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Liberalized trade policy and inequality

Evidence from post-Multi-Fibre Arrangement India and some theoretical issues

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Abstract: The phased elimination of the Multi-Fibre Arrangement has been one of the most compelling trade policy reforms of the early twenty-first century, and has brought in significant changes in the industrial structures of the countries of the global south. The textile and clothing industry is the largest foreign exchange earner and the largest employment provider in India. We show that since the withdrawal of the quota, the industry has witnessed unprecedented concentration of firm-level activities, size-wise as well as state-wise, thereby creating some sort of inequality. Moreover, we also show that the aggregate wage bill of export-oriented firms in India actually rose during this period. However, the aggregate state-level wage bill falls as the profit level rises for the industry. We have also provided a brief analytical exercise to point out conditions under which such a global policy could well raise labourers' income and generate more employment.

Keywords: trade policy, MFA quota, employment, wage, inequality
JEL classification: F13, F14, F16, J30

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1 Introduction

The implications of international trade policies on a country's labour market 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 et al. 2007; Attanasio et al. 2004; Harrison and Hanson 1999). For explorations of the specific relationship between economic reforms and industry-level adjustments at the country level, important contributions are available in Aghion et al. (2008), while for the effects of trade reform on firm-level productivity in India, Topalova and Khandelwal (2011) offer substantial recent evidence. We deal with a specific trade policy in this paper. This involves the withdrawal of the Multi-Fibre Arrangement (MFA) 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 labour earnings of workers involved in the textile and related 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, textiles constitute the largest industry, which qualifies as the largest net foreign exchange earner. The contribution of this industry to gross domestic product is about four per cent. Its contribution to industrial production is about 14 per cent, and it contributes over 20 per cent of India's export earnings while adding only 2-3 per cent to the gross import bill. Between textiles and apparel, the apparel (clothing) industry is of more recent origin and produces exportables, primarily. Second, the textile industry directly employs more than 12.58 million workers and indirect employment is about 26 million (in 2005-06; employment dropped by 25 per cent compared to the 2004-05 fiscal year). Total employment is, however, distributed between formal and informal organizations, and is second only 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 textiles and apparel is still quite low as compared to other nations, including the Asian giants like China, South Korea, Singapore and Hong Kong. Unsurprisingly, the export promotion policies in India, which in recent times have become quite sensitive to changing global economic order and to the newly adopted rules, strongly support this sector. The Indian textile industry started to integrate fully with the World Trade Organization (WTO) rules from January 2005. The MFA was replaced by the ATC (Agreement on Textiles and Clothing), which incorporated various stages of phasing out quantitative restrictions at the beginning of the years 1995, 1998, 2002 and 2005, respectively. The impact of exogenous shocks, such as the withdrawal of MFA, on 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 understanding of the global labour market implications of the withdrawal of the MFA and supplement the few country-level studies that are already available in the literature. In this regard, Marouani (2009) shows that for Tunisia, the withdrawal of the MFA has lead to an increase in unemployment and wage inequality but has not significantly affected the main macroeconomic variables, since exchange-rate management took into account this expected shock. Ernst et al. (2005) forecasted some of these changes and found that China's exports to the quota-imposing regions would rise by 386.5 per cent, way above the 37.2 per cent rise for India. The actual differences are, however, much more 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 labour cost at the firm level varies with important parameters chosen for this analysis, in particular those which capture the effects of the withdrawal of the MFA on the labour market. This section also deals with regional, or rather, state-level

inequality in terms of aggregate wage earnings and employment arising from the abolition of the quota. 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 firms (each producing more than the mean output level for all years under consideration) between the years 1998 and 2012, all of which are exclusively engaged in the production and export of textiles and related commodities, from the most comprehensive database for firm-level information available in India (the Prowess Database, from the Centre for Monitoring Indian Economy).

We chose a number of variables (as in Equation (1)) from the firm-level panel to explain the movements in the *total labour cost* (comprising salaries, wages, bonuses and *ex gratia* payments). The explanatory variables include value of exports (*Exports*) of textiles 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 (Appendix Table 1 offers detailed descriptive statistics for these variables). The main hypothesis we wish to test is whether the total labour cost (or bill) borne by the firms has gone down due to the withdrawal of the MFA, thereby reflecting on the question of firms' viability in the post-MFA regime. 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 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; the 10-firm concentration ratio (CR10); the 50-firm concentration ratio (CR50); and the 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 Textiles 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 each of these years and calculated their shares in total sales at the industry level. To further refine this, we calculated the Hirschman–Herfindahl Index of concentration, which presents the sum of squares of the shares of the top 50 firms of the industry, for the entire period of our study.

