Effect of Trade Liberalization on Gender Inequality: The Case of India

Ashmita Gupta*

Indian Statistical Institute, Chennai

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*Indian Statistical Institute, Chennai. E-mail: ashmita@isichennai.res.in

Abstract

Using a panel of establishments from the Annual Survey of Industries (ASI), I study the impact of the 1991 trade liberalization episode in India on the employment share of women. Contrary to the predictions of a taste-based discrimination model, I find that establishments exposed to larger output tariff reductions and import competition reduced the share of female workers. I also find that input tariff reductions neither raised nor reduced female employment share. The negative association between output tariff reductions and female employment appears to be driven by two factors. First, establishments facing larger output tariff declines engaged in more skill-upgrading which worked against women (who are less skilled in terms of measured education). Second, establishments facing larger tariff declines increased the number of shifts per worker. Since women in India are prohibited by law from working long hours and night shifts, this hours-constraint appears to have reduced relative employment of women. I find this effect to be particularly large among "big and private" establishments. This paper is the first to provide empirical evidence of how a well intentioned policy of limiting female work hours might have unintended side effects.

JEL: D3, F15,J16

Keywords: trade, gender, inequality

1 Introduction

In this paper I examine the link between trade liberalization and gender inequality. Understanding this link is important since gender inequality is prevalent all over the world, and it manifests itself in many faces such as mortality, natality, basic facility, special opportunity, professional, household and ownership inequality (Sen (2001)). Accordingly, advancing gender equality was recognized by policy makers as one of the eight stated goals in the U.N. Millenium Development Goals Report (UN, 2009).

Beginning in the 1970s, many developing countries in Latin America, east and south Asia and Africa have adopted trade liberalization policies to spur growth, not always with desirable distributional outcomes. Indeed, trade liberalization policies have in many cases increased skill premiums, raised income inequality and poverty (see Goldberg and Pavcnik (2007) for a comprehensive survey).[1] In this context, another important question which is relatively under-studied is whether trade liberalization also increases gender inequality, thus directly putting at odds the twin goals of growth and gender equity.

Empirical evidence on the link between trade and gender is relatively scant. In one of the earlier papers, Black and Brainerd (2004) find that U.S. industries subject to greater import competition experienced larger reductions in the gender wage gap, a finding which they attribute to reductions in discrimination. A recent paper by Ederington et al. (2010) find similar results for Colombia. Aguayo et al. (2013) find that the signing of the North American Free Trade Agreement (NAFTA) increased demand for female labor both within and between industries in Mexico. Juhn et al. (2014) link the within-sector shift towards female labor due to U.S. tariff reductions on Mexican goods. Export tariff reductions raised exports and investments in technology which increased the relative productivity of women in blue-collar work.

[1] Revenga (1997), Hanson and Harrison (1999), Feliciano (2001), Currie and Harrison (1997) show evidence of this from a wide range of countries such as Mexico, Morocco, Chile, Argentina and Columbia.

In this study, I use the 1991 Indian tariff reforms to study the impact of trade liberalization on relative labor market outcomes of women. The Indian case provides an ideal setting as the tariff reductions were unexpected, large, and quickly implemented in an attempt to meet the conditions for an IMF rescue package. Not only were there drastic reductions in the level of tariffs, the variance of tariff changes was also large across sectors as those sectors with the highest initial tariffs underwent the largest reductions. Topalova (2010) finds that the amount of industry-level tariff reductions were not correlated with initial industry characteristics and thus could be treated as plausibly exogenous.[2] I use this variation in tariff reductions as the exogenous shock that impacted female hiring by establishments.

There are studies that have examined the impact of Indian tariff reforms on various outcomes. Topalova (2010) finds that regions with higher initial exposure to industries that underwent large tariff reductions experienced slower reductions in poverty. Khandelwal and Topalova (2011), Goldberg et al. (2010b) find that tariff reductions raised productivity of extant establishments, mainly by lowering the cost of imported inputs. However, the effect of Indian trade reform on the labor market has been relatively less studied. Sharma (2012) finds a change in skill composition mainly due to the increased use of imported intermediate inputs. This paper, to the best of my knowledge, is the first to use establishment level data to look at the change in gender composition of the workforce in the Indian labor market due to the introduction of trade reforms.

I use establishment level data from Annual Survey of Industries (ASI) prepared by the Department of Commerce in India. The ASI is a survey of all registered establishments in the manufacturing sector.[3] The ASI is a census of big establishments and a sample of smaller establishments [4]. I use unique establishments level identifiers to con-

[2]In the context of this study, I find that the output tariff change is also uncorrelated with the log female to male share in man-days in 1989, the log skill ratio in 1989 and log male intensity in 1989 at the industry level (the results are presented in table 15).

[3]See Data Section below for more details

[4]All establishments with 100 workers or above were surveyed in 1989 and all establishments with 200 workers or above were surveyed in 1998

struct a panel and examine within-establishments changes between 1989 (the "before" period) and 1998 (the "after" period). I complement my panel analysis with analysis of cross-sections of establishments in 1989 and in 1998 to take account of entry and exit of establishments.

I find that larger reductions in tariffs on final goods (output tariffs) reduced relative employment of women. This appears to be the case for all establishments but it is especially true for "big and private" establishments in our panel data. This result is directly counter to what we would expect if tariff reductions led to increased competition and reduced taste-based discrimination practiced by employers, a channel suggested by Becker's model of taste-based discriminationBecker (1957). I also find very limited role for tariff reductions to have shifted gender composition through the imported inputs channel. Reductions in input tariffs appear to have neither positively nor negatively impacted women in our data.

What are the channels which potentially account for these findings? I examine two factors that could distinguish female and male labor for employers. The first factor is skill level. Female workers may be less skilled than male workers. I find evidence that sectors which experienced the largest tariff reductions and thus were subject to more import competition also had more rapid skill-upgrading, measured as the ratio of white collar to blue collar workers. Using household survey data, I also document that women who work in blue-collar manufacturing jobs have on average 5 years less formal education than their male counter-parts. If skill-upgrading occurred within blue-collar jobs, as it did across blue-collar and white-collar occupations, this suggests that female workers may have been hurt by trade liberalization through the skill channel.

The second factor which distinguishes male and female in the Indian context is hours restrictions imposed by federal and state legislation. All registered manufacturing units have to follow the guidelines of the Factories Act of 1948. Section 66 of this Act limits the working hours of women and prohibits them from working night shifts. I find evidence that establishments which experienced the largest tariff reductions responded

by increasing work intensity, or the number of shifts per worker. To the extent that women were barred from extended hours and night shifts, this would have lowered hours worked by women relative to hours worked by men. In support of this hypothesis, I find that the negative impact of tariff declines on female share was most pronounced among establishments with higher initial shifts per worker measure in 1989. Hence, this paper adds to the literature which assess the possible impact of labor laws in the labor market empirically. Recently, there is a lot of interest among academics, media and policy makers about the impact of labor laws on industry and how these laws have been hampering in reaping the benefits of liberalization in India. In the press there is a lot of discussion on this issue and we get to hear that a lot of the existing laws are going to be scrapped (including Section 66 of the factories act). Although, the policy makers believe that these laws are harmful for development, there is no concrete empirical evidence in this regard. This paper is the first to show empirical evidence of how a well intentioned policy of limiting working hours for women mght have unintented adverse side effects.

My results suggest that the Indian episode of trade liberalization adversely impacted women in terms of their employment rates. Since there is now growing evidence that empowering women promotes education, health and better outcomes for children Thomas (1990), Duflo (2003), Qian (2008), Duflo (2012) this may also have had long-term adverse impacts. One has to keep in mind, however, that my examination of trade's impact is restricted to a context narrower than what perhaps is ideal. I examine only the organized manufacturing sector. I also study only production workers due to data limitations. In my analysis, I do not look at the change in relative wages, as I do not have information for wages for the "pre" period[5]. I ignore the impact of outsourcing and other footprints of globalization. For example, the rapidly growing IT industry may have positively impacted women as recently suggested by Millett and

[5]Figure 2 shows that the correlation between log ratio of female to total share man-days and log ratio of female to total share in wage bill for 1998 is 0.95.

Oster (2013). These questions are left for future investigations. However, this study is an important starting point exploring the relationship between trade liberalization and gender inequality in the Indian labor market.

The paper is organized as follows. Section 2 lays out the conceptual framework. Section 3 discusses the trade liberalization episode and related literature. Section 4 describes the data. Section 5 describes the empirical specifications. Section 6 reports the main results. Section 7 discusses and evaluates alternative channels. Section 8 discusses the robustness of main results. Finally, Section 9 presents the main conclusions of the study.

2 Conceptual Framework

In this paper, I use plausibly exogenous changes in tariff rates across industries to study the impact of trade liberalization on the hiring of men and women at the establishment level. What are some possible channels that link these changes? One possible channel is through reductions in discrimination. As suggested by Becker (1957), employers may practice taste-based discrimination and not hire women even when men and women are equally productive. Trade liberalization and reductions in tariffs may increase competition from imports and drive discriminating employers out of the market, thereby raising relative share of women employment and their wage levels. Empirically, this channel has been validated in a variety of settings. Black and Brainerd (2004) test the Becker model for the U.S. and find that industries subject to greater import competition experienced larger reductions in the gender wage gap. Ederington et al. (2010) find similar results for Colombia.

Tariff reductions which increase import competition may cause the less productive establishments to lose market share or drive them out of business. Surviving establishments may respond by raising productivity. Khandelwal and Topalova (2011) find that tariff reductions raised productivity of incumbent establishments through two channels.

