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Liberalized Trade Policy and Inequality: Evidence from Post-MFA India and Some Theoretical Issues

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Abstract

The withdrawal of the bi-lateral quota under the Multi–Fibre Arrangement (MFA) has been one of the most compelling trade policy reforms carried out within the scope of global negotiations in recent times. The extent of the withdrawal has brought in significant changes in the industrial structures in the countries of the south, in particular for those countries where textile and garments industry accounted for a fair share of output and employment. The industry is the largest employment provider in India and records a mix of formal and informal firms. We obtained data for 47 large firms in the country that accounts for the lion's share of export revenue. We show that since the withdrawal of quota, the industry has witnessed unprecedented concentration of firm level activities within the country not only by size of operation but also by specific regions or states within the country, thereby creating some sort of inequality. We generated a firm level longitudinal data for 15 years encompassing the period over which MFA phased out gradually. Relating trade and labor market outcomes, our firm-level empirical estimates show that the export-oriented firms in India were not affected adversely and that the aggregate wage bill also rose during this period. The firm-level panel is supplemented by a state-level panel between 1998 and 2008 to capture the more aggregative impact of the withdrawal of MFA on the level of labor earnings in various regions of India. This should serve to document whether the aggregate labor income diverges across states (or regions) thereby offering some indication of regional inequality created by trade liberalization. One of the stark results of this panel state fixed effects regression is that the aggregate state level wage bill falls as the profit level rises for the industry. The results also show that regional wage disparity has strong relation with regional disparity in firm-concentration at the level of the industry as measured by the number of factories as well as with regional disparity in sales across the states or provinces. The regional concentration of activities therefore additionally reinforces the firm level observations on concentration in the post-MFA regime in India. We also provide a brief analytical exercise in order to lend a generalized structure to this evidence. We have pointed out conditions under which such global policy could well raise the income of the laborers and generate more employment.

Keywords: Trade Policy**,** MFA-quota, Employment, Wage, Inequality,

JEL Classification: F13, F14, F16, J3, L6

1. Introduction

The implications of international trade policies on the labor market of a country can be varied. The wage-employment impacts of unilateral as well as multilateral trade reforms have been studied both theoretically and empirically (for developing countries, see Goldberg and Pavcnik, 2007; Hasan, Mitra and Ramaswamy, 2007; Attanasio, Goldberg and Pavcnik, 2004; Hanson and Harrison, 1999). For explorations in the specific relationship between economic reforms and industry-level adjustments at the country level, important contributions are available in Aghion, Burgess, Redding and Zilibotti, 2008, while for the effects of trade reform on firm level productivity in India, Topalova and Khandelwal, 2011 offer substantial evidence in recent times. We deal with a specific trade policy in this paper. This involves the withdrawal of the Multi-Fibre Arrangement that took effect globally in the year 2005 following a decade long phase out plan. We find the implications of this trade policy reform on the aggregate labor earnings for the workers involved in the textile and allied industries in India. Further, we also discuss possible regional differences arising from the dismantling of the quota system.

The motivation behind choosing India for the empirical estimate is straightforward. For India, textile constitutes the largest industry and qualifies as the largest net foreign exchange earner. The contribution of this industry to the gross domestic product is about 4%, to the industrial production by about 14%, and to the export earnings of India by over 20% while adding only 2-3% to the gross import bill. Between textile and apparel, the apparel (clothing) industry is of more recent origin and produces exportable, primarily. Second, the textile industry directly employs more than 12.58 million workers and the indirect employment is about 26 million (in 2005-06;

employment dropped by 25% compared to 2004-05 fiscal year). The total employment is however, distributed between formal and informal organizations, and is second to agriculture as the largest employment provider in India. It should be noted that despite being the largest net foreign exchange earning industrial sector in India, the industry's share in world exports of textile and apparel is still quite low as compared to other nations, including the Asian giants like China, South Korea, Singapore and Hong Kong. Not surprisingly, the export promotion policies in India strongly support this sector, which in recent times have become quite sensitive to changing global economic order and to the newly adopted rules. Indian textile industry started to integrate fully with WTO from January 2005. The MFA was replaced by the ATC (Agreement on Textile and Clothing) which incorporated stages of phasing out quantitative restrictions, at the beginning of 1995, 1998, 2002 and 2005 respectively. The impact of exogenous shocks, such as, the withdrawal of MFA on the textile workers in India therefore needs to be studied with greater alacrity than what the available literature offers.

The empirical analysis for India is expected to enrich the global labor market implications of withdrawal of MFA and supplement only a few country-level studies that are already available in the literature. In this regard, Marouani (2009) shows that for Tunisia, withdrawal of MFA has lead to an increase in unemployment and wage inequality but has not significantly affected the main macroeconomic variables, since the exchange rate management took into account the expected shock. Ernst, Ferrer and Zult (2005) forecasted some of these changes and found that China's export growth to the quota-imposing regions would go up by 386.5% way above 37.2% rise for India. The realized differences are however much modest. Clearly, the variations in these estimates

and the possible perverse impact need further analysis perhaps with some theoretical conjectures on what to expect of such policy reforms.

