion of size) in reformed industries increases very modestly - 4.2 percent for an average industry 10 years after reform. Average firm age also declined very modestly - 1 percent for an average industry 10 years after reform. Finally, as results in Table 4 show that we find female employment outcomes declined not only in shares but also in total and absolute terms. If the results on shares of employment outcomes were driven entirely by entry of new firms and their hiring, location or managerial practices then we would not have observed adverse employment outcomes for females in absolute and total terms. The decline in total employment and wage bill suggests that existing firms also changed their labour composition against females.

Another possible explanation is that the liberalization of FDI has lead to an intensification of work. FDI investments could make both the market more competitive and as well as allow firms to upgrade their technology and participate in the export market. Both of these mechanisms can lead to intensification of work. As a result, workers may be required to work extra shifts. Labour is often indivisible and women may face several social barriers

[9] Column 1 and column 2 indicates that exits have also been very limited.

that may limit their possibility of working extra shifts. Firms may optimize by replacing female labour. We find evidence contrary to this possibility. ASI data allows us to indirectly calculate shifts - total workdays divided by total number of employees. This gives us number workdays per employee an indirect proxy of shifts.[10] In Table 6, we show the results of FDI liberalization on shifts. In column 5, we find that overall shifts decline. For an average 4 digit industry, 10 years after reforms, number of shifts declined by 1.35 percent. This decline is there for both males and females. The decline is much larger (in percentage terms) for females - 30.9 percent. For males, shifts decline by 1.4 percent. Thus, the evidence suggests that FDI liberalization did not lead to an intensification of work.

Another possibility is that the FDI liberalization lead to rising income for men. Women moved out of the labour market in response to increased household income. Labour supply of women are often shaped by household income. Rising income of the husband may increase returns to home production. Furthermore, social norms may also matter. Increased income of husbands may increase bargaining power of the husband leading to a reduction of labour supply of the women. In Table 8, we use the National Sample Survey (NSS) to answer this question. We estimate the impact on female employment for those households where atleast a male member is employed in a reform industry. In column 1 the outcome variable is percentage of females that have any employment outside the household. We find no significant effect. Column 2 is any employment in the reform industry. Though we find negative effects, the results are not significant. Column 3 is employed as a salaried worker in the reform industries. We find a positive effect. Thus, overall we do not find any consistent impact specially on female workers in those households where a male member is employed in the reform industry. Thus, we find no evidence to suggest that the adverse employment outcomes of women are driven by rising income of men.

[10] Each workday is defined as 8 hours.

7 Discussion and Policy Implications

Female labour force participation in India has declined for over more than two decades despite a modest and continuous growth in per-capita GDP, human capital outcomes and even other women empowerment outcomes. Amongst other sectors, this decline is substantial in manufacturing given baseline low levels of employment for women in the manufacturing sector. On the other hand, over the last two decades Foreign Direct Investment (FDI) levels has increased in India. These rising FDI levels have also lead to increases in capital stock and investments in technology such as in information technology. What impact did the rising FDI levels and the consequent investments in capital and technology have on female employment outcomes?

In this paper, we attempt to answer this question. Answering this question in general is challenging as year to year fluctuations in FDI levels would capture underlying industry or year specific unobservables that may independently determine female employment outcomes. We overcome this challenge by using policy changes as natural shocks that are arguably unrelated to these observables. In 2001 and 2006, Government of India liberalized regulations for certain industries that allowed them to receive FDI over the 50 percent cap.

We combine this change in policy and firm level data from the Annual Survey of Industries (ASI) between 1998 and 2014. We find that the FDI policy change lead to an increase in capital, investments in technology and an expansion in labour including in managerial and supervisory roles. However, at the same time the FDI liberalization lead to a reduction in (both in share and in absolute terms) female employment, workdays and wage bill in production related jobs in the manufacturing sector. Male employment in these jobs increased. Thus, FDI liberalization and the consequent investment in technology lead to a substitution of female labour in production related jobs in the manufacturing sector. We

rule out that these changes are not entirely driven by new firms, or a result of intensification of work or women opting out of the labour market as a result of men getting better jobs.

Though at this stage, we do not know the exact mechanism, we are exploring a hypothesis. FDI may have lead to change in nature of tasks in the production process. For example, tasks in the production process may have become more routine-cognitive from routine-manual. Routine-cognitive work may require higher levels of skills and women who were already employed in these manufacturing jobs may have lacked the requisite skills. Thus, more investments in technology may have lead to substitution away from female labour. At this stage, we are exploring several datasets to document this mechanism.