First, reductions in tariffs on final goods (output tariffs) raised productivity by increasing competition. Even more importantly, they find reductions in tariffs on imported inputs (input tariffs) had even larger impact on establishment productivity by increasing the quality and variety of goods produced and the scale of production. Increases in productivity may be accompanied by investments in new technology and the hiring of skilled workers who complement the upgraded technology. How would men and women be differentially impacted in this case? If men and women differ in terms of their underlying productivity and in particular, if women are less skilled than men, then women's employment and wage prospects may worsen. In other words, skill upgrading by the establishment may manifest itself in falling share of women employment.

Juhn et al. (2014) provide a different model which differentiates men and women. They propose that women have less "brawn-intensive" skills compared to men. Trade induced technology upgrading increases the relative productivity of women in blue-collar work. They find that tariff reductions in Mexico associated with the North American Free Trade Agreement (NAFTA) encouraged exports, technology upgrading, and the hiring of female labor.

Yet another channel which may be relevant in the Indian context is hours constraints faced by women. Tariff reductions and the onset of competition may change production decisions for establishments in ways that disadvantage women even when men and women have similar underlying productive capacities. If establishments increase hours of operation and number of shifts, this may disadvantage women who are constrained by family obligations or explicit government regulations that limit their hours. These constraints are similar in spirit to those in developed economies where hours requirements and inflexible schedules in certain occupations limit the advancement of women (Goldin and Katz (2011), Bertrand et al. (2010)). In India, women are prohibited from working night shifts. If the optimal hours of plant operations increases to night shifts, men are likely to expand hours of operation relative to women in such plants.

3 Background

3.1 Indian Tariff Reforms

Since independence in 1947, India followed a policy of import substitution. As a result huge import tariffs were imposed on various industries. Apart from tariffs there were also other kinds of restrictions in the form of non-tariff barriers such as import quotas. Partial liberalization began in 1980. However, in 1991 India ran into an acute balance of payment crisis for which it had to seek help from International Monetary Fund (IMF).[6]

As part of IMF conditions India implemented economy wide reforms in 1991 including drastic reductions in tariffs in all industries. Average output tariffs declined from 150 percent in 1988 to 38 percent in 1997. Similarly, average input tariffs declined from 147 percent in 1988 to 38 percent in 1997. As Figure 1b and Figure 1a illustrate, not only were there reductions in the levels of tariffs but the dispersion of tariffs fell as well with the largest declines occurring in industries with the largest initial tariffs. [7]Topalova (2010) documents that the original round of tariff reductions were broadly based and unanticipated. The tariff reductions continued even after 1998 but Khandelwal and Topalova (2011) find that later reforms were more correlated with industry characteristics. Hence, I isolate my analysis to the tariff reductions which occurred over the 1989-1998 period.

3.2 Related Literature

The impact of trade liberalization on employment has been studied in a number of countries. One of the channels through which trade could affect employment is through skill biased technological change, and this has been widely studied. Skill biased technological change leads to an increase in the share of skilled workers within industries as

[6]The crisis in turn was triggered due to various incidences such as rise in oil prices, the Gulf War, fall in remittances, political uncertainty and assassination of Rajiv Gandhi which led to a fall in investor confidence.

[7]The change in tariffs are in percentage points.

well as compositional changes and "quality" upgrading of product, plant and workers.[8]

Trade liberalization could lead to skill biased technological change through the export channel. Bustos (2011b) and Bustos (2011a) find evidence of technology and skill-upgrading as a result of change in export status due to trade liberalization. Establishments subject to competition may also invest in newer technology and increasingly hire skilled workers who complement the upgraded technology. Apart from exports, other measures are used in various studies to show the effect of trade liberalization on different outcomes. Verhoogen (2008) uses exchange rate shocks as a measure of variation. Import competition and use of imported intermediate inputs is another measure of trade liberalization which has got the attention of various scholars. It is associated with improvement in quality upgrading of products and increase in wages and skill premium. [9] However, we do have some conflicting evidences.[10]

Skill biased technological change is likely to impact gender inequality [11]. Juhn et al. (2014) link the above two and put forward a model in which men and women embody different "brain" and "brawn" skills and test them empirically in Mexico. They conclude that changes in production technology towards "brain" intensive work should provide women with a comparative advantage which lead to a decline in gender inequality.

The previous studies linking trade liberalization and gender inequality have mainly used household data and focused on separating out within versus between industry changes in wage inequality [12]. They find that most of the effects of trade liberalization are within industry.

The exogenous trade liberalization in India had an effect on the Indian Industry along various dimensions. Khandelwal and Topalova (2011) show that these reforms

[8] Acemoglu (2003); Attanasio et al. (2004); Tybout (2003) provide for a survey; Helpman et al. (2011); Ahn et al. (2010); Amiti and Davis (2012); Amiti and Khandelwal (2013).

[9] Amiti and Khandelwal (2013), Amiti et al. (2007), Csillag and Koren (2011)

[10] Autor et al. (2013), Amiti et al. (2012)

[11] (Galor and Weil (1996); Blau and Kahn (1997); Weinberg (2000); Autor et al. (2003) and Rendall (2010))

[12] See Ozler (2000); Ederington et al. (2010), Paul and Paul (2012); Aguayo et al. (2013)

have led to an increase in productivity due to increase in import competition and use of imported intermediate inputs. They establish that the latter has a stronger effect than the former. Goldberg et al. (2010b) find changes in product composition within establishments in terms of both input and output as a result of trade liberalization. They show that there were a variety of new products that were produced as well as variety of inputs thats were used to produce them. Sharma (2012) finds evidence of a shift in workforce composition favoring skilled labor mainly due to the use of imported intermediate inputs. However, she does not look into the gender composition of workers.

However, there are several complexities which needs to be kept in mind while analyzing the Indian labor market. Bollard and Sharma (2013) do not find any associations between any major reforms and productivity growth. The reforms that they look into are industrial de-licensing, tariff reductions, FDI liberalizations and lifting of small-scale industry reservations. Menon et al. (2013) look at technical change due to trade and attribute it to agglomeration and differences in regional productivity. Menon and Rodgers (2008) show that trade liberalization has led to an increase in concentration among industries which happened to be biased against women leading to increased gender inequality. Banerjee and Veeramani (2015) look at the effect of trade liberalization on female work intensity at the industry level and find a negative effect. The aggregate industry level analysis alone cannot give us a complete picture as the types of firms used to aggregate up-to the industry level which might be different for different years.

Aghion et al. (2005) emphasize the role of domestic institutions, labor market restrictions in particular, and their interactions with technology adoption for the distributional effects of trade policy in India. They find that productivity and profits increased more in industries that were close to the Indian productivity frontier and in states that had more flexible labor market institutions.

There is a body of literature which shows that labor laws and differences in them across states play an important role in determining the effect of trade liberalization on

industry. Hasan et al. (2007) show that trade liberalization has led to higher labor demand elasticities and these were stronger in states with flexible labor laws. Ahsan et al. (2012) find that the unemployment has decreased in urban areas with flexible labor markets and in net exporter industries. Ahsan (2013) shows that rapid contract enforcement is necessary in order to maximize the productivity benefits from input tariff liberalization. Ahsan and Mitra (2014) find that labor share of total revenue increased in small labor intensive establishments but decreased in large capital intensive establishments. Ahsan et al. (2014) analyze the role of trade unions while looking at the effect of trade on employment. They find that in the net importer industries which experienced larger tariff cuts experienced larger increase in union wages. However, the total wage income losses from de-unionized workers exceed the total gains of unionized workers.

The economic reforms of 1991 have also influenced various socio-economic aspects. In districts with greater exposure to tariff reductions, there is an increase in poverty and inequality Topalova (2010), a decline in school attendance Edmonds et al. (2010), fertility increases for low status women and decreases for high status women Anukriti and Kumler (2013). They find that tariff liberalization increases the relative employment of lower status women. They however look at household data which gives more of the supply side effects. Hence, looking at the effect of reforms on the Indian industry on one hand and its effect on social outcomes on the other prompts us to directly explore the effect of trade liberalization on women in the labor market.

Tariff change impact studies have mainly focused on changes in technology, productivity and employment, etcetera, but not on gender inequality. This paper is an attempt to fill that research gap. Since the gender inequality in employment has obvious welfare implications, the present study is also an addition to the small body of literature on welfare impacts of tariff liberalization.

4 Data

4.1 Tariff Data

The tariff data is available at the 3-digit National Industrial Classification (NIC) which resembles international classifications commonly used in other countries.[13] These classifications were revised between 1989 and 1998. I converted all industry classifications to the 1998 NIC codes using concordance tables provided by Ministry of Statistics and Program Implementation (MOSPI). These data were then merged with the establishment level data using the 3-digit NIC codes, resulting in 90 industries.[14]

4.2 Establishment Level Data

I use establishment level data from Annual Survey of Industries (ASI) made available by the Department of Commerce in India. The unit of observation is an establishment or a plant. For convenience, however, I will use the terms "firm" and "establishment" interchangeably in the paper. ASI covers all registered establishments in the manufacturing sector.[15] All establishments with 100 workers or above were surveyed in 1989 and all establishments with 200 workers or above were surveyed in 1998. For establishments below these size cut-offs, a stratified sampling procedure was used where the stratification was done at the state and-4 digit industrial classification level. The sample scheme surveyed approximately one third of the establishments below the size cut-off every year, subject to the constraint that a sufficient number of establishments were sampled to assure representativeness at the state and industry level. An observation is a single plant for the fiscal year from April to March, with the exception that an owner of two or more establishments located in the same industry group and state is

[13] I am grateful to Reshad Ahsan and Debashish Mitra for sharing their tariff data.