Subsequently, section 2 shows how the total labor cost at the firm level varies with important parameters chosen for this analysis, in particular those, which capture the effects of the withdrawal of MFA on the labor market. This section also deals with regional, rather state-level, inequality in terms of aggregate wage earnings and employment arising out of the abolition of quota for India. Section 3 develops a theoretical application to generalize the relationship between trade reform and regional inequality.

2. The Empirical Model and Results

We construct a panel of 47 major [each producing more than the mean output level for all years under consideration (at current prices)] firms between the years 1998 and 2012, for those exclusively engaged in the production and export of textile and related commodities, from the most comprehensive database for firm level information available in India (Centre for Monitoring Indian Economy – Prowess Database).

We chose a number of variables (equation 1) from the firm level panel to explain the movements in the *total labor cost* (comprising of salaries, wages, bonus and ex-gratia). The explanatory variables include, *value of export* (*exports*) of textile and clothing (henceforth, T&C), *total capital stock (Capital)*, *net fixed assets (NFA)*, *total value of sales (SALES)*, and *profit after tax (PAT)*. We incorporate a number of interaction terms to measure the relative strength of each of these variables (Table 1A in the appendix offers detailed descriptive statistics for these variables). The main

hypothesis is whether the *total labor cost* (or bill) borne by the firms has gone down due to the withdrawal of the MFA, thereby reflecting on the question of viability of the firms in the post-MFA regime. The intuition suggests that as the MFA was removed, all the countries that previously enjoyed some positive output and market share owing to the assured country-quota would now be exposed to global competition and the impact would be directly felt at the firm level within all such countries. We constructed a Herfindahl index to measure the degree of concentration at the firm level and found that the Indian firms have unambiguously become more concentrated between 1998 and 2009. Surprisingly, for 2010 there is a substantial decline in the degree of concentration, although still later the index again starts moving upward. Table 1 offers the values of total sales of all the firms taken together, 10-firm concentration ratio (CR10), 50-firm concentration ratio (CR50), and Hirschman-Herfindahl Index (HHI) for 1998-2012.

Since we have more than 750 firms in our database (considering all the manufacturing and exporting firms in the Textile and Clothing sector), we have calculated different types of concentration indices and compared them in order to get a definitive outcome. We have calculated both the 10-firm and 50-firm Concentration Ratios by identifying the top 10 and top 50 firms in this industry for all these years and calculated their shares in total sales at the industry-level. To further refine it, we calculated the Hirschman-Herfindahl Index of concentration, which is basically the sum of squares of the shares of the top 50 firms of the industry, for the entire period of our study.

Table 1: Total Sales and Concentration Indices

YEAR	TOTAL SALES (in Rs. Million)	CR10	CR50	HHI
1998	458789.7	0.265935787	0.539182549	0.043106
1999	479718.9	0.275774417	0.542131444	0.044875
2000	533338	0.28489757	0.545870911	0.047751
2001	592084.6	0.281744028	0.545416989	0.048478
2002	560916	0.239365609	0.502304623	0.050872
2003	620847.3	0.247778802	0.494131488	0.051525
2004	642901.9	0.263405661	0.521553755	0.052845
2005	717767.3	0.280616991	0.533050753	0.055648
2006	785648.9	0.26945726	0.530489128	0.053036
2007	911765	0.279931232	0.539288852	0.057014
2008	1081350.1	0.280778075	0.542134874	0.057666
2009	1167977.5	0.273324786	0.555342034	0.053614
2010	1269895.9	0.260063837	0.561796995	0.037895
2011	1421381.8	0.260382889	0.591362855	0.030675
2012	928895.7	0.376461319	0.688540059	0.04495

Data Source: Centre for Monitoring Indian Economy – Prowess Database

Table 1 gives a clear view of the pattern of change in the structure of the Textile and Clothing industry in the context of liberalization of textile trade (elimination of bilateral MFA quotas) and the substantial reform in the domestic industrial policy exclusively for this sector. As the overall results show, all the indices demonstrate an increasing trend of concentration specifically between the first and the final year but there are some intricacies that should not be overlooked. For instance, prior to 2012 the share of top 10 firms in the total sales remain more or less constant while a slightly increasing trend is observable for the share of top 50 firms in the total sales. Similarly, the HHI show a consistent upward trend till 2009, while in 2011 there is a substantial decline, with a positive turnaround in the following year.