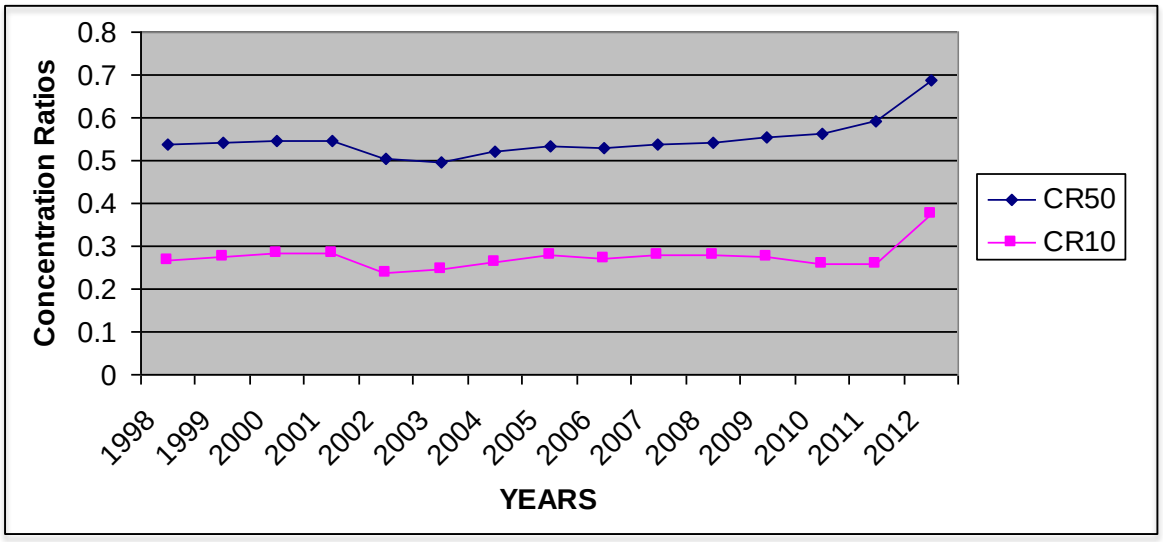
Table 1 and Figures 1 and 2 give a clear view of the pattern of change in the structure of the textile and clothing industry in the context of liberalization of textile trade (elimination of bilateral MFA quotas) and the substantial reform in domestic industrial policy exclusively for this sector. As 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 remained 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 shows a consistent upward trend until 2009, while in 2011 there is a substantial decline, with a positive turnaround in the following year.

Table 1: Total sales and concentration indices

Year	Total sales (in million INR)	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

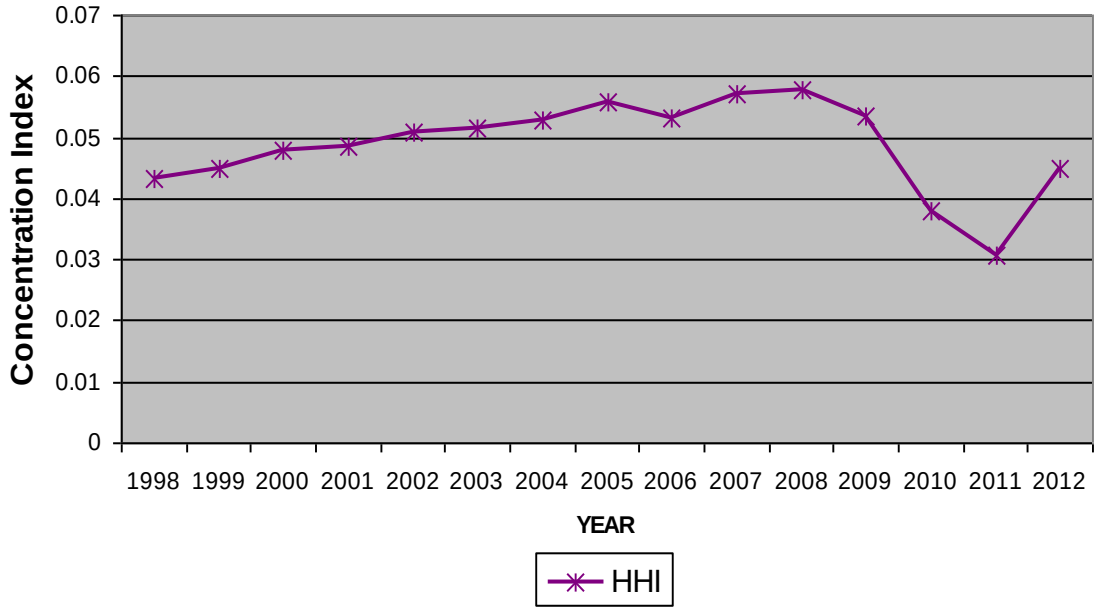
Source: Authors' elaboration based on data from CMIE – Prowess.