[14] Input tariffs were constructed by Ahsan and Mitra (2014) using the formula used by Amiti et al. (2012). Consider industry j that uses inputs from industry k. In this case Input Tariff$_{jt} = \sum_k s_{jk} *$ Output Tariff$_{kt}$, where s_{jk} is the share of input k used in producing output j. The share of inputs are obtained from the relevant input output tables.

[15] These are registered under the Factories Act of 1948. This includes all establishments using 10 or more workers if using power and 20 or more workers if not using power.

permitted to submit a joint statement.[16] The data for 1989 and 1998 are available as representative cross-sections. In a recent release of the ASI, establishment identifiers were included which allowed me to create a panel data set in which the same establishment is observed at two points in time, 1989-1998. The match rate and summary statistics are reported in Table 1 and Table 2b. I use this panel data for my main analysis and use the cross-sectional data to check the robustness of my results. Table 2a and 2b in the provides summary statistics of the cross-sectional data as well as the panel data. [17]

The ASI data contains detailed information on employment. It reports separately different categories such as directly employed, contract workers, supervisory and other workers. I have categorized direct and contract workers as "production workers" and supervisory and other workers as "non-production workers", following the standard used by the Bureau of Labor Statistics. Man-days (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 man-days worked, I also have the daily average numbers of workers on payroll, averaged over a year, which I refer to as "number" of workers. The ASI data also contain information on plant ownership (government or private), age and location of the plant. I also have information on the total value of imported inputs, gross sales, fixed capital and working capital.

The share of female man-days is calculated by taking the ratio of female man-days to total man-days among directly employed (production) workers. The log of this share is taken for each year and then the difference is calculated between 1989 and 1998. Similarly, I look at the share of females by dividing the number of female workers by the number of all workers.

Following the size cut-offs for being in the census of establishments or in the sam-

[16] While the ASI data is a representative data set for all registered factories, not all factories are registered under the Factories Act. However, they are still a significant share of plants in the manufacturing sector in India Allcott et al. (2014)

[17] Table 13 contains the summary statistics of the variables actually used in the regressions.

ple, I classify establishments with $>$ 60000 man-days as "big" establishments.[18]This includes 1832 establishments. Around 43.40 percent of the big establishments in 1989 are matched and included in the panel data set. This is expected, given that Hsieh and Klenow (2014) find that the exit rate of large establishments is around 4 percent every year. The match rate among smaller establishments is even lower. Around 7 percent of the smaller establishments in the 1989 sample are matched and included in the panel data set.

5 Empirical Specification

5.1 Panel Data Regressions

The central question in this paper is how tariff reductions impact the share of female workers at the establishment level. While it would be instructive to examine both production and non-production workers separately, ASI unfortunately has the gender break-down for production workers only in the establishment data. The results of this paper therefore apply to production workers. I estimate the following reduced-form equation using OLS.

$$\Delta F_{ji} = \beta_1 \Delta OutputTariff_i + \beta_x X_{ji,1989} + \delta_{i'} + \Delta\epsilon_{ji} \tag{1}$$

where, j refers to the establishment, i refers to 3-digit industry. ΔF_{ji} is the change in log female share. More specifically, it is the 1998 log female share less the 1989 log female share. [19] $\Delta OutputTariff_i$ is output tariff in 1998 at 3 digit NIC less output tariff in 1989. $\delta_{i'}$ refers to 2-digit industry controls. I am looking at within-establishment changes. However, the changes in log female share may vary with initial characteristics

[18]This definition of the census sector is taken according to 1998. However, only 5% of these establishments were not part of the census sector in 1989. Even if I drop these 5 % establishments, the results remian similar. Also, I do not find any correlation between change in tariff and the total size of establishments.

[19]I also look at the change in ratio of female to total man-days (in levels) and find no difference in results.

of the establishment, $X_{ji,1989}$. I include the ratio of fixed capital to sales and the ratio of working capital to sales, all measured in 1989. I also control for age of the establishment, state where the establishment is located, and dummy variable indicating whether the establishment has imported inputs. My main coefficient of interest is β_1. A positive coefficient means that a decline in output tariffs (which is what occurred between 1989 and 1998) leads to a decrease in female share.

In addition to output tariffs, another important channel is input tariffs. The literature indicates that reduction in input tariffs increased productivity among establishments importing inputs. In my second set of models, I include input tariff changes as well as output tariff changes as specified in the following equation:

$$\Delta F_{ji} = \beta_1 \Delta OutputTariff_i + \beta_2 \Delta InputTariff_i + \beta_x X_{ji,1989} + \delta_{i'} + \Delta\epsilon_{ji} \quad (2)$$

Here, I run a "horse-race" between output and input tariffs by comparing β_1 and β_2. Since input tariffs also declined from 1989 to 1998, a positive coefficient means that a decline in input tariffs leads to a decrease in female share.

Since the ASI data is a census of larger establishments and a sample of smaller establishments, the larger entities are more likely to be in my constructed panel data set. I do not have panel weights and therefore do not assign weights to observations in my panel. Therefore, it is likely that the smaller establishments in my panel are less likely to be representative of all establishments in this category. In addition, larger establishments are more likely to survive, leading to smaller survival bias in my estimates. For these reasons, I examine results separately for "big" establishments which are more likely to be representative of the establishments in this category. I also examine separately "private" establishments. Since the government-owned establishments might have equity concerns apart from maximizing profits, I examine private establishments separately where I expect markets forces to have the larger impact. In 1989, around 10

percent of the establishments were publicly owned.

5.2 Industry-Level Regressions

Within-establishment changes in female share are not subject to changes in the composition of establishments which may confound my analysis. On the other hand, the results based on the balanced panel may not be representative of industry-level changes which include births and deaths of establishments. I, therefore, also run following regressions on industry-level data based on representative cross-sections of establishments in 1989 and 1998.

$$\Delta F_i = \beta' \Delta OutputTariff_i + \Delta\epsilon_i \tag{3}$$

$$\Delta F_i = \beta_1' \Delta OutputTariff_i + \beta_2' \Delta InputTariff_i + \Delta\epsilon_i \tag{4}$$

6 Results

6.1 The Effect of Output Tariffs on Female Share

Table 3 gives the results from estimating Equation 1. Each column represents a separate regression. Columns (1)-(4) do not include initial establishment characteristics while I include these initial characteristics in columns (5)-(8). Columns (4) and (8) include establishments which are privately owned and have $>$ 60000 man-days of operation in a given year and hence are categorized as "big". In all specifications, the coefficient is positive which means that greater tariff reductions led to declines in female share. Among "all" establishments, the estimate is 0.030 but not statistically significant at conventional levels. While the standard errors are large, the coefficients for "big and private" establishments are large and statistically significant at the 10 and 5 percent levels in columns 4 and 8 respectively.[20] The point estimate of 0.725 implies that a "big

[20] I cluster standard errors at the 3-digit industry level.

and private" establishment in an industry experiencing 10 percentage point reduction in output tariffs would reduce female share by 7 percent. An establishment in an industry experiencing the average output tariff decline (115 percent) would reduce female share by approximately 40 percent (from a base of 10 percentage points) relative to a establishment facing minimum tariff change (60 percent). These results are counter to what we expect from declining discrimination due to increased competition as laid out by the Becker model. In contrast to the theoretical prediction, I find that output tariff reductions led to declines in the relative share of female employment.

6.2 The Effect of Input Tariffs on Female Share

Table 4 presents the results from estimating Equation 2 where I include input tariff changes. Here again, the columns have similar representation as Table 3. None of the coefficients on input tariff changes is statistically significant. Thus the change in input tariffs does not have any effect on female share. The coefficients of output tariff changes remain positive and significant for "big" and "private" establishments, and insignificant for the other samples, as in the main results.[21]

6.3 Industry Level Regressions

I report the results of industry level regressions in Table 5. Table 5 presents results from estimating Equations 3 and 4 when I aggregate female man-hours and total man-hours up to the 3-digit NIC level. I do the same for columns (4), (5) and (6) of Table 5, except that I aggregate over establishments in the "big and private" category only. Since the cross-sections of establishments in 1989 and 1998 are representative of all establishments in the economy, these regressions give me an idea of how results differ if I take account of all establishments including those newly born and those that do not survive.

[21] I have also interacted the importer dummy with input tariff changes to check for differential effects and found none of the interactions to be statistically significant.

As shown in Table 5, when all establishments are included, I obtain a coefficient on output tariff change of 0.400 which is significant at the 10 percent level (column (1)). When both output and input tariffs are included, output tariff change still has a positive effect while input tariff change now has a negative effect, although neither coefficient is significant. In columns (4), (5) and (6) of Table 5, I focus on establishments which are "big and private." The coefficient on output tariff change alone is now no longer significant. When both tariff changes are included, the coefficient on output tariff change becomes large, positive and significant while the coefficient on input tariff change are negative and insignificant. This is similar to the pattern found in the panel level regressions in Table 4.

Overall, I find that the industry level regression results are broadly consistent with the results from panel data, especially for output tariff change. I find that coefficients on output tariff changes, while not always significant, are consistently positive, implying a negative association between tariff reductions and female employment share. In the case of "all establishments" which includes smaller establishments, the industry level regression may be more representative of the population of establishments. The coefficient I obtain for "all establishments," 0.400, is similar in size to the coefficient from the panel data regression.[22]

6.4 Extensive and Intensive Margin

Among the establishments in the panel data, 63 percent did not hire any female workers in 1989.[23] Changes in female share can occur through the extensive margin (more establishments hiring at least one female worker) or through the intensive margin (establishments which hire female workers expanding the share of female labor). In this section, I examine the relative importance of these margins. Columns (1)- (4) of Table 6 present the results from estimating changes in female share at the extensive

[22]Figure 3 shows that the correlation between output and input tariff is 0.61.