In the changing global scenario, after the gradual dismantling of bilateral MFA quota and integration of textile and clothing trade in the WTO framework, when the domestic firms have to face severe competition from the low cost international firms, the natural outcome is the emergence of price, cost and quality competitiveness. Naturally, in the domestic front only those firms having such competitiveness accrued from scale-related advantages can survive and the smaller and non-profitable firms have to exit the market. The consequence of the situation is nothing but the increased concentration, which is revealed in our study. This can lead to two possible outcomes. First, the higher concentration and bigger firm sizes that can potentially benefit from the scale effects and technological advances, and therefore remain competitive in the face of steep competition from China, may offer better wages owing to complementarities and productivity growth. Second, the contraction of many medium and small enterprises previously in business would evidently create pressure on the labor market pushing the wage negotiations to a lower level and therefore reducing the aggregate wage bill for all firms taken together. The detailed econometric specification for *j* firms over *t* time periods defining the panel (with firm fixed effects), is given by:

$$AW = \alpha + \beta_1 Exports + \beta_2 SALES + \beta_3 NFA + \beta_4 PAT + \beta_5 Capital + \beta_6 (Exports * Capital) + \beta_7 (Exports * NFA) + \varepsilon_{it} \quad (1)$$

where, AW is the aggregate wage bill and the remaining variables are defined above, while (β_6, β_7) are coefficients of the interaction terms used in our model. Our results should additionally serve to empirically verify a recent proposition (see, Marjit, Kabiraj and Mukherjee, 2009) that the MFA-quotas, however anti-competitive, favored better distribution of firms across developing and transition countries and that removal of the quota would lead to concentration in a few.

We have reported three sets of regressions within the ambit of the broad specification in equation (1) in Table 3. The results of the regression of the reported variables on total labor cost with capital and export-capital interaction term are presented in column 1 of Table 3. Similarly, the results of the regression with net fixed asset (NFA) and NFA-export interaction term with sales as one of the explanatory variable are presented in column 2 and those with NFA and NFA-export interaction term without sales are presented in column 3.

Table 2: Descriptive Statistics

Variable	Observations	Mean	Std Deviation
Labour cost	619	438.63	682.72
Export of goods	640	1751.94	2623.46
Export*k	705	1882180	1.18e+08
Net fixed asset	697	4569.67	7851.32
Profit after tax	697	365.907	1805.87
Sales	704	8110.93	12542.13
Total capital	696	556.14	765.87
Export*nfa	705	2.08e+07	1.18e+08

Data Source: Centre for Monitoring Indian Economy – Prowess Database

Table 3: Results of Panel Regression using Firm–Level Data

Dependent Variable: labor cost(salaries, wages, bonus, ex gratia)			
Variables	1	2	3
Export of goods	0.0357793***	0.0395847***	.059751***
	(6.90)	(7.35)	(10.21)
Export*k	-5.37E-06**		
	(-3.70)		
Net fixed asset	0.0166355***	0.0193136***	.0420933***
	(5.89)	(6.45)	(15.67)
Profit after tax	0.0324389**	0.0340987**	.0918143***
	(4.54)	(4.78)	(14.94)
Sales	0.0239314***	0.0238961***	
	(12.25)	(12.35)	
Total capital	-0.0624798*	-0.083787**	-.091072**
	(-2.11)	(-3.37)	(-3.21)
Export*nfa		-6.30E-07**	-9.26e-07**
		(-4.40)	(-5.76)
Constant	135.2114***	130.7036***	181.7428***
	(7.33)	(7.44)	(9.34)
R^2	0.7583	0.7624	0.7254

*** = 1% level of sig.; **= 5% level of sig; *=10% level of sig.

Data Source: Centre for Monitoring Indian Economy – Prowess Database

Relating trade and labor market outcomes, our firm-level empirical estimates show that doubling of export would raise the labor cost bill by 3.5% to 5.9% (estimates 1 and 3, Table 3). This is largely in conformity with Egger, Egger and Kreickemeir (2011), which shows that exporting firms offer a wage premium over non-exporting firms owing to better productivity. However, since the rise in capital stock lowers employment and the wage bills, the rise in exports due to capitalization would also lower the total labor cost bill. This is what the interaction between export and capital (*Exports*K*) suggests for estimate 1 in Table 3. With the same reasoning, a rise in exports attributed to a rise in NFA significantly decreases the labor cost bill (as illustrated by the negative sign of the interaction term, *Exports*NFA*) although a standalone rise in

NFA of the firms seems to push firms towards allocating more resources on labor. The influence of other firm-specific variables like value of sales and profit after tax are positive as expected. All of these results are statistically significant.

2.1 The State-Level Analysis

The firm-level panel is supplemented by a state-level panel between 1998 and 2008 (using the data from Annual Survey of Industries, Government of India) to capture the more aggregative impact of the withdrawal of MFA on the level of labor earnings in various states and Union Territories (centrally administered region) of India. This should serve to document whether the aggregate labor income diverges across states (or regions) thereby offering some indication of regional inequality. We have chosen 11 major textile producing states of India which contributes to almost 80% of the total production of the country in order to study the impact of trade liberalization on regional disparity. One of the stark results of this panel state fixed effects regression is that the aggregate state level wage bill falls as the profit level rises for the industry. This seems to have been of recent concern even with the Reserve Bank of India, which echoes that the wage share tends to fall in India despite growth in certain industrial sectors (RBI Bulletin, August, 2013). This may be possible either with greater capitalization replacing labor or retrenchment of labor from the organized units. Movement of labor into less organized units, where wages are determined outside the scope of organized labor market could also be dominant in some of the states. This is also the basis of our theoretical generalization presented in section 3 below. For other standard variables of interest, namely, the number of factories (*log of factories*), industry-wide profit (*profits*) or the net income

(*Net income*) from all factories located in a state, the change in total labor income (*lnwage*, i.e., log of wages, and measuring the elasticity of wage change) is positive and significant.