Figure 1: Top percentile concentration over the years



Source: Authors' elaboration based on data from CMIE – Prowess.

Figure 2: Hirschman–Herfindahl Index of concentration over the years



Source: Authors' elaboration based on data from CMIE – Prowess.

In the changing global scenario, after the gradual dismantling of bilateral MFA quotas and the integration of textile and clothing trade in the WTO framework, when domestic firms have to face severe competition from low-cost international firms, the natural outcome is the emergence of competitiveness in price, cost and quality. Naturally, on the domestic front only those firms which have this 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 simply increased concentration, which is revealed in our study. This can lead to two possible outcomes. First, the higher concentration and bigger firm sizes, which mean firms can potentially benefit from 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 the market, eliminating many small and medium enterprises that were previously in business, would evidently create pressure on the labour market, pushing wage negotiations to a lower level and therefore reducing the aggregate wage bill for all firms. 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 the coefficients of the interaction terms used in our model. Our results should additionally serve to empirically verify a recent proposition (see Marjit et al. 2009b) that the MFA quotas, however anti-competitive, favoured better distribution of firms across developing and transition countries and that removal of the quota would lead to market concentration in just a few firms.

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 assets	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

Source: Authors' elaboration based on data from CMIE – Prowess.

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

Relating trade and labour market outcomes, our firm-level empirical estimates show that the doubling of exports would raise the labour cost bill by between 3.5 per cent and 5.9 per cent (estimates 1 and 3, Table 3). This is largely in conformity with Egger et al. (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 bill, the rise in exports due to capitalization would also lower the total labour cost bill. This is what the interaction term for 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 labour 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 to labour. The influence of other firm-specific variables like the 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 covering years between 1998 and 2008 (data from the Government of India's Annual Survey of Industries) to capture the more aggregative impact of the withdrawal of MFA on the level of labour earnings in various states and union territories (centrally administered regions) of India. This should serve to document whether the aggregate labour income diverges across states (or regions), thereby offering some indication of regional inequality. We have chosen 11 major textile-producing states which contribute almost 80 per cent of India's total production in order to study the impact of trade liberalization on regional disparity. One of the stark results of this panel fixed effects regression is that the aggregate state-level wage bill falls as the profit level for the industry rises. This seems to have been of recent concern even to the Reserve Bank of India, which echoes that the wage share tends to fall in India despite growth in certain industrial sectors (Reserve Bank of India 2013). This may be possible either because of greater capitalization replacing labour or retrenchment of labour from organized units. Movement of labour into less organized units, where wages are determined outside the scope of the organized labour 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 factories*), industry-wide profit (*profits*) or the net income

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

Table 3: Results of panel regression using firm-level data

Dependent variable: labour 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 assets	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

Notes: ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Source: Authors' elaboration based on data from CMIE – Prowess.

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

Notes: *** and ** indicate significance at the 1% and 5% level, respectively.

Source: Authors' calculations based on data from the 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 labour 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 variation 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 values of profits lead to data attrition, we retain the nominal values of profits only. The results are shown in Table 5.

As these results show, regional disparity as reflected by the variation in the number of factories located in different states across India has a positive and significant impact on regional differences in total labour income across the states. Directionally similar and stronger impact is observed for regional variation in the value of sales of the industry, whereas the variation in profit has an

insignificant impact on variation in log wages. The results show that regional wage disparity has strong relations with regional disparity in firm concentration at the industry level 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.

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

Notes: *** and ** indicate significance at the 1% and 5% level, respectively.

Source: Authors' calculations based on data from the Annual Survey of Industries (1998-2008).

3 A theoretical model

In view of our empirical results at the firm level, we offer a model where the withdrawal of the quotas previously enjoyed by developing country exporters constitutes the main trade policy change. We discuss the aggregate impact of the policy reforms on 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 and 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 the unit price. Thus, countries which under free trade conditions 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 the monopolization of global markets. The production and trade basket stands in direct contrast to that of developed countries where the import-competing sector is relatively more labour-intensive and the export sector produces high-tech commodities with intensive use of skill and capital. In addition, developed countries have a low share of unskilled workers and an insignificant informal sector compared to developing countries. These are important differences for our model.

The production functions in both sectors are homogeneous of degree one in inputs, and use labour (L) and capital (K), both of which are non-specific and mobile across sectors.[2] Full employment of factor inputs is maintained. Commodity markets are perfectly competitive. All workers in sector

[1] A related analysis involving the 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.

[2] The proposed structure suits medium- to long-run time dimensions.