[23]The correlation between output tariff reduction and firms which hire women in 1989 is 0.06.

margin. I define a categorical variable which takes the value 1 if the establishment hires females and 0 otherwise for 1989 and 1998. I define a switch variable which is the difference in this categorical variable across the two years. I then estimate Equation 2 using this switch variable as my dependent variable. I multiply the variable by 100 for convenience of presentation. Columns (5)- (8) explore the effect of tariff changes at the intensive margin. I begin with a sample of establishments which hired female workers. I use the change in (log) female share as the dependent variable. At the extensive margin, I find that the effect of output tariff change is positive and significant in " big and private" establishments. The coefficient of 0.034 implies that a "big and private" establishment in an industry which experienced the average output tariff decline of 115 percentage points would be approximately 2 percentage points less likely to hire at least one female worker relative to an establishment that experienced minimum tariff change (60 percent). Since about 40 percent of establishments in this category hire any female workers, this amounts to about a 5 percent decline. Among "big and private" establishments, the share which hired at least one female worker increased from 0.415 to 0.439 suggesting that gender segregation declined.[24] Output tariff declines, however, are associated with slower decline in gender segregation across establishments, again counter to the Becker model. I also find a positive coefficient on output tariff on the intensive margin, suggesting that there was a decline in the female share even at the intensive margin. However, the coefficients are not significant at conventional levels.

7 Mechanisms

In the previous section I established that output tariff decline led to a decline in female employment share. In this section, I explore the mechanisms through which output tariff reductions adversely impact female employment.

[24] See 2a.

7.1 Skill Upgrading

If women are less skilled than men and trade liberalization brings about skill biased technological change, I would expect trade liberalization to increase gender inequality. In this section, I examine whether output or input tariff changes indeed leads to skill upgrading. I estimate the following equation:

$$\Delta S_{ji} = \gamma_1 \Delta OutputTariff_i + \gamma_2 \Delta InputTariff_i + \beta_x X_{ji,1989} + \delta_{i'} + \Delta\epsilon_{ji} \quad (5)$$

where ΔS_{ji} now refers to the skill ratio in establishment j in industry i. The independent variables and the controls are the same as the previous specifications. The skill ratio is defined as the ratio of non-production to production workers. Non-production workers include supervisors and clerical workers. Production workers on the other hand include directly employed and contract workers. I look at the change in skill ratio in terms of man-days. If tariff reductions lead to skill-biased technology change, I would expect the coefficients γ_1 and γ_2 to be negative. I should find a stronger effect for input tariff reduction as it leads to the use of imported intermediate inputs which require greater skills to operate.

Table 7 reports the results. Columns (1) to (4) present results in terms of man-days. I find that the coefficients on output tariff changes are negative in all columns suggesting that larger tariff declines are associated with skill upgrading. The effect of output tariff changes on the skill ratio appears to be stronger at the smaller establishments since I find a large negative coefficient (-0.187 and -0.193) among all establishments and private establishments (columns (1) and (2)).[25]

Are women less skilled than men in the manufacturing sector? While education levels of workers are not reported in the establishment survey, one can utilize household surveys to address this question. Table 8 shows average years of education among

[25]In Tables 14 and 16 I look at the change in log ratio of plant and machinery to man-days and the change in log ratio of fixed capital to sales as alternative measures of skill upgrading. However I do not observe significant changes.

males and female in the manufacturing sector. The source of this data is the Human Development Survey, which was conducted in the year 2005. I restrict the sample to those aged 24 to 66 years in order to include individuals who would have finished their education and potentially be working 10 years ago. The values are weighted by sampling weights in order to be representative of the population. I find that females are less educated than males in all industries leading me to believe that there are skill differences among males and females which would have partly contributed to the gender inequality. To the extent that skill upgrading occurred within production workers, as it apparently did across non-production and production workers, this would have led to a reduction in the hiring of female workers.

7.2 Plant Operations and Shifts per Worker

In India, women are restricted from working extended hours and night shifts in the manufacturing sector. All registered manufacturing units have to follow the guidelines of the Factories Act of 1948. Section 66 of this Act limits the working hours of women and prohibits them from doing night shifts (Begum (2013)).[26] One possibility is that with tariff reductions and import competition, establishments increased the number of shifts worked. Since women are constrained in terms of the maximum number of hours they can work, both because of the legal constraints described above, and also possibly because of family obligations, this change in plant operations would reduce the relative employment of women. In this section, I investigate whether this could be a possible channel through which tariff reductions negatively impacted female employment.

To begin, I examine whether tariff reductions have similar negative impact on female hiring when I define female share based on number of workers. The establishments report "man-days" which is defined as the number of 8-hour shifts worked over the year.

[26]The IT sector is not subject to these restrictions. Begum (2013) studies the effect of night shifts on the health of women in the IT sector. Recent newspaper articles reported that states are actively considering repealing this section of the Act. The state governments have been given authority to make amendments to the law.

I have so far focused on this measure of employment. But establishments also report daily average number of workers, which I call "number of workers." An alternative measure of female share is the ratio of "average number of female workers" to "average number of all workers." I use this alternative measure of female share as our dependent variable and report the results in Table 9. Unlike the conclusions using man-days, I find no clear evidence that output tariff reductions adversely impacted female employment share based on this alternative measure. For example, the coefficient for "big and private" establishments is 0.111 which is not statistically significant. This leads me to hypothesize that the negative impact of tariff reductions is operating through work intensity or shifts per worker.

Table 10 examines (yearly) shifts per worker among males. I divide the number of man-days by the average number of workers. The table shows the results from regressing this variable on output and input tariff changes. The table shows that shifts per worker increased faster in establishments facing larger declines in output tariffs. Among "big and private" establishments, the coefficient is -0.124 (column (4)) which suggests that the average tariff decline of 115 percentage points led to a 7 percent increase in shifts per worker compared to an establishment with minimum tariff decline (60 percent). Since the average in 1989 was approximately 317, this amounts to 22 extra 8-hour shifts per worker compared to an establishment which experienced minimum tariff decline and 44 extra 8- hour shifts per worker compared to an establishment with no output tariff decline.

The establishments which were running multiple shifts before would have a higher propensity to increase their shifts as a result of tariff reductions. Hence we would expect establishments with higher initial shifts to experience greater decline in female share.

Table 11 examines how the effect of output tariffs on female share varies with establishment's work intensity or number of shifts per worker. I examine only the "big and private" establishments in this exercise. I run separate regressions for establishments with initial male shift per worker in 1989 below the median value and for establish-

ments with initial male shift per worker above the median value. Table 11 shows that the negative impact of output tariff declines on female share is driven by establishments with high initial shift per worker.

The rise in work intensity associated with output tariff declines are likely to be disadvantageous for female workers. As discussed above, women are explicitly barred from working long hours and night shifts. In addition, women may have household obligations which limit their ability to work long hours. Among the subset of establishments which are "big and private," these types of hours constraints appear to have worked particularly against female workers.

8 Robustness of the Main Results

In the sections above, I find that the decline in output tariff leads to a decline in female share in jobs in the organized manufacturing sector. I attribute skill biased technological change and hours constraint faced by females as the main reasons for that. In this section I discuss several threats to the identification strategy. I consider possible alternate channels and ways to rule them out.

8.1 How do we ensure causality?

I argue in Section 3 that the tariff changes were not correlated with industrial characteristics as shown by Topalova (2010) and several others thereafter. This ensures that the reforms were exogenous. In the context of this study, I find that the output tariff change is also uncorrelated with the log female to male share in man-days in 1989, the log skill ratio in 1989 and log male intensity in 1989 at the industry level (the results are presented in Table 15). Hence, this enables us to establish causal interpretation.

Additionally, the results hold even after controlling for changes in alternative measures of protection such as district's exposure to industrial delicensing, FDI and non tariff barriers (shown in Appendix Table 22).

8.2 Could establishment level characteristics matter?

It can be argued that tariff reductions and share of females are correlated with establishment level characteristics. Export and import status of the establishment could be one example. In this work I use a balanced panel of establishments and hence look at the same establishment before and after. Additionally I control for establishment level characteristics for the initial year. [27] Thus, I argue that I am able to control for establishment level characteristics.

8.3 Could sampling problems lead to selection bias?

One might argue that there could be selection bias due to sampling techniques. In my main result I look at 'big and private' establishments separately, which is a census of establishments in this category and hence are not subject to sampling biases. I also aggregate the establishment level data up to the industry level using the relevant multipliers and find similar results at the industry level as well (see Section 6.3).

8.4 Could there be changes in industrial composition?

One can argue that sectors which employed more women grew much less than those which employed more men. This could be one of the factors driving our results at the establishment and industry level. In my main specification, [28], I take an additional control of ratio of man-days worked by females to males for 1989 (which is the "pre" year) at 3 digit industry level (results are presented in Table 12). I find that the results remain very similar. Additionally I do not find an effect of output and input tariff on overall man-days worked as seen in Table 17. Also there does not seem to be a significant change in log sales especially for big and big and private establishments as a

[27] I take controls for import status of the establishment in the initial year. As mentioned earlier, I do not have information on the export status of establishments. In order to take care of this issue, I take the share of fixed capital to sales and working capital to sales and use them as a proxy for exports.

[28] Equations 1 and 2

result of the change in output and input tariffs as seen in Table 19. [29] So, as such we do not find any significant change in industrial composition as a result of change in tariff.

8.5 Could there be a shift from direct to contract workers?

One can argue that the decline in female to total workers might be due to employers hiring more contract workers. My data does not have the gender decomposition of contract workers and thus I cannot comment on the gender ratio of the contract workers. But I look at the change in share of contract to total workers (in man-days) and do not find any significant changes with respect to changes in tariffs (see Table 21). Moreover, I look at establishment level data and there is no reason to believe that the shift from direct to contract workers would be proportionally larger for females.