Table 4: Results of Panel Regression using State-Level Data

Dependent Variable: lnwage	
Variables	1
log factories	.2878186** (2.21)
profits	-4.16e-06** (-2.21)
Net income	5.60e-06*** (4.62)
Constant	7.840393*** (9.62)
R^2	0.7568

*** - 1% level of sig.; ** - 5% level of sig

Data Source: Annual Survey of Industries, 1998-2008

Next we focus on the impact of such changes on regional disparity in India (by using a measure of regional difference in labor income), as reflected by the variations in the number of factories, firm-level profits and sales across the states between 1998 and 2008. In order to capture the variation in number of factories across the states over the years, we have calculated the mean-deviation of the logarithmic values of the number of factories. The variations in another explanatory variable, sales, is also calculated in the same manner. However, as some firms earn negative profits in some years, such that logarithmic value of profits lead to data attrition, we retain the nominal values of profits only. The results are available in Table 5.

Table 5: Results of Panel Regression on State – Level Data for Regional Disparity

Dependent Variable: mean deviation of lnwages	
Variables	1
mean-deviation of log factories	.4628484 (3.99)**
mean-deviation of log sales	.6067685 (6.66)***
mean-deviation of profit	5.67e-07 (0.74)
Constant	-.0008617 (-0.05)
R^2	0.5313

*** - 1% level of sig.; ** - 5% level of sig

Data Source: Annual Survey of Industries, 1998-2008

As Table 5 shows, the regional disparity as reflected by the variation in the number of factories located in different states across India have a positive and significant impact on regional differences in total labor income across the states. Directionally similar and stronger impact is observed for regional variation in values of sales of the industry, whereas the variation in profit has insignificant impact on variation in log wages. The results show that regional wage disparity has strong relation with regional disparity in firm-concentration at the level of the industry as measured by the number of factories as well as with regional disparity in sales across the states. The regional concentration of activities therefore additionally reinforces the firm level observations on concentration in the post-MFA regime in India.

3. A Theoretical Model

In view of our empirical results at the level of the firms, we offer a model where the withdrawal of quota previously enjoyed by the exporters of the developing country constitutes the main trade policy change. We discuss the aggregate impact of the policy reforms on the employment and wage movements in two sectors that represent the economy.[1] Consider a small open developing country that produces two commodities at world prices $(P_j^*, j = X, Y)$. X is an import competing good protected by a tariff and Y, an export commodity receiving the benefits of protection via bilateral quotas. X uses a relatively capital-intensive production technology. Commodity Y represents relatively low-skill intensive goods ranging from agricultural commodities, mining products to semi-skilled manufacturing such as garments. Owing to the benefit of a quota, Y technically enjoys a subsidy at a rate 's' on unit price. Thus, countries which under free trade price one unit of the commodity at P_Y, now face a price $P_Y^* = P_Y(1+s)$, and yet there should be no price effect. In reality, since many other countries also enjoy such benefits, quota wars would not allow monopolization of global markets. The production and trade basket stands in direct contrast with that in developed countries where the import competing sector is relatively more labor intensive and the export sector produces high-tech commodities with intensive use of skill and capital. In addition, developed countries have low share of unskilled workers and insignificant informal sector compared to developing countries. These are important differences for our model.

[1] A related analysis involving firm-specific impact of trade reform and the distribution of firms according to size and scale of operations shall be taken up in future analysis.

The production functions in both sectors are homogeneous of degree one in inputs, and use labor (L) and capital (K), both non-specific and mobile across sectors. [2] Full-employment of factor inputs is maintained. Commodity markets are perfectly competitive. All workers in sector X are part of a labor union, which fixes their wage at $\overline{w}$ and above the market clearing level, w.[3] Per unit capital earns r in equilibrium via perfect mobility across sectors. Those who do not get a job in sector X join sector Y and the wage adjusts in order to accommodate such labor movements.

In the absence of skill heterogeneity this hints at the possibility of job rationing (see Marjit, 2003). This is also common in capacity constrained poor countries leading to large labor participation in the unorganized sector. Earlier, we have alluded to some anecdotal evidence whereby a portion of the textile and clothing manufacturing units belong to the unorganized sector.