What implications would this have for policy makers? Our results indicate that the relation between FDI, investments in technology and female employment is neither linear nor mechanical. Technological change may change the nature of the tasks. Skills levels often vary by gender. Women often lack access to training and up-skilling programs. Firms often do not have incentives to train employees as employees can leave the firm after acquiring training. Firms cannot write such contracts that allows employees to make ex-ante credible commitments. Keeping these constraints, governments can either subsidize firms or employees, specially targeting women for training. Such programs would improve general skill levels, reduce skills mismatch and encourage participation of women in the labour market.

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8 Table

Table 1: Summary Statistics

	Mean	S.D.	Median
Average Firm Age (in Months)	157	479	21
Total Capital	24400	69810	4299
IT Capital	142	325	47.55
Female Manufacturing Workdays	673713	3923646	27983
Female Non-Manufacturing Workdays	136	1149	0
Female Total Workdays	693026	3951600	33043
Female Workers	2221	12755	106
Female Wages	116	693	7
Male Manufacturing Workdays	3651934	10674917	1424501
Male Non-Manufacturing Workdays	82255	893400	0
Male Total Workdays	3893513	11138278	1515906
Male Workers	12109	33555	4792
Male Wages	1215	2749	442
Number of Firm-Year Observations	112376		

Note: This table reports summary statistics for the baseline manufacturing industries (i.e. not liberalized in 2001 or 2006) appearing dataset from 1999 to 2015 for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. An observation is at the industry-year level. Total capital, IT capital and wages are measured in millions of Indian Rupees.

Table 2: Associations between Industry-Level Characteristics and the Reform in the ASI

Dependent Variable	Reform=1				
	(1)	(2)	(3)	(4)	(5)
Avg. Firm Age (in Years)	0.00436				
	(0.00656)				
Log (Number of Firms)		0.0386			
		(0.0422)			
Log (Avg. Firm Capital)			-0.0498		
			(0.0311)		
Log (Avg. Firm IT Capital)				-0.00768	
				(0.0184)	
Log (Avg. Female Employment)					0.0429
					(0.0260)
Observations	124	124	124	124	124

Note: This table reports the association of different industry-level characteristics with liberalization for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. Each observation is a 4-digit industry. In columns 1–5, the outcome of interest is whether an industry was reformed during the study period. The regressors are calculated at pre-reform industry levels. Industries are weighted by size (measured as total capital in 2000, the last pre-treatment year).

Table 3: Industry-Level Total Capital and IT Capital in the ASI

Dependent Variable	Total Capital	IT Capital
	(1)	(2)
Years of Treatment Exposure	0.0475**	0.0918**
	(0.0220)	(0.0378)
	(1)	(2)
Fixed Effects		
Industry (4-digit)	Yes	Yes
Industry (2-digit) x Year	Yes	Yes
Controls		
Nb firms	Yes	Yes
Observations	1,729	1,729

Note: This table reports the effects of the reform on log total 4-digit industry-level capital and log total 4-digit industry-level IT capital (computers, software etc.) for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Industry-Level Female Worker Shares, Workdays, Employment, and Wages in the ASI

Dependent Variable		Share-Workdays (1)	Share-Employment (2)	Share-Wage bill (3)	Workdays (4)	Employment (5)	Wage (6)
Years of Treatment Exposure		-0.294***	-0.287***	-0.350***	-0.482***	-0.342***	-0.786***
		(0.0588)	(0.0577)	(0.0589)	(0.137)	(0.0778)	(0.166)
Fixed Effects							
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes	Yes
Controls							
	Nb firms	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,709	1,709	1,709	1,709	1,709	1,709

Note: This table reports the effects of the reform on 4-digit industry-level logarithm percentage share of female worker workdays, employment, and wage bill, logarithm total 4-digit industry-level female worker workdays, employment and wage for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Industry-Level Male Worker Shares, Workdays, Employment, and Wages in the ASI

Dependent Variable		Share-Workdays	Share-Employment	Share-Wage bill	Workdays	Employment	Wage
		(1)	(2)	(3)	(4)	(5)	(6)
Years of Treatment Exposure		-0.00111	-0.000412	0.000461	0.0328**	0.0334**	0.00356
		(0.00250)	(0.00261)	(0.00114)	(0.0160)	(0.0152)	(0.0155)
Fixed Effects							
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes	Yes
Controls							
	Nb firms	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,709	1,709	1,709	1,709	1,709	1,709

Note: This table reports the effects of the reform on 4-digit industry-level logarithm percentage share of male worker workdays, employment, and wage bill, logarithm total 4-digit industry-level male worker workdays, employment and wage for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6: Industry-Level Mean Yearly Shifts in the ASI