8.6 What are the effects from the supply side?

I look at the period between 1989 and 1998. This coincides with the emergence of the IT industry in India. Millett and Oster (2013) mention how the increase in IT jobs increased the relative hiring and education of girls. In this context one can argue that females are probably shifting from formal manufacturing to the IT sector. In my main specification, I take state level controls. Further, I take control for each district and find that the results remain broadly similar (see Table 18). The district is a much smaller geographical location and thus if employment opportunities arose in certain districts in the non-manufacturing sector, taking district level controls would ensure that we look at changes within a district.

I argue that the change in tariff has a significant effect on the change in female share and I also argue that one of the main channel is increase in the hours of works. I however cannot fully disentangle these between demand and supply side effects.

[29] In Table 20, I look at the I look at the change in log ratio of total sales to man-days and find that there is a decline overall with respect to a decline in output as well as input tariffs.

9 Conclusion

The larger question addressed in this paper is how trade liberalization policies in India impacted gender inequality. While this is the larger question at hand, in practice, my empirical work addresses the narrower question of how tariff reductions impacted the relative hiring of women by employers in the manufacturing sector. How the initial trade shocks feed through the economy through input-output linkages to impact other sectors is left for future research. It would be ideal to be able to examine the impact on both production and non-production workers. Unfortunately, the establishment data gives the breakdown of female and male employment only for production workers. Thus, my study is confined to examining how tariff reductions impacted the female share of employment among production workers.

My findings suggest that larger tariff declines reduced the relative hiring of women. This appears to be the case for all establishments, but it is especially true for "big and private" establishments in our panel data. This result is directly counter to what I would expect if tariff reductions led to increased competition and reduced taste-based discrimination practiced by employers. I also find tariff reductions had little role in changing gender composition through the imported inputs channel, as suggested by a number of papers Goldberg et al. (2010b), Goldberg et al. (2010a), Goldberg et al. (2009), Khandelwal and Topalova (2011). Reductions in input tariffs appear to have neither positively nor negatively impacted women in my data.

What are the possible channels for my finding? I identify two possible channels that are consistent with my empirical analysis. First, I find that establishments facing larger tariff reductions undertook more skill-upgrading, which I define as the increase in the ratio of white-collar to blue-collar workers. Using household data, I establish that blue-collar female workers in manufacturing have lower levels of education (by nearly 5 years) compared to male workers in manufacturing. To the extent that establishments subject to trade liberalization and import competition engaged in skill-upgrading even

within production work, this would have negatively impacted the hiring of women. I also identify another channel which appears to be especially important for "big and private" establishments. While I am not able to precisely identify the cause, I find that work intensity, or shifts per worker, rose more rapidly among establishments facing steep tariff reductions in their sector. Since women are explicitly barred from working extended hours and night shifts by law and constrained from long hours of work due possibly to family obligations, I hypothesize that this development would also have deterred the hiring of women. Consistent with this hypothesis, I find that tariff reductions negatively impacted women among establishments which had high initial levels of work intensity in 1989.

My analysis suggests that women did not benefit from trade liberalization policies and in fact these policies may have increased, rather than decreased, gender inequality. This is broadly consistent with the conclusions of Topalova (2010) and Edmonds et al. (2010) who find that regions with exposure to trade liberalization policies had relatively slower reductions in poverty and child labor. On the other hand, my results are counter to some recent papers which examine the impact of trade liberalization on gender inequality in the Mexican case. Since my findings here appear to be at odds, some further elaboration is warranted. An important distinction between Indian tariff reforms and the North American Free Trade Agreement signed by Mexico is that in the Indian case, the tariff reductions were unilateral while in the Mexican case they were bilateral. Juhn et al. (2014) find that reductions in U.S. tariff rates imposed on Mexican exports led to increases in the number of exporting Mexican establishments and that these establishments in turn upgraded technology. The upgraded technology appears to have benefited female blue-collar workers who previously had been disadvantaged in terms of "brawn-intensive" skills. There was no such reduction in export tariffs in the Indian case. It is also worth noting that expansion of trade, defined broadly to include outsourcing (the re-location of services across countries) may have helped Indian women. Millett and Oster (2013) documents how the increase in IT jobs increased the relative hiring and

education of girls.

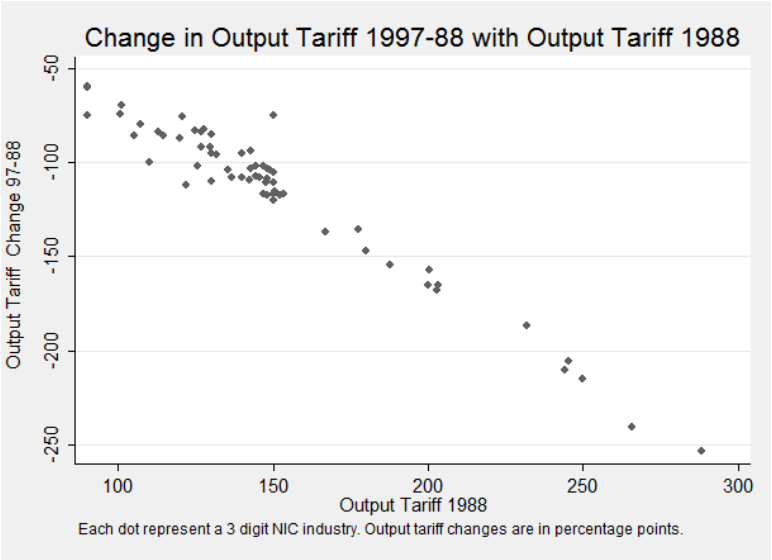

Figure 1a: Change in output tariff and initial output tariff in 1988

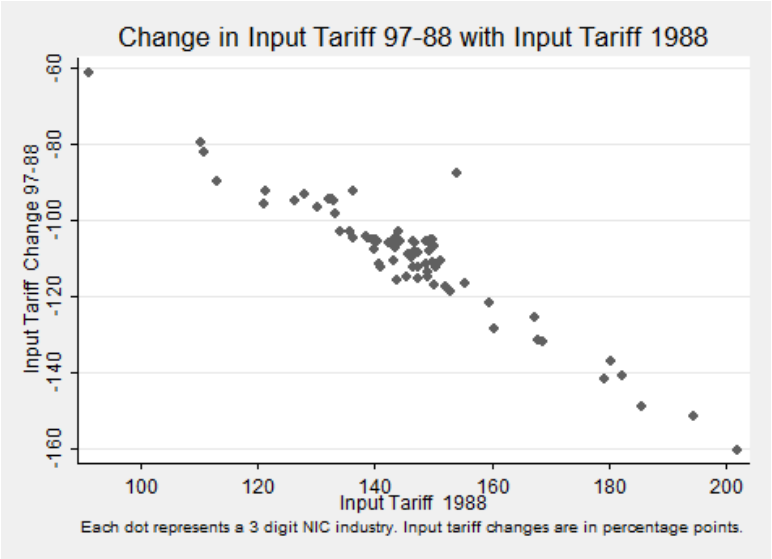

Figure 1b: Change in input tariff and initial input tariff in 1988

Table 1: Panel Match Rate Table

	> 60000	30000-60000	< 30000
Cross Section 1989	4221	2980	27038
Cross Section 1998	3991	1446	13322
Panel	1832	389	1893
Match Rate $\%$	43.40	13.05	7.00

Notes: > 60000 represents all establishments which reported > 60000 total man-days worked in a year. $30000 - 60000$ represents all establishments which reported $30000 - 60000$ total man-days worked in a year. < 30000 represents establishments which reported < 30000 total man-days in a year.

Table 2a: Summary Statistics: Cross Section

	1989		1998	
	All	Big& Pvt	All	Big& Pvt
Female Man-days/Total Man-days	0.156	0.126	0.195	0.195
	(0.293)	(0.265)	(0.330)	(0.331)
Female Number/Total Number	0.193	0.131	0.260	0.200
	(0.282)	(0.262)	(0.312)	(0.228)
Male Man-days/ Male Number	176.55	315.30	251.37	314.43
	(126.75)	(110.18)	(106)	(123.44)
Skilled Man-days/Unskilled Man-days	0.297	0.323	0.387	0.333
	(0.280)	(0.279)	(0.376)	(0.335)
Working Capital/Sales	0.178	0.108	0.340	0.247
	(0.263)	(0.183)	(0.369)	(0.301)
Fixed Capital/Sales	0.200	0.176	0.416	0.417
	(0.288)	(0.248)	(0.382)	(0.348)
Import Dummy	0.06	0.234	0.056	0.459
	(0.236)	(0.424)	(0.230)	(0.498)
Female Dummy	0.294	0.410	0.335	0.466
	(0.456)	(0.492)	(0.472)	(0.498)
Observations	34239	3056	18759	3164

Table 2b: Summary Statistics: Panel

	1989		1998	
	All	Big& Pvt	All	Big& Pvt
Female Man-days/Total Man-days	0.128	0.102	0.141	0.102
	(0.263)	(0.234)	(0.282)	(0.232)
Female Numbers/Total Numbers	0.152	0.106	0.183	0.105
	(0.259)	(0.233)	(0.277)	(0.231)
Male Man-days/Male Number	246.73	317.97	275.98	321.56
	(121.29)	(111.96)	(88.14)	(52.63)
Skill Man-days/Unskill Man-days	0.310	0.351	0.387	0.393
	(0.275)	(0.406)	(0.366)	(0.691)
Working Capital/Sales‡	0.136	0.100	0.297	0.214
	(0.211)	(0.163)	(0.346)	(0.270)
Fixed Capital/Sales‡	0.181	0.184	0.372	0.371
	(0.259)	(0.247)	(0.359)	(0.315)
Import Dummy‡	0.113	0.228	0.149	0.442
	(0.317)	(0.419)	(0.356)	(0.496)
Female Dummy	0.367	0.415	0.374	0.439
	(0.482)	(0.492)	(0.483)	(0.496)
Observations	4114	1289	4114	1289

The table mean coefficients. Standard deviations are in parentheses. Female Dummy is 1 if a firm hires at least 1 female and 0 otherwise. Likewise Import Dummy is 1 if the firm imports and 0 otherwise.

