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Trade Liberalization, Labor Markets and Imperfect Competition

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Trade Liberalization, Labor Markets and Imperfect Competition*

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Abstract

This paper looks at the recent empirical literature on the effects of trade reforms on firm level wages, employment and labor demand elasticities in import-competing sectors. The focus is empirical investigations using frameworks that allow for imperfect competition. Imperfect competition in product markets allows for changes in elasticities and markups through trade reforms and thus brings about additional effects on firm-level employment and wages. Further, there is the theoretical possibility of this change in product demand elasticity leading to a change in firm-level labor demand elasticity. These issues are investigated in Kambhapati, Krishna and Mitra (1997) and Krishna, Mitra and Chinoy (forthcoming). In this paper, I discuss the theory, methodologies and results of both of these papers. Further, I investigate the benefits of bringing in imperfect competition in the labor market into the analysis of the labor market impact of trade reforms and in that context discuss some of the recent literature.

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1 Introduction

The last two decades have witnessed major economic reforms in many developing countries. Trade liberalization has been the key element of these reforms. The gains from free trade in distortionless situations are well understood by any student of international trade. However, political constraints do not always allow the implementation of trade reforms. Within any society, there are gainers and losers from such reforms and there are obstacles to designing redistributive mechanisms that ensure sharing of gains from trade by all sections of society if and when the reforms are in place.

However, when these reforms somehow get implemented, detailed studies of how different social and economic groups are affected are extremely important. These studies are a pre-condition for the design of effective post-reform policies that ensure a more even split of the gains from trade or, at the very least, that try to heal the wounds of groups hurt by greater openness in trade.

A counterargument to the above in the case of developing countries is that these countries are labor-abundant (capital-scarce) and so more open trade benefits its more abundant factor, labor and hurts its scarce factor, capital through specialization along comparative advantage. Since ownership of capital is highly concentrated, it is the very rich who are hurt and the very poor who gain. Thus, free trade seems to be a wonderful way of reducing income inequalities in developing countries. So it appears

that there is not even the slightest need for caring about spreading the gains from trade or healing the wounds of these wealthy capitalists.

However, the story may not be as simple as described in a two factor Heckscher-Ohlin world. The real world is plagued by imperfections that include all kinds of distortions and frictions. These imperfections complicate the story and in their presence, theoretical arguments can be constructed where the poor, assetless workers in developing countries can be hurt by trade liberalization.

Rodrik (1997) and Slaughter (1997) have emphasized a new linkage between openness and labor markets: the possibility, particularly in imperfectly competitive contexts, for the elasticity of demand for labor to be higher in magnitude with greater openness. The link between factor demand elasticities and product market elasticities is directly established through Hicks' well known "fundamental law of factor demand" which states that "the demand for anything is likely to be more elastic, the more elastic is the demand for any further thing which it contributes to produce" (Slaughter, 1997). Since product market elasticities are likely to rise with trade liberalization, this means that, with greater trade openness, we should see an increase in labor demand elasticities as well.[1]

[1]See Hammermesh (1993) and Slaughter (1997) for a more detailed discussion. It should be emphasized also that the argument just stated can be made directly only in a partial equilibrium context. For a critical examination of this linkage between openness and labor demand elasticities in a general equilibrium context, see Panagariya (2000).

As Rodrik (1997) notes and as explained in Krishna, Mitra and Chinoy (forthcoming), rising elasticities have important consequences. These include the shifting of the wage or employment incidence of non-wage labor costs towards labor and away from employers, more volatile responses of wages and employment to labor demand shocks and the shifting of bargaining power over rent distribution in firms away from labor and towards capital. Thus, workers can be put under greater pressure relative to capitalists through trade liberalization.

Krishna, Mitra and Chinoy (subsequently referred to as KMC in this paper) attempt to investigate the link between between trade openness and plant-level factor demand elasticities empirically in a partial equilibrium, imperfectly competitive set up. First an econometrically implementable theoretical model of a firm operating in an imperfectly competitive context is specified and predictions are derived about the implications of changes in trade policy for labor demand elasticities. This is then tested using plant-level data from the Turkish manufacturing sector from a period when there were large scale changes in the level of trade protection (specifically, the trade reforms of 1984).[2]

Our analysis suggests that the linkage between greater trade openness and labor demand elasticities as suggested by the theory may be empirically quite weak: In the

[2]This same episode, using the same exact data set, was examined in the classic paper by Levinsohn (1993) which looked at the impact of trade reforms on industry markups and found strong support in the data for the hypothesis that greater openness leads domestic firms to behave more competitively.

vast majority of the industries we considered, we are unable to reject the hypothesis of no relationship between these variables. As we discuss in detail in the paper, this finding remains robust to changes in the type of labor considered (all production workers, overtime labor, externally contracted labor, female labor etc.) and quite robust to changes in specification as well.

In the presence of labor market frictions, trade liberalization may generate short-term costs borne mainly by workers who lose jobs in the shrinking, import competing sectors. These workers would ultimately be absorbed by the expanding export sectors. However, this process may be time consuming. Thus, empirically studying the effects of trade reforms on the levels and dynamics of industry-level and firm-level employment in the import competing sector is of considerable importance.