Dependent Variable	Share of Female Yearly Shifts	Share of Male Yearly Shifts	Female Yearly Shifts	Male Yearly Shifts	Overall Yearly Shifts
	(1)	(2)	(3)	(4)	(5)
Years of Treatment Exposure	-0.0433*	-0.000442***	-0.343**	-0.0158**	-0.0150**
	(0.0238)	(0.000153)	(0.131)	(0.00684)	(0.00685)
Fixed Effects					
Industry (4-digit)	Yes	Yes	Yes	Yes	Yes
Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes
Controls					
Nb firms	Yes	Yes	Yes	Yes	Yes
Observations	1,709	1,709	1,709	1,709	1,709

Note: This table reports the effects of the reform on log 4-digit industry-level mean percentage share of yearly shifts for female and male workers per firm, log 4-digit industry-level mean yearly shifts for female and male worker per firm, and log 4-digit industry-level mean yearly shifts per firm for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. Shift is obtained by dividing total workdays by the number of workers.'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7: Industry-Level Manufacturing and Non-Manufacturing Work Days in the ASI

Dependent Variable	Overall Manufacturing	Overall Non-manufacturing	Female Manufacturing	Female Non-manufacturing	Male Manufacturing	Male Non-manufacturing	Share-Female Manufacturing	Share-Female Non-manufacturing	Share-Male Manufacturing	Share-Male Non-manufacturing
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years of Treatment Exposure	0.0277**	-0.656	-0.528***	0.180*	0.0269***	-0.656	-0.312***	0.112**	-0.000996	-0.462
	(0.0108)	(0.439)	(0.163)	(0.0999)	(0.0101)	(0.439)	(0.0638)	(0.0527)	(0.00218)	(0.313)
Fixed Effects										
Industry (4-digit)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls										
Nb firms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,610	1,610	1,610	1,610	1,610	1,610	1,610	1,610	1,610	1,610

Note: This table reports the effects of the reform on log 4-digit industry-level manufacturing and non-manufacturing workdays for directly employed male and female workers for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. . Overall refers to all such male and female workers combined and share refers to log 4-digit industry-level percentage share pertaining to relevant categories. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Female Employment in Households with Males Employed in Reform Industries in the NSS

Dependent Variable		Employed	Any Employment	Regular Worker
		(1)	(2)	(3)
Years of Treatment Exposure		0.813	-1.901	2.702**
		(0.757)	(2.259)	(1.310)
Fixed Effects				
	Industry (4-digit)	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes
Observations		1,234	678	678

Note: This table reports the effects of the reform on female employment in households where at least one male is employed in the reform industries in the NSS at 4-digit industry-level. The first outcome variable refers to the percentage of such females have any kind of employment outside household. The second outcome variable is the percentage of the employed females engaged in any kind of employment in the reform industries. The third outcome variable is the percentage of the employed females engaged as regularly-salaried workers in the reform industries. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9: Industry-Level Number of Firms and Average Firm Age in the ASI

Dependent Variable		Number of Firms (1)	Firm Age (2)
Years of Treatment Exposure		0.0464*	-0.0113
		(0.0243)	(0.00699)
Fixed Effects			
	Industry (4-digit)	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes
Observations		1,729	1,731

Note: This table reports the effects of the reform on log 4-digit industry-level number of firms and log 4-digit industry-level average age of firm (in years) for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 10: Different Dimensions of Female Employment in the NSS

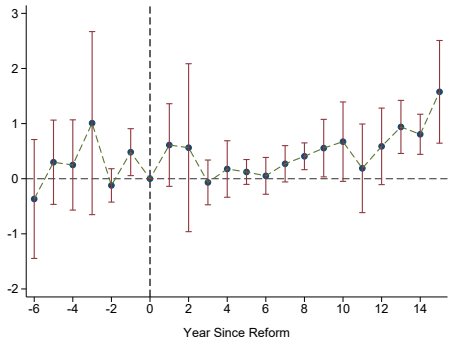
Dependent Variable			Age-wise Share of Female Workers		Males Employed in Liberalized Industries		
		Share of White-Collar Female	<35	≥35	Employed	Any Employment in Reform Industry	Regular Worker in Reform Industry
		(1)	(2)	(3)	(4)	(5)	(6)
Years of Treatment Exposure		-1.719*	-1.920**	-3.468***	0.689	-5.436***	0.557
		(0.969)	(0.867)	(0.759)	(0.892)	(1.991)	(1.666)
Low Female-Male Skill Gap X Years of Treatment Exposure					9.917	23.39***	14.19***
					(28.51)	(2.268)	(2.440)
Fixed Effects							
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) X Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,048	1,157	1,152	1,234	678	678