‡ indicates these variables are used as controls. The summary statistics for these variables are winsorized at 1%.

Table 3: Female Share and Output Tariffs

Dependent Variable: Change in Log of Female to Total Ratio in Man-days								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	0.320	0.274	0.441	0.712*	0.337	0.311	0.445	0.725**
	(0.406)	(0.334)	(0.618)	(0.395)	(0.393)	(0.330)	(0.582)	(0.354)
WorkCap/Sales					-8.152	-11.58***	-31.60***	-31.28***
					(5.050)	(3.698)	(2.829)	(1.497)
FixedCap/Sales					4.452	2.467	19.98***	19.18***
					(2.880)	(2.400)	(2.215)	(1.518)
Observations	4114	3429	1832	1289	4114	3429	1832	1289
R^2	0.028	0.024	0.052	0.063	0.030	0.025	0.057	0.071

Notes: Same as in Table:4

Table 4: Female Share and Output and Input Tariffs

Dependent Variable: Change in Log of Female to Total Ratio in Man-days								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big &Pvt (8)
ΔOutput Tariff	0.252	0.283	0.317	0.781*	0.250	0.311	0.291	0.765***
	(0.311)	(0.222)	(0.801)	(0.412)	(0.308)	(0.233)	(0.708)	(0.284)
ΔInput Tariff	0.388	-0.061	0.635	-0.376	0.504	0.001	0.784	-0.214
	(1.227)	(1.124)	(2.019)	(1.166)	(1.161)	(1.093)	(1.851)	(1.021)
WorkCap/Sales					-8.561	-11.81***	-31.76***	-31.23***
					(5.190)	(3.777)	(2.792)	(1.543)
FixedCap/Sales					4.692	2.665	20.19***	19.11***
					(2.965)	(2.490)	(2.136)	(1.475)
Observations	4114	3429	1832	1289	4114	3429	1832	1289
R^2	0.028	0.024	0.052	0.063	0.030	0.025	0.057	0.071

Notes: Standard errors clustered at 3 digit industry level in parentheses. Dependent variable is the (log(female man-days in 1998/total man-days in 1998) - log(female man-days in 1989/total man-days in 1989)) *100. Columns (1) & (5) represent all establishments in the panel. Columns (2) & (6) include establishments which have completely private ownership. Columns (3) & (7) include establishments that have $>$ 60000 man-days of operation and hence categorized as big establishments. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). WorkCap/Sales is the ratio of working capital to sales in 1989. FixedCap/Sales is the ratio of fixed capital to sales in 1989. All regressions include controls for imported inputs, age of the establishment, 2 digit industry and states. The control for imported inputs is a dummy which takes the value 1 if the establishment imports1989. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 5: Female Share and Output Tariff - Industry level

Dependent Variable: Change in Log of Female to Total Ratio in Man-days						
	All			Big & Pvt		
	(1)	(2)	(3)	(4)	(5)	(6)
ΔOutput tariff	0.400*		0.467	0.916		2.04**
	(0.237)		(0.323)	(0.745)		(1.01)
ΔInput Tariff		0.562	-0.256		-0.641	-4.20
		(0.621)	(0.838)		(1.92)	(2.59)
Observations	89	89	89	86	86	86
R^2	0.031	0.010	0.033	0.017	0.002	0.049

Notes: Standard errors in parentheses. Dependent variable is the (log(total female man-days in the industry in 1998/total man-days in the industry in 1998) - log(female man-days in the industry in 1989/total man-days in the industry in 1989)) *100. I aggregated the cross section of establishments up to the 3 digit NIC industry level in columns (1), (2) and (3). In columns (4), (5) and (6), I aggregated "big" (establishments with $>$ 60000 man-days) and private establishments from the cross-section of establishments. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 6: Female Share and Tariffs- Extensive and Intensive Margin

	Dependent Variable:							
	Change in dummy variable for hiring female				Change in Log of Female to Total Ratio in Man-days in female hiring firms			
	Extensive Margin				Intensive Margin			
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	0.0160	0.0199	0.00638	0.0340**	0.987	1.112	-0.488	2.598
	(0.0168)	(0.0150)	(0.0331)	(0.0152)	(1.545)	(1.972)	(2.594)	(1.680)
ΔInput Tariff	0.0336	-0.0114	0.0682	-0.0154	1.228	-1.228	2.925	-4.139
	(0.0578)	(0.0609)	(0.0875)	(0.0517)	(3.244)	(3.654)	(5.712)	(3.931)
WorkCap/Sales	-0.563	-0.767***	-2.050***	-2.064***	-29.10***	-29.52***	-35.43***	-30.28***
	(0.353)	(0.262)	(0.170)	(0.102)	(4.708)	(6.529)	(5.712)	(2.995)
FixedCap/Sales	0.312	0.192	1.322***	1.305***	16.50***	17.40**	23.62***	19.00***
	(0.202)	(0.176)	(0.126)	(0.0979)	(2.753)	(7.731)	(7.242)	(4.057)
Observations	4114	3429	1832	1289	1824	1472	916	630
R^2	0.034	0.029	0.059	0.076	0.075	0.072	0.113	0.140

Notes: Standard errors clustered at 3 digit industry level in parentheses. Dependent variable for columns (1) to (4) is the (Female98 -Female89)*100. Female89 and Female98 categorical variable which takes the value 1 if the establishment hires females and 0 otherwise for 1989 and 1998 respectively. The dependent variable for columns (5) to (8) is the same as Table 3 and 4. In col. (5) to (8) I take the sample of establishments which hire at least one female. Columns (1) & (5) represent all establishments in the panel. Columns (2) & (6) include establishments which have completely private ownership. Columns (3) & (7) include establishments that have $>$ 60000 man-days of operation and hence categorized as big establishments. Columns (4) & (8) include all establishments that are big as defined above and privately owned. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). WorkCap/Sales is the ratio of working capital to sales in 1989. FixedCap/Sales is the ratio of fixed capital to sales in 1989. All regressions include controls for imported inputs, age, 2 digit industry and states. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 7: Skill Ratio and Output and Input Tariffs

Dependent Variable: Change in Log Skill Ratio Man-days				
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)
ΔOutput Tariff	-0.187**	-0.193**	-0.0516	-0.0291
	(0.0869)	(0.0966)	(0.0375)	(0.0442)
ΔInput Tariff	0.173	0.235	0.213*	0.125
	(0.322)	(0.369)	(0.117)	(0.147)
WorkCap/Sale	0.153	-0.490	0.770	0.827**
	(1.556)	(1.600)	(0.552)	(0.414)
FixedCap/Sales	-0.119	-0.458	-0.649	-0.567
	(0.913)	(1.355)	(0.506)	(0.423)
Observations	4114	3429	1832	1289
R^2	0.021	0.023	0.034	0.041

Notes: Standard errors clustered at 3 digit industry level in parentheses. Dependent variable is the (log skill ratio in man-days in 1998 - log skill ratio in man-days in 1989)*100. Skill ratio is the ratio of non-production to production workers. Non-production workers include supervisory and other workers. Production workers include direct and contract workers. Columns (1) represent all establishments in the panel. Columns (2) include establishments which have completely private ownership. Columns (3) include establishments that have $>$ 60000 man-days of operation and hence categorized as big establishments. Columns (4) include all establishments that are big as defined above and privately owned. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). WorkCap/Sales is the ratio of working capital to sales in 1989. FixedCap/Sales is the ratio of fixed capital to sales in 1989. All regressions include controls for imported inputs, age, 2 digit industry and states. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 8: Education Among Males and Females in Manufacturing Industries

	Male		Female	
Coal Mining	6.05	(4.43)	1.12	(2.03)
Iron Mining	4.97	(4.77)	0.81	(1.67)
Other Metal Mining	3.99	(4.43)	3.11	(3.71)
Non Metal Mining	3.27	(3.86)	0.53	(1.49)
Mining Services	4.03	(4.77)	1.11	(2.54)
Food Products	5.75	(4.33)	2.49	(3.46)
Beverage and Tobacco	4.29	(4.55)	1.65	(2.82)
Manf Cotton Textiles	6.28	(4.27)	2.37	(3.95)
Manufacture of Wool, Silk Etc	5.80	(3.99)	2.30	(3.57)
Manufacture of Jute	7.91	(5.37)	3.96	(3.13)
Manufacture of Apparel	5.20	(3.82)	4.72	(4.48)
Manf Wood/Furniture	5.48	(4.01)	1.95	(3.72)
Manf of paper/publish	8.65	(3.49)	7.16	(3.77)
Manf of Leather	6.44	(4.38)	7.04	(5.79)
Manf of Chemicals	9.68	(3.46)	5.22	(5.28)
Rubber and Plastic	7.86	(3.77)	3.48	(3.79)
Manufacture Minerals	4.09	(4.98)	0.37	(1.24)
Manufacture Basic Metals	7.78	(4.04)	3.11	(4.01)
Manf of Metal products	7.15	(4.31)	2.34	(3.23)
Manufacture Machinery	9.38	(3.55)	2.70	(4.97)
Manf Other	7.67	(4.55)	2.76	(3.31)
All Blue Collar	7.73	(4.25)	2.93	(3.99)

Standard deviations in parentheses. Source: Human Development Survey, 2005. Table shows the average education level among males and female blue collared workers in manufacturing. I restrict the sample to the age 24 to 66 years. The values are weighted by sampling weights in order to be representative of the population.