Surprisingly, most studies examining the impact of greater openness in trade on employment have found very negligible or no effect inspite of often a positive effect on wages. An explanation for this employment insensitivity provided by Kambhapati, Krishna and Mitra (1997) rests on the presence of imperfect competition in the product markets of the import-competing goods. Opening up the economy to foreign trade would raise wages through the Stolper-Samuelson effect as the demand for the labor-intensive exportable goods increases and the demand for the capital-intensive import-competing goods falls. This should have a negative effect on employment in the import sector. However, trade reforms also generate an opposing effect, often

referred to as the "pro-competitive effect" in the literature. This effect comes from the increased competition from foreign products which makes the demand faced by imperfectly competitive firms more elastic. In other words, a liberalized trade regime leads to more substitution possibilities due to a greater availability of or a fall in the domestic prices of imported goods. This in turn results in lower markups and thus higher output and employment for given factor prices, an effect opposite in direction to the Stolper-Samuelson effect.

Kambhapati, Krishna and Mitra (KKM) break down the impact of trade reforms into the above two effects and empirically identify them using firm level data from India. Employment in Indian import-competing firms does not show a change in trend or levels in the post-reform period. However, a panel study of firms clearly shows that employment is negatively related to wages as well as markups. Thus, the effect of trade reforms on firm level employment in import-competing sectors is ex ante unknown if the precise magnitude of the opposing effects of the reform on wages and markups is unknown.

There are other studies that try to incorporate imperfection in the labor market into the framework. These look at how employment and wages are affected in industries where there is the possibility of rent sharing with employers. Greater opennes in trade through effects on competition can affect the magnitude of these rents and thus can have significant effects on employment and the remuneration of the employees.

Similarly, labor market immobility might dampen the effects of trade on wages and employment at the firm level. In these contexts, I discuss papers by Revenga (1997) and Currie and Harrison (1997).

2 Does Trade Affect Labor-Demand Elasticities? [Krishna, Mitra and Chinoy (forthcoming)]

To demonstrate theoretically how changes in trade policy resulting in greater product market competition and larger product market elasticities could work their way to larger factor demand elasticities, and to establish theoretical underpinnings for the empirical work to follow, KMC work with a model of monopolistic competition, where each firm faces its own less than infinitely elastic demand curve and where there is assumed to be no strategic interaction between firms.[3]

Specializing to the case where the only inputs are labor, capital, materials and fuel in a Cobb-Douglas production function and letting w, r, m and f denote the logs of the wage rate, the rental rate, materials price and the fuel price respectively, each deflated by the industry-level average output price, the labor demand function is then derived as

$$l_{ijt} = \delta_0 + \delta_w w_{ijt} + \delta_r r_{ijt} + \delta_m m_{ijt} + \delta_f f_{ijt} \tag{1}$$

[3]This approximates a situation in which there are a large number of varieties and each firm is an infinitesimal player but has some power over the pricing of its product

where l is the log of labor demanded. Thus, the final estimating equation is

$$l_{ijt} = \delta_0 + \delta_w w_{ijt} + \delta_r r_{ijt} + \delta_m m_{ijt} + \delta_f f_{ijt} + e_{ijt} \tag{2}$$

where the error term e_{ijt} allows for random shocks to affect the firm's demand for labor. In KMC, it is shown theoretically both for this special case with four factor inputs as well as in the general case with n factor inputs that $\frac{\partial|\delta_w|}{\partial\in} > 0$ where $\in$ is the absolute value of the elasticity of output demand faced by a firm. This elasticity of demand increases in magnitude with trade liberalization and thus, theoretically, given the set up assumed, should result in an increase in the elasticity of labor demand, δ_w.

Equation (2) derived in the previous section is the basic estimating equation and is estimated separately for each industry (although results using data pooled across industries are presented and discussed later in this section as well). To take into account within-industry firm heterogeneity, both "fixed effects" and the "random effects" specifications are estimated. To capture the effect of change in trade policy on the parameters in (2), intercept and interactive trade reform dummies (which take the value of one for the post liberalization period) are introduced. KMC also experiment with year-specific intercept dummies (in place of the reform intercept dummy) to capture year-specific shocks common to all firms in an industry.

Labor demand elasticities and their changes in each of the ten industries, under the fixed effects and random effects specifications, are presented in Table I. The vast majority of the estimated elasticities (δ_w) lie within the range of -0.15 to

-0.75. Thus, these fall well within what Hammermesh (1993) has identified as being a reasonable range of values for labor demand elasticities. In eight out of ten cases, under both fixed effects and random effects specifications, the elasticity estimates are quite tightly estimated.