Note: This table reports the effects of the reform on total 4-digit industry-level percentage of white-collar female employment in the manufacturing sector in col. 1 and total 4-digit industry-level percentage of female employment by age in col.s 2-3 in the NSS. The remaining three columns reports the effects of the reform on female employment in households where at least one male is employed in the reform industries in the NSS at 4-digit industry-level. The first outcome variable (col. 4) refers to the percentage of such females have any kind of employment outside household. The second outcome variable (col. 5) is the percentage of the employed females engaged in any kind of employment in the reform industries. The third outcome variable (col. 6) is the percentage of the employed females engaged as regularly-salaried workers in the reform industries. Low Female-Male Skill Gap refers to reform industries which had below-median gap of female-male workers with at least secondary education. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

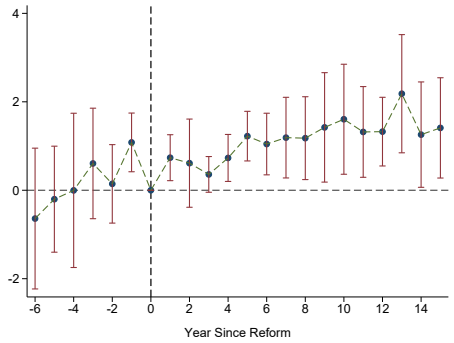
9 Figures

Figure 1: Event Study Graphs for the Effect of Foreign Capital Liberalization on Industry-Level Total Capital and IT Capital in the ASI

(a) Total Capital

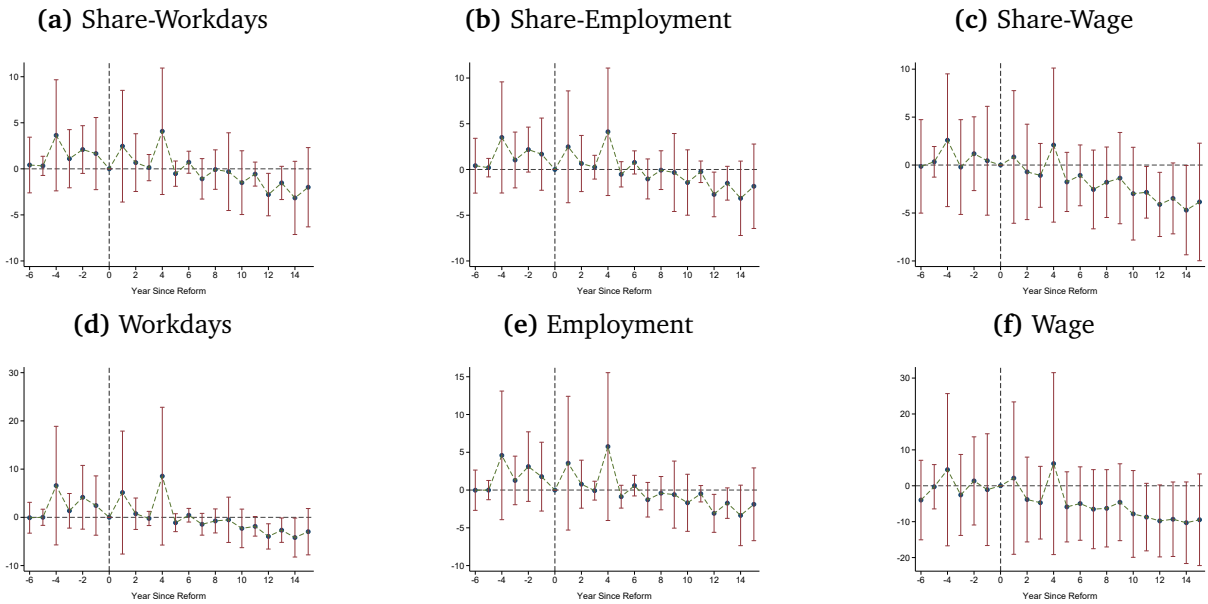


(b) IT Capital



Notes: This figure reports event study graphs for the effects of the reform on log total 4-digit industry-level capital and log total 4-digit industry-level IT capital (computers, software etc.) for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. The reform is normalized to take place in year 1. Each dot is the coefficient of the observed t years after the reform in a treated industry. The confidence intervals are at the 95% level.