Table 9: Change In Female Share In Number of Employees

Dependent Variable: Change in Log of Female to Total Ratio in Number of Employees				
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)
ΔOutput Tariff	-0.0213	-0.0613	0.133	0.111
	(0.0667)	(0.0713)	(0.113)	(0.0974)
ΔInput Tariff	-0.193	-0.0820	-0.156	0.0679
	(0.274)	(0.271)	(0.314)	(0.297)
Observations	4113	3429	1831	1289
R^2	0.041	0.051	0.054	0.053

Standard errors clustered at 3 digit industry level in parentheses. Dependent variable for is (log of ratio of female number to total number in 1998 - log of ratio of female number to total number in 1998)*100. Columns (1) represent all establishments in the panel. Columns (2) include establishments which have completely private ownership. Columns (3) include establishments that have $>$ 60000 man-days of operation and hence categorized as big establishments. Columns (4) include all establishments that are big as defined above and privately owned. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). WorkCap/Sales is the ratio of working capital to sales in 1989. FixedCap/Sales is the ratio of fixed capital to sales in 1989. All regressions include controls for imported inputs, age, 2 digit industry and states. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 10: Total Male Employment Intensity and Output and Input Tariff

Dependent Variable: Change in Log of ratio of male man-day to numbers of male employees								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	-0.0839*	-0.0993*	-0.0947**	-0.124**	-0.0746	-0.0847	-0.108***	-0.133***
	(0.0491)	(0.0563)	(0.0456)	(0.0558)	(0.0490)	(0.0551)	(0.0311)	(0.0379)
ΔInput Tariff					-0.0535	-0.0892	0.0687	0.0468
					(0.177)	(0.197)	(0.138)	(0.174)
WorkCap/Sales	-1.143	-0.873	-4.408***	-4.918***	-1.137	-0.867	-4.423***	-4.931***
	(1.010)	(0.949)	(0.661)	(0.310)	(1.004)	(0.941)	(0.663)	(0.291)
FixedCap/Sales	0.657	0.848	4.234***	4.698***	0.654	0.840	4.252***	4.713***
	(0.587)	(0.749)	(0.670)	(0.348)	(0.583)	(0.741)	(0.667)	(0.322)
Observations	4113	3429	1831	1289	4113	3429	1831	1289
R^2	0.065	0.064	0.043	0.051	0.065	0.064	0.043	0.051

Notes: Standard errors clustered at 3 digit industry level in parentheses. Dependent variable is (log of male intensity in 1998 - log of male intensity in 1989)*100. The LHS is multiplied by 100 due to convenience of presentation. Male intensity is measured as a ratio of male man-days by average number of male workers. Columns (1) & (5) represent all establishments in the panel. Columns (2) & (6) include establishments which have completely private ownership. Columns (3) & (7) include establishments that have $>$ 60000 man-days of operation and hence categorized as big establishments. Columns (4) & (8) include all establishments that are big as defined above and privately owned. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). WorkCap/Sales is the ratio of working capital to sales in 1989. FixedCap/Sales is the ratio of fixed capital to sales in 1989. All regressions include controls for imported inputs, age of the establishment, 2 digit industry and states. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 11: Effect of Female Share on Output Tariff by Initial Male Intensity Distribution

Dependent Variable: Change in Log of Female to Total Ratio in Man-days		
	Above Median	Below Median
ΔOutput Tariff 98-89	1.187***	0.255
	(0.378)	(0.622)
Observations	654	635
R^2	0.093	0.101

Notes: Standard errors clustered at 3 digit industry level in parentheses. Dependent variable is the (log(female man-days in 1998/total man-days in 1998) - log(female man-days in 1989/total man-days in 1989)) *100. Columns (1) & (5) represent all establishments in the panel. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). The median value of male intensity in 1989 is 310, 8- hour shifts per male worker. All regressions include controls for imported inputs, age, 2 digit industry and states. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 12: Female Share and Tariff with the Female Share in 1989 at 3 digit NIC as a Control

Dependent Variable: Change in Log of Female to Total Ratio in Man-days								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	0.326	0.296	0.420	0.697**	0.246	0.300	0.291	0.754***
	(0.389)	(0.325)	(0.578)	(0.348)	(0.303)	(0.228)	(0.698)	(0.273)
ΔInput Tariff					0.457	-0.0292	0.661	-0.306
					(1.184)	(1.095)	(1.891)	(1.043)
Observations	4114	3429	1832	1289	4114	3429	1832	1289
R^2	0.030	0.026	0.057	0.071	0.030	0.026	0.057	0.071

Notes: All regressions include controls of ratio of female to male man days worked in 1989 by 3 digit NIC. All other things are the same as columns (4) to (8) of Tables 3 and 4. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

10 Appendix Tables

Table 13: Summary Statistics: Variables Used in Regressions

	1989		1998		Change	
	All	Big& Pvt	All	Big& Pvt	Δ All	Δ Big & Pvt
Female Dummy	0.367	0.415	0.374	0.439	0.006	0.02
	(0.482)	(0.492)	(0.483)	(0.496)	(0.38)	(0.350)
$\text{Ln}\left(\frac{\text{Female Man-days}}{\text{Total Man-days}}\right)$	-2.93	-2.78	-2.601	-2.34	0.333	0.445
	(8.959)	(10.16)	(8.817)	(10.26)	(6.73)	(6.89)
$\text{Ln}\left(\frac{\text{Female Numbers}}{\text{Total Numbers}}\right)$	-4.27	-4.273	-4.27	-4.271	0.314	0.002
	(2.03)	(2.031)	(2.01)	(2.011)	(1.20)	(1.11)
$\text{Ln}\left(\frac{\text{Male Man-days}}{\text{Male Number}}\right)$	5.26	5.67	5.40	5.70	0.137	0.03
	(1.01)	(0.63)	(1.12)	(0.60)	(1.13)	(0.67)
$\text{Ln}\left(\frac{\text{Skill Man-days}}{\text{Unskill Man-days}}\right)$	-1.77	-1.58	-1.51	-1.48	0.267	0.005
	(1.70)	(1.26)	(1.75)	(1.23)	(1.86)	(0.82)
Output tariff	150.68	154.08	38.34	38.42	-112.25	-115.30
	(38.04)	(40.55)	(7.53)	(7.43)	(38.90)	(40.91)
Input tariff	147.06	148.81	38.40	38.88	-108.62	-109.88
	(14.56)	(14.89)	(6.30)	(6.14)	(13.89)	(14.64)
Observations	4114	1289	4114	1289	4114	1289

Notes: The table mean coefficients. Standard deviations are in parentheses. Female Dummy is 1 if a firm hires at least 1 female and 0 otherwise. These variables are used in the regressions.

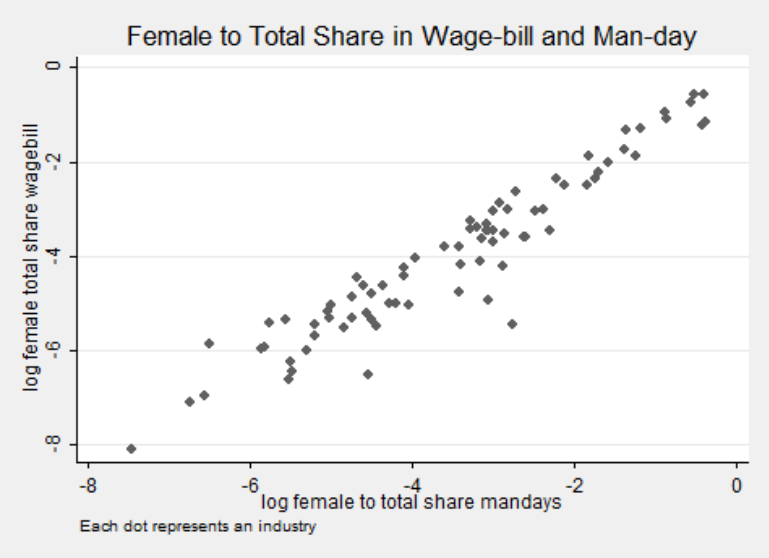

Figure 2: Relationship between Log Wage Bill Share and log Manday Share in 1998

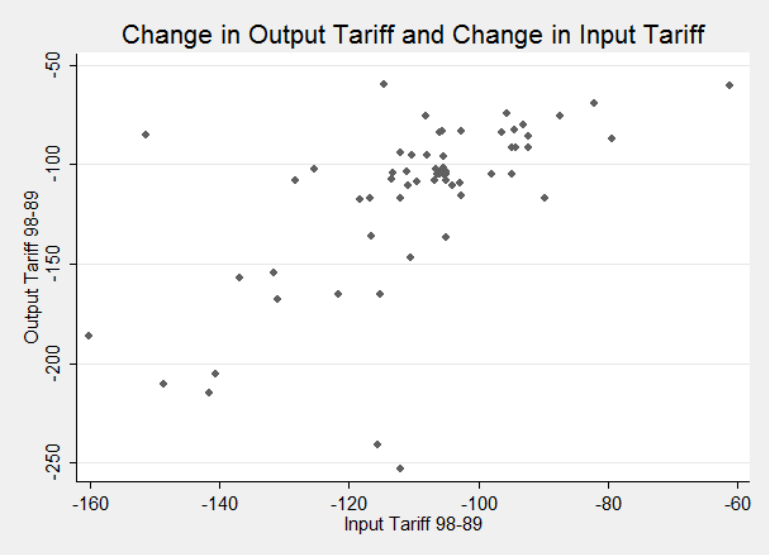

Figure 3: Relationship of output Tariff and Input Tariff Change

Table 14: Change in Log Plant and Machinery/Man-days and Output and Input Tariff

Dependent Variable: Change in Log of Plant and Machinery to Sales								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	0.00448	0.0741	-0.131	0.0339	-0.0467	0.0591	-0.101	0.165**
	(0.110)	(0.124)	(0.112)	(0.123)	(0.0936)	(0.110)	(0.0956)	(0.0800)
ΔInput Tariff					0.299	0.0940	-0.152	-0.703**
					(0.474)	(0.471)	(0.325)	(0.274)
Observations	3864	3190	1801	1265	3864	3190	1801	1265
R^2	0.063	0.081	0.112	0.099	0.063	0.081	0.112	0.101