Algebraically, these features are captured by the following production functions reconstructed into corresponding profit functions in equations (3) and (4).[4]

$$X = X(L_X, K_X), \qquad Y = Y(L_Y, K_Y) \tag{2}$$

where, $Z_j > 0, Z_{jj} < 0, \; Z_{js} > 0; \; j, s = (L, K), j \neq s, \quad Z = X, Y, \; H_j = 0.$

The symbols have usual meanings and H_j stands for the Hessian determinant. Under small country assumption commodity prices are exogenous. We hold the price of commodity X as the *numeraire*, i.e., $P_X^* \equiv 1$ and all other prices are expressed in terms of the *numeraire*. Thus, price of commodity Y, with s as the rate of quota-related subsidy is

[2] The proposed structure suits medium to long run time dimensions.
[3] Marjit, Kar and Maiti (2009) determine the unionised wage endogenously under similar production structures. We bypass this procedure to concentrate on the main theme.
[4] See Batra and Ramachandran (1980) and Batra (1986) for previous use of this structure.

given by $p^* = p(1+s)$. Total factor endowments are $(\bar{L} = L_X + L_Y, \bar{K} = K_X + K_Y)$. Therefore,

$$\pi_X = X(L_X, K_X)(1+t) - \bar{w}L_X - rK_X \quad (3)$$

and $$\pi_Y = p(1+s)Y(L_Y, K_Y) - wL_Y - rK_Y \quad (4)$$

First-order conditions for profit maximization from (3) and (4) and full employment conditions yield

$$X_L(L_X, K_X) = \bar{w} \quad (5)$$

$$X_K(L_X, K_X) = r = p^*(1+s)Y_K(\bar{L} - L_X, \bar{K} - K_X) \quad (6)$$

$$p(1+s)Y_L(\bar{L} - L_X, \bar{K} - K_X) = w \quad (7)$$

Equations (5) – (7) determine (L_X, K_X) and *w*. These are determined from five parameters, *p**, *s*, $\bar{L}$, $\bar{K}$ and $\bar{w}$. Substituting equilibrium values of (L_X, K_X) in (6) we get the equilibrium value of *r*.

Drawing from the example of the withdrawal of MFA (as well as multilateral pressure on lifting of other subsidies that developing countries usually provide to their agriculture and primary goods sector) let us consider a reduction in '*s*'. This is equivalent to a fall in the international price of commodity *Y*. As price falls, demand for both capital and labor falls in *Y*. However, the other sector has not undergone any change and therefore the return to capital in *X* does not fall, especially with wage in sector *X* fixed from outside. Thus, return to labor in *Y* alone falls if unemployment has to be averted. The inter-sectoral wage inequality clearly rises owing to this effect.

For India and several other developing countries, the wage gap between the sectors that receive formal patronage or public support, and that between the informal

sectors, which usually accommodate workers by adjusting wages downward, has increased significantly in recent years. The existence of two-sided wage inequality across trading nations is also discussed in light of these findings (see Marjit and Kar, 2012; Beladi, Kar and Marjit, 2013).

However, this result can be generalized to simultaneous changes in the level of protection received by each sector of the economy. Since withdrawal of MFA coincided with further trade liberalization in various other sectors of the Indian economy, the comparison should be meaningful. To this end, we fully differentiate (5)–(7) and apply (ds, dt) signifying the price impact of the withdrawal of quota and a change in the tariff rate, on *Y* and *X*, respectively. Rearranging, we get equation (8).

$$\begin{bmatrix} (1+t)X_{LL} & (1+t)X_{LK} & 0 \\ (1+t)X_{KL} + p^*(1+s)Y_{KL} & (1+t)X_{KK} + p^*(1+s)Y_{KK} & 0 \\ -p^*(1+s)Y_{LL} & -p^*(1+s)Y_{LK} & -1 \end{bmatrix} \begin{bmatrix} dL_X \\ dK_X \\ dw \end{bmatrix} = \begin{bmatrix} -X_L dt \\ -X_K dt - p^* Y_K dt \\ -p^* ds \end{bmatrix} \tag{8}$$

where, $|A| = -(1+t)^2[X_{LL}X_{KK} - X_{LK}^2] - (1+t)p^*(1+s)[X_{LL}Y_{KK} - X_{LK}Y_{KL}]$

with $H_X = (X_{LL}X_{KK} - X_{LK}{}^2) = 0$, $|A| \gtrless 0, \; iff, \; (X_{LK}Y_{KL} - X_{LL}Y_{KK}) \gtrless 0$.

From Euler's theorem: $X_L L_X + X_K K_X = X$. Differentiating with respect to L_X,

$(X_{LL}L_X + X_{KL}K_X = 0) \; and \; X_{KL} = X_{LK} \Rightarrow (X_{KL} / X_{LL} = -L_X / K_X)$. And similarly for *Y*

leads to: $|A| = \left[(1+t)p^*(1+s)X_{LL}Y_{KK}\left(\frac{k_Y - k_X}{k_X}\right) \right] < 0$

where, $k_j = (K/L)_j \; and \; (k_Y - k_X) < 0$ by assumption.