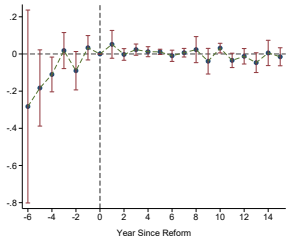
Figure 2: Event Study Graphs for the Effect of Foreign Capital Liberalization on Industry-Level Female Worker Shares, Workdays, Employment, and Wages in the ASI



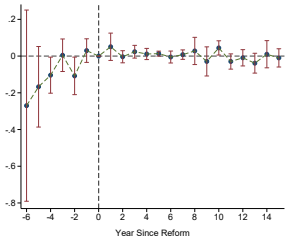
Notes: This figure reports event study graphs for the effects of the reform on 4-digit industry-level logarithm percentage share of female worker workdays, employment, and wage bill, logarithm total 4-digit industry-level female worker workdays, employment and wage for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. The reform is normalized to take place in year 1. Each dot is the coefficient of the observed t years after the reform in a treated industry. The confidence intervals are at the 95% level.

Figure 3: Event Study Graphs for the Effect of Foreign Capital Liberalization on Industry-Level Male Worker Shares, Workdays, Employment, and Wages in the ASI

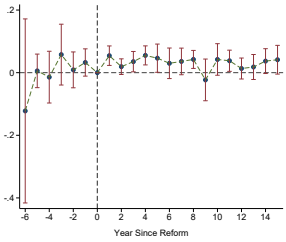
(a) Share-Workdays



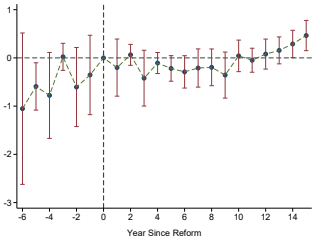
(b) Share-Employment



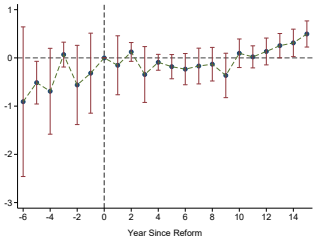
(c) Share-Wage



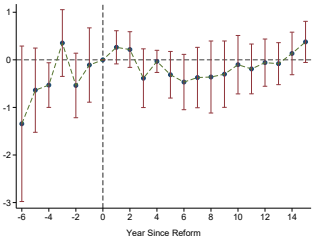
(d) Workdays



(e) Employment



(f) Wage



Notes: This figure reports event study graphs for the effects of the reform on 4-digit industry-level logarithm percentage share of male worker workdays, employment, and wage bill, logarithm total 4-digit industry-level male worker workdays, employment and wage for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. The reform is normalized to take place in year 1. Each dot is the coefficient of the observed t years after the reform in a treated industry. The confidence intervals are at the 95% level.

10 Appendix

Table A1: Industry-Level Outcomes by Reform Years for Large Private Firms in the ASI

Dependent Variable	Total Capital	IT Capital	Female Share-Workdays	Female Share-Employment	Female Share-Wage bill
	(1)	(2)	(3)	(4)	(5)
			Panel A: Only 2001 Reform		
Years of Treatment Exposure	0.0982***	0.0918**	-0.294***	-0.287***	-0.350***
	(0.0240)	(0.0378)	(0.0588)	(0.0577)	(0.0589)
Observations	1,731	1,729	1,709	1,709	1,709
			Panel B: Only 2006 Reform		
Years of Treatment Exposure	0.0707	0.183	-0.154	-0.141	-0.201
	(0.0512)	(0.127)	(0.189)	(0.186)	(0.167)
Observations	1,713	1,713	1,693	1,693	1,693
Fixed Effects					
Industry (4-digit)	Yes	Yes	Yes	Yes	Yes
Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes
Controls					
Nb firms	Yes	Yes	Yes	Yes	Yes

Note: This table reports the effects of the reform on log total 4-digit industry-level outcomes for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A2: Industry-Level Total Capital and IT Capital in the ASI (Reform Share)

Dependent Variable	Total Capital	IT Capital
	(1)	(2)
Share of (4-digit) Industry Treated	0.0368	0.627*
	(0.124)	(0.353)
Fixed Effects		
Industry (4-digit)	Yes	Yes
Industry (2-digit) x Year	Yes	Yes
Controls		
Nb firms	Yes	Yes
Observations	1,729	1,729

Note: This table reports the effects of the reform on log total 4-digit industry-level capital and log total 4-digit industry-level IT capital (computers, software etc.) for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. *Share of (4-digit) Industry Treated* represents interaction of the reform dummy and the share of 5 digit industries in the (4-digit) Industry Group. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A3: Industry-Level Female Worker Shares, Workdays, Employment, and Wages in the ASI (Reform Share)

Dependent Variable		Share-Workdays (1)	Share-Employment (2)	Share-Wage bill (3)	Workdays (4)	Employment (5)	Wage (6)
Share of (4-digit) Industry Treated		-1.646**	-1.598**	-2.262***	-2.975**	-2.100**	-5.708***
		(0.649)	(0.648)	(0.694)	(1.420)	(0.917)	(2.052)
Fixed Effects							
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes	Yes
Controls							
	Nb firms	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,709	1,709	1,709	1,709	1,709	1,709