Notes: Standard errors in parentheses clustered at 3 digit industry level. Dependent variable is the change in Δ log ratio of plant and machinery to total man-days (1998-1989). The LHS is multiplied by 100 due to convenience of presentation. The LHS variables are in nominal values. Columns (1) & (5) represent all establishments in the panel. Columns (2) & (6) include establishments which have completely private ownership. Columns (3) & (7) include establishments that have $>$ 60000 man-days of operation and hence categorized as big establishments. Columns (4) & (8) include all establishments that are big as defined above and privately owned. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). All regressions include controls for imported inputs, age, 2 digit industry, states, working capital/sales and fixed capital/sales. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 15: Exogeneity of Tariff Change

Dependent Variable: Change in Output Tariff			
	(1)	(2)	(3)
$\text{Ln}\left(\frac{\text{Female Man-days89}}{\text{Total Man-days89}}\right)$	0.794		
	(2.413)		
$\text{Ln}\left(\frac{\text{Non-Production89}}{\text{Production 89}}\right)$		-5.453	
		(8.768)	
$\text{Ln}\left(\frac{\text{Male Man-days89}}{\text{Male Number89}}\right)$			0.996
			(14.15)
Observations	92	92	92
R^2	0.001	0.004	0.000

Notes: Standard errors in parentheses. Dependent variable is change in output tariff between 1998 and 1989. All variables are at 3-digit NIC. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 16: Change in Log Fixed Capital/Sales and Output and Input Tariff

Dependent Variable: Change in log of Fixed Capital to Sales								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff 98-89	0.329**	0.331**	0.0597	0.00288	0.361**	0.368**	0.261	0.198
	(0.158)	(0.153)	(0.261)	(0.354)	(0.168)	(0.171)	(0.256)	(0.320)
ΔInput Tariff 98-89					-0.193	-0.230	-0.975	-0.933
					(0.596)	(0.650)	(1.039)	(1.271)
Observations	48884	46207	3911	3368	48884	46207	3911	3368
R^2	0.042	0.044	0.088	0.094	0.042	0.044	0.088	0.094

Notes: Standard errors in parentheses clustered at 3 digit industry level. Dependent variable is the change Δ log fixed capital by sales between 1989 and 1998. The LHS is multiplied by 100 due to convenience of presentation. The LHS variables are in nominal values. Columns (1) & (5) represent all establishments in the panel. Columns (2) & (6) include establishments which have completely private ownership. Columns (3) & (7) include establishments that have $>$ 60000 man-days of operation and hence categorized as big establishments. Columns (4) & (8) include all establishments that are big as defined above and privately owned. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). All regressions include controls for imported inputs, age, 2 digit industry, states, working capital/sales and fixed capital/sales. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 17: Change In Log(Man-days)

Dependent Variable: Change in log of Man-days								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	0.104**	0.128**	-0.0125	0.0245	0.0653	0.0830	0.00257	0.0354
	(0.0517)	(0.0537)	(0.0482)	(0.0412)	(0.0540)	(0.0531)	(0.0525)	(0.0480)
ΔInput Tariff					0.224	0.277*	-0.0768	-0.0581
					(0.158)	(0.149)	(0.179)	(0.153)
WorkCap/Sales	-1.556	-1.362	-5.379***	-5.517***	-1.580	-1.380	-5.363***	-5.501***
	(1.116)	(0.926)	(0.193)	(0.197)	(1.136)	(0.949)	(0.207)	(0.179)
FixedCap/Sales	0.883	0.921	4.989***	5.094***	0.898	0.948	4.969***	5.075***
	(0.648)	(0.831)	(0.174)	(0.203)	(0.660)	(0.844)	(0.188)	(0.177)
Observations	4114	3429	1832	1289	4114	3429	1832	1289
R^2	0.044	0.040	0.238	0.246	0.045	0.040	0.238	0.246

Notes: Standard errors clustered at 3 digit industry code in parentheses. The Dependent Variable is (log Man-days in 1998 - log Man-days in 1989)*100. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). All regressions include controls for imported inputs, age, 2 digit industry, states, working capital/sales and fixed capital/sales. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 18: Female Share and Tariff with Initial Female Share and District as Control

Dependent Variable: Change in Log of Female to Total Ratio in Man-days								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	0.134	0.289	-0.00343	0.302	0.196	0.417*	0.114	0.689*
	(0.351)	(0.327)	(0.626)	(0.521)	(0.270)	(0.226)	(0.688)	(0.377)
ΔInput Tariff					-0.365	-0.811	-0.609	-2.119
					(1.413)	(1.507)	(2.202)	(1.927)
Observations	4114	3429	1832	1289	4114	3429	1832	1289
R^2	0.152	0.155	0.250	0.262	0.152	0.155	0.250	0.263

*Notes:*All regressions include controls of ratio of female to male man days worked in 1989 by 3 digit NIC and controls for each district. All other things are same as columns (4) to (8) of tables 3 and 4. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 19: Change In Log (Sales)

Dependent Variable: Change in Log of Sales								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	0.554**	0.678***	0.0912	0.230	0.529**	0.628**	0.108	0.294
	(0.253)	(0.241)	(0.206)	(0.190)	(0.239)	(0.244)	(0.206)	(0.217)
ΔInput Tariff					0.149	0.323	-0.0884	-0.350
					(0.681)	(0.609)	(0.559)	(0.557)
Observations	4114	3429	1832	1289	4114	3429	1832	1289
R^2	0.150	0.145	0.116	0.137	0.151	0.146	0.117	0.137

Notes: Standard errors clustered at 3 digit industry code in parentheses. The Dependent Variable is (log Sales in 1998 - log Sales in 1989)*100.Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). All regressions include controls for imported inputs, age, 2 digit industry, states, working capital and fixed capital. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 20: Change In Log(Total Sales/Man-days)

Dependent Variable: Change in Log of Total Sales to Man-days Ratio								
	All (1)	Pvt (2)	Big (3)	Big & Pvt (4)	All (5)	Pvt (6)	Big (7)	Big & Pvt (8)
ΔOutput Tariff	0.842**	1.017**	0.510	0.909*	0.541*	0.640**	0.292	0.626*
	(0.396)	(0.432)	(0.391)	(0.499)	(0.293)	(0.292)	(0.231)	(0.337)
ΔInput Tariff					1.726*	2.307**	1.126	1.514
					(0.892)	(1.006)	(1.200)	(1.614)
Observations	4114	3429	1832	1289	4114	3429	1832	1289
R^2	0.150	0.145	0.116	0.137	0.151	0.146	0.117	0.137

Notes: Standard errors clustered at 3 digit industry code in parentheses. The Dependent Variable is (log Sales/Man-days in 1998 - log Sales/Man-days in 1989)*100. Δ Output Tariff represents (output tariff in 1998 - output tariff in 1988). Δ Input Tariff represents (input tariff in 1998 - input tariff in 1988). All regressions include controls for imported inputs, age, 2 digit industry, states, working capital and fixed capital. The control for imported inputs is a dummy which takes the value 1 if the establishment imports. Age is a dummy which has a value 1 if the establishment is less than 15 years old and 0 otherwise. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 21: Share of Contrct to Total Workers in Mandays

Dependent Variable: Ratio of Contract to Total Workers in Man-days								
	All (1)	Pvt (2)	Big (3)	Big + Pvt (4)	All (5)	Pvt (6)	Big (7)	Big + Pvt (8)
Δ Output Tariff	-0.145	-0.116	-0.0164	0.0587	-0.235	-0.200	-0.123	0.00680
	(0.294)	(0.298)	(0.431)	(0.492)	(0.258)	(0.250)	(0.414)	(0.486)
Δ Input Tariff					0.519	0.517	0.543	0.278
					(1.046)	(1.227)	(1.308)	(1.837)
Observations	4255	3544	1862	1304	4255	3544	1862	1304
R^2	0.032	0.033	0.063	0.086	0.032	0.034	0.063	0.086

Notes: Same as Table 3. ***, **, * denote significance at 1%, 5%, 10% levels respectively.

Table 22: Share of Female Share aand Tariffs including Other Reform Controls

Dependent Variable: Ratio of Female to Total Workers in Man-days				
	All	Pvt	Big	Big & Pvt
Δ Output Tariff	0.219	0.209	0.159	0.551*
	(0.350)	(0.293)	(0.755)	(0.318)
Δ Input Tariff	-1.037	-1.130	-1.055	-1.296
	(0.996)	(0.952)	(1.882)	(1.281)
Observations	3543	2925	1610	1119
R^2	0.031	0.028	0.048	0.062

Notes: Same as Table 3. ***, **, * denote significance at 1%, 5%, 10% levels respectively.Additional controls taken are change in district's exposure of industrial de-licensing, change in districts exposure to FDI and change in districts exposure to non-tariff barriers.

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