Thus we can find out changes in (L_X, K_X) and *w* from (8). Employment level in *X* falls

with a fall in *s, if,*

$$\frac{dL_X}{ds} = \frac{1}{|A|}\left[X_L(1+t)X_{KK} + p^*(1+s)Y_{KK} - (1+t)X_{LK}X_K\right]\frac{dt}{ds} - \frac{1}{|A|}(1+t)X_{LK}p^*Y_K$$

such that, when *dt=0*, $\frac{dL_X}{ds} > 0$, *iff* $\frac{X_{KK}}{X_{LK}} < \frac{p^*Y_K}{X_L}$. (9)

Also, note that, $dL_X = -dL_Y$.

Since $\left[X_{KK} < 0\right]$ employment unambiguously falls in sector *X* when the subsidy is lifted in sector *Y*. This should be considered as a perverse outcome beyond the context of the partial equilibrium analysis pursued in the empirical section of this paper.

Next, let us look into the impact of the removal of subsidy on the use of capital in sector *X*. Here,

$$\frac{dK_X}{ds} = \frac{1}{|A|}\left[X_{LL}(1+t)X_K\frac{dt}{ds} + p^*(1+t)X_{LL}Y_K + (1+t)X_{KL}X_L\frac{dt}{ds} + Y_{KL}p^*(1+s)X_L\frac{dt}{ds}\right]$$

Once again, if the tariff rate does not change,

$$\frac{dK_X}{ds} = \frac{1}{|A|}\left[p^*(1+t)X_{LL}Y_K\right] > 0, \text{ since}\left[X_{LL} < 0\right] \quad (10)$$

The impact is just the reverse for sector *Y*, because, $dK_X = -dK_Y$

(9) and (10) shows that a fall in subsidy when the tariff rate remains unchanged may lead to rise in employment and capital use in sector *Y* contrary to expectation. In fact, the results would continue to hold in (10) even if both tariff cut and removal of subsidy take place in this economy provided the capital-labor substitution in both *X* and *Y* are small at the margin $(X_{KL} = Y_{KL} \approx 0)$.

Finally, let us calculate the effect of *s* on the wage in sector *Y.*

$$dw = \frac{1}{|A|}\begin{bmatrix} (1+t)X_L\{-p^*ds(1+t)X_{KK} - p^{*2}(1+s)dsY_{KK}\} \\ +(1+t)X_{LK}\{-X_K dt - Y_k p^* ds\}\{-p^*(1+s)Y_{LL}\} \\ -X_L dt\begin{Bmatrix}\{(1+t)X_{KL} + p^*(1+s)Y_{KL}\}\{-p^*(1+s)Y_{LK}\} \\ +p^*(1+s)Y_{LL}((1+t)X_{KK} + p^*(1+s)Y_{KK})\end{Bmatrix} \end{bmatrix} \quad (11)$$

Therefore, when dt=0,

$$\frac{dw}{ds} > 0, iff \ \left[(1+t)X_L p^*(1+t)X_{KK} + p^{*2}(1+s)Y_{KK} + (1+t)X_{LK}Y_K p^{*2} Y_{LL}\right] < 0 \quad (12)$$

The condition in (12) is unambiguously true, meaning that a fall in subsidy would necessarily lower the return to labor in this sector. But once again, if the fall in subsidy is accompanied by other instruments of liberalization in this economy, then

$$\frac{dw}{ds} < 0, iff \ \frac{ds}{dt} > X_L\left(\frac{B_4 + B_3}{B_1}\right) + \frac{B_2}{B_1} \quad (13)$$

where, $B_1 = \left[(1+t)X_L p^*(1+t)X_{KK} + p^{*2}(1+s)Y_{KK} + (1+t)X_{LK}Y_K p^{*2} Y_{LL}\right] < 0$.

$B_2 = (1+t)X_{LK}X_K p^*(1+s)Y_{LL} > 0$

$B_3 = \{(1+t)X_{KL} + p^*(1+s)Y_{KL}\}\{-p^*(1+s)Y_{LK}\} < 0$

and $B_4 = p^*(1+s)Y_{LL}[(1+t)X_{KK} + p^*(1+s)Y_{KK}] > 0$.

Equation (13) offers a very general condition which shows that simultaneous changes in (s, t) could even raise the wage in the export sector when the subsidy is lifted, if the relative change in the two rates exceeds a combination of changes in marginal productivities of capital and labor in the two sectors. In essence, it is possible that a reduction in subsidy hurts labor in sector *Y*, but a simultaneous fall in protection in sector *X* lowers demand for both capital and labor. Since wage does not change in *X*, *r* falls, and by perfect capital mobility between sectors, the rental return also falls in *Y*. If the fall in *r* is much stronger than the fall in $p^*(1+s)$, *w* must rise to reinstate equilibrium.