Note: This table reports the effects of the reform on 4-digit industry-level logarithm percentage share of female worker workdays, employment, and wage bill, logarithm total 4-digit industry-level female worker workdays, employment and wage for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. *Share of (4-digit) Industry Treated* represents interaction of the reform dummy and the share of 5 digit industries in the (4-digit) Industry Group. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A4: Industry-Level Male Worker Shares, Workdays, Employment, and Wages in the ASI (Reform Share)

Dependent Variable		Share-Workdays	Share-Employment	Share-Wage bill	Workdays	Employment	Wage
		(1)	(2)	(3)	(4)	(5)	(6)
Share of (4-digit) Industry Treated		0.0115	0.0167	0.0124	0.152	0.162	-0.114
		(0.0315)	(0.0323)	(0.0121)	(0.185)	(0.175)	(0.150)
Fixed Effects							
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes	Yes
Controls							
	Nb firms	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,709	1,709	1,709	1,709	1,709	1,709

Note: This table reports the effects of the reform on 4-digit industry-level logarithm percentage share of male worker workdays, employment, and wage bill, logarithm total 4-digit industry-level male worker workdays, employment and wage for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. *Share of (4-digit) Industry Treated* represents interaction of the reform dummy and the share of 5 digit industries in the (4-digit) Industry Group. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A5: Industry-Level Number of Firms, Average Firm Age, Worker Shares for Workdays, Employment, Wages and Female-Male Wage-Gap in a Pseudo-Panel in the ASI

Dependent Variable		Number of Firms	Firm Age	Share-Female Workdays	Share-Female Employment	Share-Female Wage bill	Share-Male Workdays	Share-Male Employment	Share-Male Wage bill	Female-Male Wage Gap
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Share of (4-digit) Industry Treated		0.0316*	-0.00443	-0.216***	-0.211***	-0.284***	-0.00143	-0.000965	0.000733	-0.458***
		(0.0167)	(0.00575)	(0.0511)	(0.0508)	(0.0521)	(0.00155)	(0.00154)	(0.00122)	(0.144)
Fixed Effects										
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls										
	Nb firms	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,694	1,717	1,694	1,694	1,694	1,694	1,694	1,694	1,694

Note: This table reports the effects of the reform on log 4-digit industry-level number of firms, log 4-digit industry-level average age of firm (in years), 4-digit industry-level logarithm percentage share of male and female worker workdays, employment, wage bill and log 4-digit industry-level per-unit female-male wage-gap for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. The sample excludes firms established after 1999, the first year of ASI survey included in the paper. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A6: Industry-Level Total Capital, IT Capital, Female Worker Shares for Workdays, Employment, and Wages for All Firms in the ASI

Dependent Variable		Total Capital	IT Capital	Share-Female Workdays	Share-Female Employment	Share-Female Wage bill
		(1)	(2)	(3)	(4)	(5)
Years of Treatment Exposure		0.157***	0.123***	-0.114***	-0.0992***	-0.162***
		(0.0286)	(0.0264)	(0.0366)	(0.0320)	(0.0529)
Fixed Effects						
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes
Controls						
	Nb firms	Yes	Yes	Yes	Yes	Yes
Observations		1,919	1,919	1,919	1,919	1,919

Note: This table reports the effects of the reform on log total 4-digit industry-level capital, log total 4-digit industry-level IT capital (computers, software etc.), 4-digit industry-level logarithm percentage share of female worker workdays, employment, and wage bill for all firms in the ASI. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A7: Industry-Level Total Capital, IT Capital, Female Worker Shares for Workdays, Employment, and Wages for Smaller Firms in the ASI

Dependent Variable		Total Capital	IT Capital	Share-Female Workdays	Share-Female Employment	Share-Female Wage bill
		(1)	(2)	(3)	(4)	(5)
Years of Treatment Exposure		0.0593***	0.0692*	-0.0866**	-0.0939**	-0.0779**
		(0.0160)	(0.0366)	(0.0400)	(0.0423)	(0.0337)
Fixed Effects						
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes
Controls						
	Nb firms	Yes	Yes	Yes	Yes	Yes
Observations		1,918	1,918	1,918	1,918	1,918

Note: This table reports the effects of the reform on log total 4-digit industry-level capital, log total 4-digit industry-level IT capital (computers, software etc.), 4-digit industry-level logarithm percentage share of female worker workdays, employment, and wage bill for smaller firms in the ASI i.e. firms with total yearly workdays not exceeding 60,000. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A8: Industry-Level Total Capital, IT Capital, Female Worker Shares for Workdays, Employment, and Wages in the ASI while dropping Election-States