X are part of a labour union, which fixes their wage at $\overline{w}$ and above the market-clearing level, *w*.[3] In equilibrium, capital earns *r* per unit 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 labour 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 labour 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, which are reconstructed into the 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 the usual meanings and H_j stands for the Hessian determinant. Under the assumption of a small country, 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, the price of commodity *Y*, with *s* as the rate of quota-related subsidy, is given by $p^* = p(1+s)$.

Total factor endowments are $(\overline{L} = L_X + L_Y, \overline{K} = K_X + K_Y)$. Therefore,

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

and

$$\pi_Y = p(1+s)Y(L_Y, K_Y) - wL_Y - rK_Y \tag{4}$$

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

$$X_L(L_X, K_X) = \overline{w} \tag{5}$$

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

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

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

Drawing from the example of the withdrawal of the MFA (as well as multilateral pressure aimed at the lifting of other subsidies that developing countries usually provide to their agriculture and

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[3] Marjit et al. (2009a) determine the unionized 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.

primary goods sectors), 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 labour falls in sector *Y*. However, the other sector has not undergone any change and therefore the return to capital in *X* does not fall, especially with the wage level in sector *X* fixed from outside. Thus, the return to labour in sector *Y* alone falls if unemployment has to be averted. 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 the informal sectors, which usually accommodate extra workers entering the sector 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 et al. 2013).

However, this result can be generalized to simultaneous changes in the level of protection received by each sector of the economy. Since the 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 Equations (5)-(7) and also apply (ds, dt) (partial differentiation with respect to *s* and *t*), signifying the price impact of the withdrawal of the quota and a change in the tariff rate, on *Y* and *X*, respectively. Rearranging, we get Equation (8):

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

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 doing the same 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). The 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 $[X_{KK} < 0]$, 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 the subsidy on the employment 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,

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

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

Equations (9) and (10) show that a fall in the subsidy when the tariff rate remains unchanged may lead to a rise in employment and capital use in sector *Y,* contrary to expectations. In fact, the results would continue to hold in (10) even if both the tariff cut and the removal of the subsidy took place in this economy, provided the capital–labour substitutions 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*.

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

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 the subsidy would necessarily lower the return to labour in this sector. But once again, if the fall in the subsidy is accompanied by other instruments of liberalization in this economy, then

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

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 the marginal productivities of capital and labour in the two sectors. In essence, it is possible that a reduction in the subsidy would hurt labour in sector *Y*, but a simultaneous fall in protection in sector *X* lowers the demand for both capital and labour. Since the wage in *X* does not change, *r* falls, and, due to perfect capital mobility between sectors, the rental return also falls in sector *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 labour market outcomes show that doubling of export value would raise the labour cost bill significantly. However, since the rise in capital stock lowers employment and wage bills, the rise in exports due to capitalization would also lower the total labour cost. With the same reasoning, a rise in exports attributed to a rise in NFA significantly decreases the cost of labour, 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 textiles and clothing production 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 aggregate labour income as long as the sector does not become highly capital-intensive.

For the state-level analysis, we conducted a fixed effects panel regression which showed a decrease in the aggregate wage bill when the profit level rose quite consistently for the same industry. This may be possible either due to greater capitalization replacing labour or with direct retrenchment of labour from 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 labour income is positive and significant.

Further, regional variation in sales imparts a positive impact on wage dispersion over time. However, the variation in firm-level profit has little or no impact on the variation in labour 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 a quota. As we have argued at length, the prevailing quota system under the aegis of the MFA offered *de facto* protection to exporters of clothing and garments located in developing countries. The quota in general helped producers from the global south by giving a constant market share regardless of price competition. However, now that the quota has been 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 the quota translates into a fall in price facing the exporters from the global south. The internal effects of this price fall are felt on the wage and rental rates charged on labour and capital, respectively. We showed that the dedicated effect of a quota withdrawal is unambiguously harmful for labour, 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 the fall in the price of the export good is no longer an imminent threat. It is even possible that, for low levels of marginal changes in the rate of substitution between capital and labour in the production of the two goods, the joint impact of quota withdrawal and import liberalization may benefit domestic labour. In the future we wish to extend this theoretical exercise in relation to the distribution of firms by size, and observe the impact of quota removal on the aspect of concentration when trade opens up possibilities for the entry of foreign firms into countries that had enjoyed comparative advantage for a very long time.

Appendix

Appendix Table 1: 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	0.2	5519.2
sales	704	8110.926	12542.13	344.5	121790.3
export	640	1751.94	2623.462	0.1	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-export-NFA	705	2.08e+07	1.18e+08	0	2.37e+09
Inter-export-K	705	1882180	1.18e+07	0	2.29e+08

Source: Authors' calculations based on data from CMIE – Prowess.

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