4. Conclusion

The firm-level empirical estimates relating trade and labor market outcomes show that doubling of export would raise the labor cost bill significantly. However, since the rise in capital stock lowers employment and the wage bills, the rise in exports due to capitalization would also lower the total labor cost. With the same reasoning, a rise in exports attributed to a rise in NFA significantly decreases the labor cost although any independent rise in NFA tends to push firms to allocate more resources to maintenance of the work force. The influence of other firm-specific variables like value of sales and profit after tax are positive and highly significant. Thus, it seems that in the post-MFA regime, Indian firms in the textile and clothing producing sector are increasingly catching up with international competitiveness but at the cost of higher industrial concentration at home for surviving the cost competition. The exportability of the firms has increased significantly and it has a positive impact on the aggregate labor income so long as the sector does not become highly capital-intensive.

For the state-level analysis, we conducted fixed effects panel regression showing decrease in aggregate wage bill when the profit level rose quite consistently for the same industry. This may be possible either with greater capitalization replacing labor or direct retrenchment of labor from the organized units – an outcome of greater concentration. For other variables of interest, namely, the number of factories or the net income from all factories located in a state, the change in total labor income is positive and significant. Further, regional variation in sales imparts positive impact on the wage dispersion over time. However, the variation in firm-level profit has little or no impact on variation in labor cost.

The empirical evidence provided in this paper motivated an analytical exercise. We developed a general equilibrium model of international trade, where the main concern was to accommodate the price impact of the withdrawal of quota. As we have argued at length, the prevailing system of quota under the aegis of the multi fiber arrangement offered a *de facto* protection to the exporters of clothing and garment located in developing countries. The quota in general helped the producers from the south with a constant market share regardless of the price competition. However, now that the quota is lifted, all countries must find their market share anew and here the role of prices become significant. The short model was aimed at capturing this precise effect. The withdrawal of quota translates itself into a fall in price facing the exporters from the south. The internal effects of this price fall are felt on the wage and rental rates charged on labor and capital, respectively. We showed that the dedicated effect of a quota withdrawal is unambiguously harmful for the labor although it is possible to have employment growth. The employment effect on the industry is largely counterintuitive, although quite clearly borne out in the empirical results. However, when related economic reforms are also initiated in the economy, the detrimental effect of fall in the price of the export good is no longer imminent. It is even possible that for low levels of marginal changes in the rate of substitution between capital and labor in the production of the two goods, the joint impact of quota withdrawal and import liberalization benefits domestic labor. In future we wish to extend the theoretical exercise in relation to the distribution of firms by size and observe the impact of quota removal for the aspect of concentration, when trade opens up possibilities of entry of foreign firms in such countries that had enjoyed comparative advantage for a very long time.

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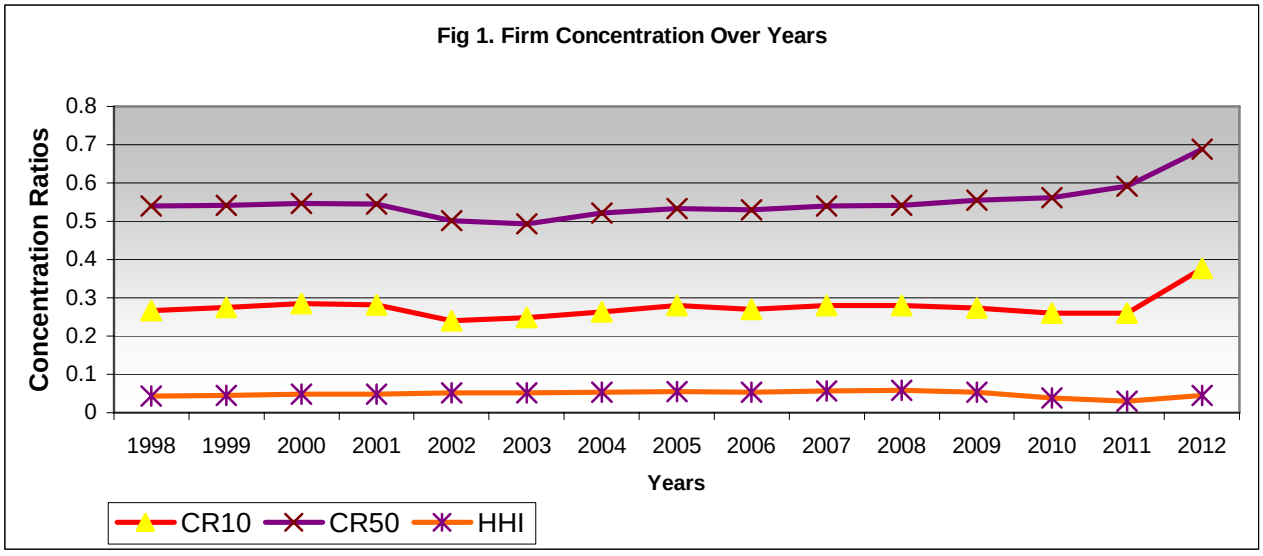
Appendix