Dependent Variable		Total Capital	IT Capital	Share-Female Workdays	Share-Female Employment	Share-Female Wage bill
		(1)	(2)	(3)	(4)	(5)
Years of Treatment Exposure		0.0495*	0.0984***	-0.304***	-0.292***	-0.354***
		(0.0255)	(0.0365)	(0.0584)	(0.0580)	(0.0591)
Fixed Effects						
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes
Controls						
	Nb firms	Yes	Yes	Yes	Yes	Yes
Observations		1,728	1,728	1,706	1,706	1,706

Note: This table reports the effects of the reform on log total 4-digit industry-level capital, log total 4-digit industry-level IT capital (computers, software etc.), 4-digit industry-level logarithm percentage share of female worker workdays, employment, and wage bill for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. Observations from the states of Assam, West Bengal, Kerala, Tamil Nadu, and Puducherry were dropped as these states had state-elections in both the reform yeas of 2001 and 2006. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

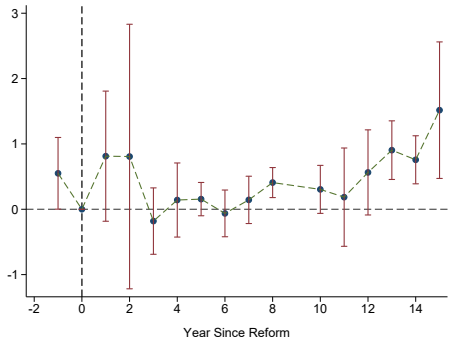
Table A9: Industry-Level Workdays, Employment, and Wages for Non-Production Employees in the ASI

Dependent Variable		All Non-Production Employees			Supervisory and Managerial Employees				
		Workdays (1)	Employment (2)	Wage bill (3)	Workdays (4)	Employment (5)	Wage bill (6)	Manufacturing (7)	Non-Manufacturing (8)
Years of Treatment Exposure		0.0270***	0.0280**	0.0123	0.0228**	0.0231**	0.0280*	0.0126	0.0143
		(0.00970)	(0.0112)	(0.0164)	(0.0103)	(0.00980)	(0.0157)	(0.0107)	(0.441)
Fixed Effects									
	Industry (4-digit)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Industry (2-digit) x Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls									
	Nb firms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		1,709	1,709	1,709	1,709	1,709	1,709	1,610	1,610

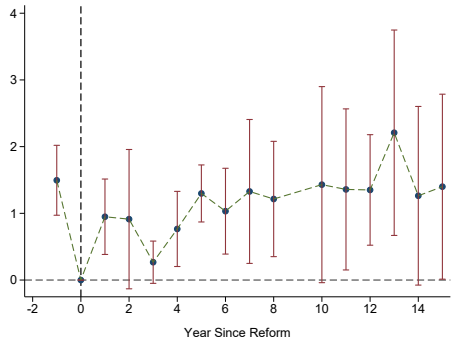
Note: Col.s 1-3 of this table reports the effects of the reform on 4-digit industry-level logarithm workdays, employment, and wage bill for all non-production emloyees i.e., employees who are not workers, including supervisory and managerial employees. Col.s 4-8 report the effects of the reform on 4-digit industry-level logarithm workdays, employment, wage bill, manufacturing and non-manufacturing workdays for supervisory and managerial employees separately. The sample includes large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. 'Nb firms' refers to a control for the log number of firms in an industry-year. Pre-treatment capital weights are used in the regressions. Standard errors are clustered at the 4-digit industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Figure A1: Event Study Graphs for the Effect of Foreign Capital Liberalization in 2001 on Industry-Level Total Capital and IT Capital in the ASI

(a) Total Capital

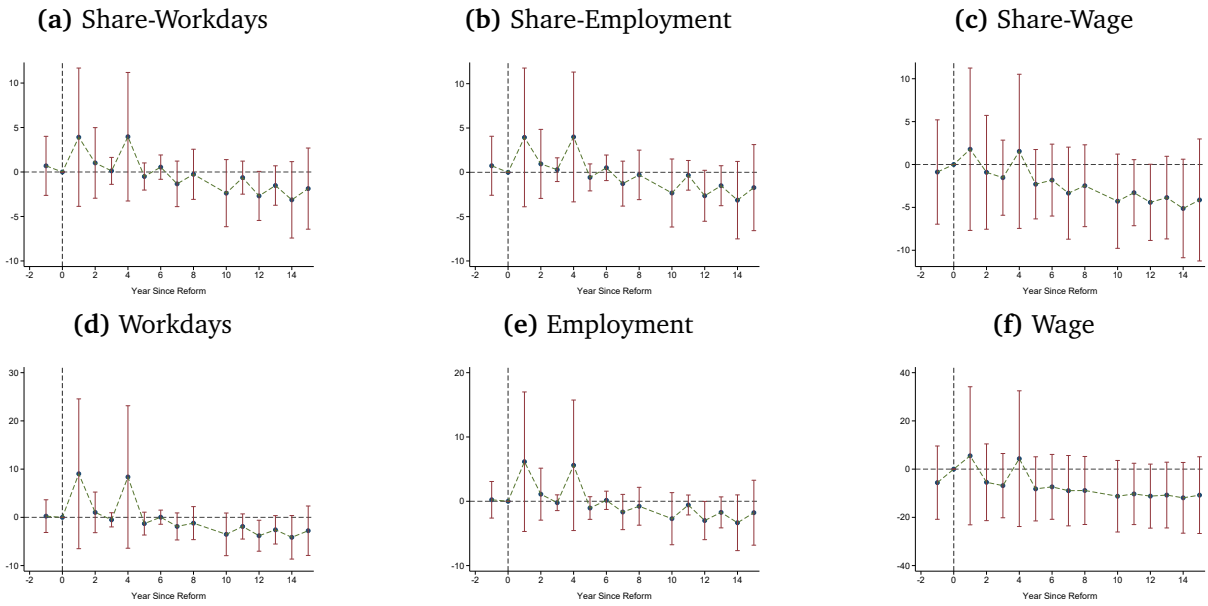


(b) IT Capital



Notes: This figure reports event study graphs for the effects of the reform in 2001 on log total 4-digit industry-level capital and log total 4-digit industry-level IT capital (computers, software etc.) for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. The reform is normalized to take place in year 1. Each dot is the coefficient of the observed t years after the reform in a treated industry. The confidence intervals are at the 95% level.

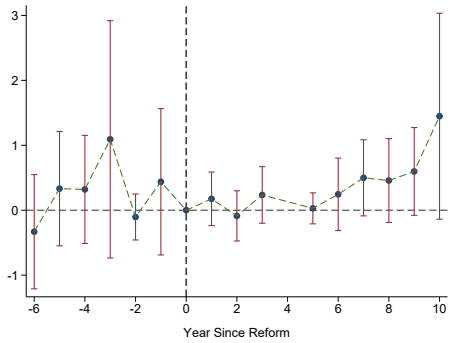
Figure A2: Event Study Graphs for the Effect of Foreign Capital Liberalization in 2001 on Industry-Level Female Worker Shares, Workdays, Employment, and Wages in the ASI



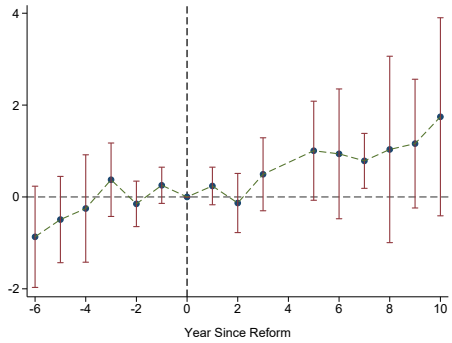
Notes: This figure reports event study graphs for the effects of the reform in 2001 on 4-digit industry-level logarithm percentage share of female worker workdays, employment, and wage bill, logarithm total 4-digit industry-level female worker workdays, employment and wage for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. The reform is normalized to take place in year 1. Each dot is the coefficient of the observed t years after the reform in a treated industry. The confidence intervals are at the 95% level.

Figure A3: Event Study Graphs for the Effect of Foreign Capital Liberalization in 2006 on Industry-Level Total Capital and IT Capital in the ASI

(a) Total Capital



(b) IT Capital



Notes: This figure reports event study graphs for the effects of the reform in 2006 on log total 4-digit industry-level capital and log total 4-digit industry-level IT capital (computers, software etc.) for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. The reform is normalized to take place in year 1. Each dot is the coefficient of the observed t years after the reform in a treated industry. The confidence intervals are at the 95% level.

Figure A4: Event Study Graphs for the Effect of Foreign Capital Liberalization in 2006 on Industry-Level Female Worker Shares, Workdays, Employment, and Wages in the ASI

Notes: This figure reports event study graphs for the effects of the reform in 2006 on 4-digit industry-level logarithm percentage share of female worker workdays, employment, and wage bill, logarithm total 4-digit industry-level female worker workdays, employment and wage for large private firms in the ASI i.e. privately-owned firms with total yearly workdays exceeding 60,000. The reform is normalized to take place in year 1. Each dot is the coefficient of the observed t years after the reform in a treated industry. The confidence intervals are at the 95% level.