Table 1A. Detailed Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
year	705	2005	4.323561	1998	2012
firmid	705	24	13.57429	1	47
labourcost	619	438.6296	682.7158	.2	5519.2
sales	704	8110.926	12542.13	344.5	121790.3
export	640	1751.94	2623.462	.1	27679.8
PAT	697	365.9066	1805.866	-4994.8	22326
NFA	697	4569.674	7851.319	25.5	85520.9
Capital	696	556.1447	765.8734	11.8	8262.8
Inter-exportNFA	705	2.08e+07	1.18e+08	0	2.37e+09
Inter-export-K	705	1882180	1.18e+07	0	2.29e+08



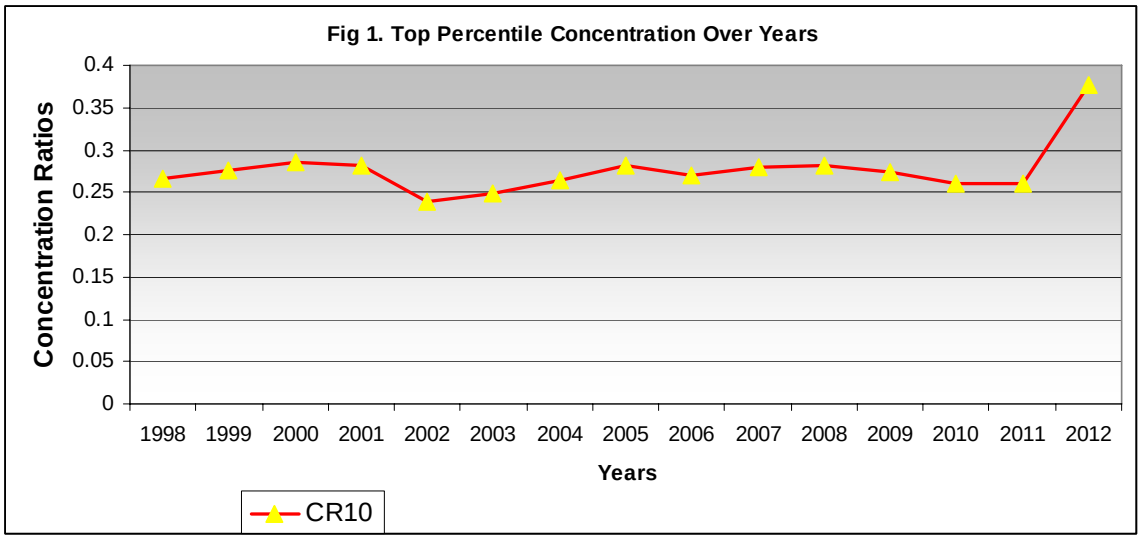


Fig 1. Top Percentile Concentration Over Years
Concentration Ratios
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
Years
CR10

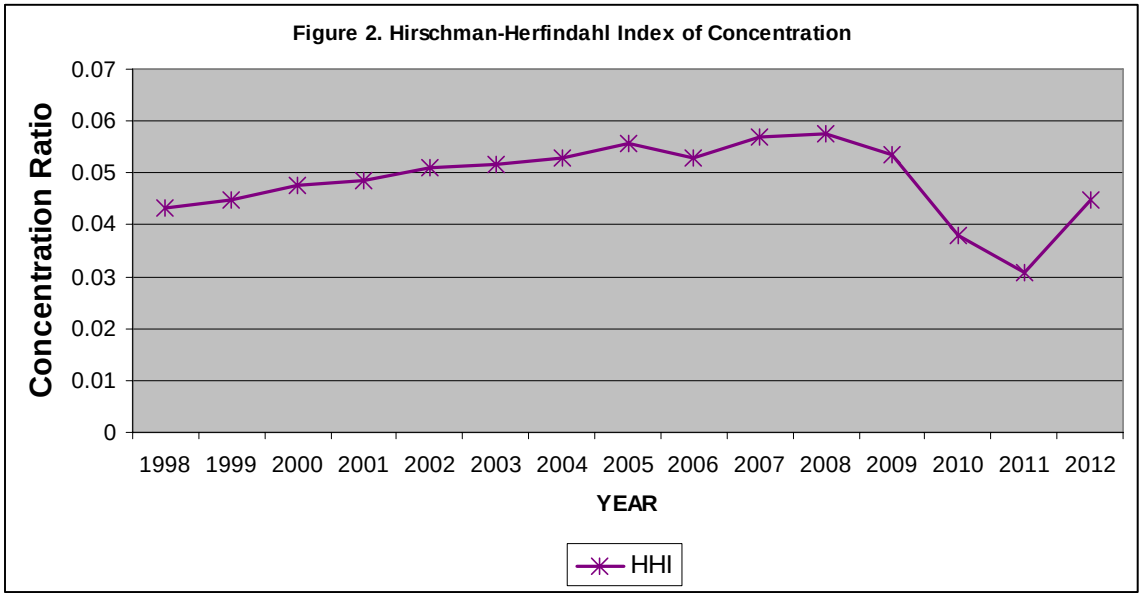


Figure 2. Hirschman-Herfindahl Index of Concentration
Concentration Ratio
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
YEAR
HHI