The parameter of particular interest here is elasticity change, i.e., the parameter corresponding to the wage variable interacted with the liberalization dummy - $\Delta\delta_w$ in Table I. Estimates of the changes in labor demand elasticities are small in magnitude and largely insignificant. In seven out of ten cases, under both the fixed effects and random effects specifications, the null hypothesis that the change in elasticity after the reforms is zero cannot be rejected at the 5 percent level or indeed in most cases at even a higher level of significance. The three industries where the null hypothesis of no elasticity change is rejected are Metal Products (381), Non-Electrical Machinery (382) and Electrical Machinery (383). In these cases the $\Delta\delta_w$ estimate is negative, implying that the absolute value of the own price labor demand elasticity goes up. However, in one out of these three industries, namely, Metal Products (381), Levinsohn actually found an increase in markup implying a reduction in the product demand elasticity perceived by plants in this industry. Overall then, it appears that in Turkey industries' labor demand elasticities are subject to friction and do not respond to changes in openness as predicted by the theory.

Alternative specifications were attempted as well: In order to take into account

the possible fixity of capital in the short run, (2) was estimated by dropping the terms corresponding to rental rate of capital. Time-specific intercept dummies (in place of the reform dummy) were included (in addition to the firm-specific effects) in our regressions. The results remain more or less the same with the estimates of own price labor demand elasticities, their changes and the associated standard errors all changing only negligibly.

Several issues regarding the validity of the estimation framework and the interpretation of the results arise. First is the familiar issue of possible simultaneity and correlation between the error term and the right hand side variables. The identifying assumption made by KMC clearly is that labor supplies facing each firm are perfectly elastic, i.e., that shifts in the labor supply curve, an assumption that is justifiable when disaggregated plant level are used. Further, the concentration of most of the plants (around 600 of them) in the Istanbul area rules out the possbility of any market power for the average firm/plant. Furthermore, introducing time specific-dummies in addition to firm-specific effects does not change elasticity and elasticity change estimates. The results with both these kinds of effects are negligibly different from those presented in Table I (Table II of KMC). Any aggregate demand or productivity shocks (which may simultaneously move labor demand and wage as noted earlier) are thus accounted for - taking care of the bulk of this endogeneity problem.

Other than lagged endogenous variables, there are no variables in the data set

that may be regarded as being exogenous. Using lagged variables as instruments is problematic due to the short length of our panel (four years). KMC experiment with the pooling of data across industries to use lagged variables as instruments. These results turn out to be qualitatively the same as the uninstrumented fixed and random effects results.

Finally, KMC note, as does Slaughter (1997), that even though a correlation between the wage and the error term will bias the elasticity estimates, there is no reason to expect the post-liberalization elasticity change estimates to be biased one way or the other. More precisely, there is no reason to expect the bias in the labor demand elasticity estimate to be different in one regime (post or pre-reform) than in the other. This is confirmed by Monte Carlo simulations in KMC's paper.

A second issue concerns that of timing and lagged responses. I As Hammermesh (1993) has noted, much of the adjustment in firm labor demand takes place within six months to a year. Thus, given that the Turkish data are annual, this is not a serious problem.

A third issue is that of constancy of parameters across firms is addressed by experimenting with a random coefficients (Hildreth-Houck) specification. The results remain the same qualitatively.

As is common in the literature, cross price elasticities (of labor demand) and their changes following the trade reform were not estimated with great precision.

For robustness (and also independent interest in variations in labor demand elasticities across worker types), the demand for female workers, contract workers and overtime workers were considered separately. The elasticities again were quite tightly estimated. However, as expected, their values are higher in magnitude than the ones for overall labor as substitution possibilities are higher when we look at specific kinds of labor than in the case of labor in general. Changes in elasticity are again mostly insignificant following the reforms. As mentioned earlier, pooling data across industries to use lagged variables as instruments and subsequently to introduce tariff and import penetration interactions in place of reform dummy interactions do not yield any qualitatively different results.

The finding that greater trade openness did not lead to greater labor demand elasticities in Turkey at first thought seems somewhat inconsistent with Levinsohn's (1993) finding that greater openness did lead to reduced markups (just as theory would predict). This is all the more puzzling since the markup equation estimated by Levinsohn and the elasticity equation estimated in KMC follow from the same set of first order conditions for profit maximization for a firm operating in an imperfectly competitive context:

$$\frac{\frac{\partial q}{\partial [labor]}}{\left[\frac{w}{p}\right]} = \frac{\frac{\partial q}{\partial [capital]}}{\left[\frac{r}{p}\right]} = \frac{\frac{\partial q}{\partial [materials]}}{\left[\frac{m}{p}\right]} = \frac{\frac{\partial q_{ijt}}{\partial [fuel]_{ijt}}}{\left[\frac{f}{p}\right]} = \mu \tag{3}$$

where μ denotes the industry markup, while w, r, m and f denote levels (unlike in

the previous parts of this paper where they denoted logs) of factor input prices and p is the output price. KMC are able to explain the source of the differences between their results and those of Levinsohn's to be the *imposition* of (3) being satisfied with equality across all factors in Levinsohn's paper. KMC's own re-estimation of Levinsohn's estimating equation allowing for markup coefficients to differ across factors indicates that this result does not hold factor by factor. It thus appears that it was the combination of input factors other than labor that generated his results. Thus, it is the average (across factors) wedge between marginal products and factor rewards that was estimated as the common markup in Levinsohn (1993) and shown to have declined. What KMC have shown is that this decline did not take place factor by factor. Changes in labor demand in particular do not seem to be playing a role in the drop in average markup results estimated by Levinsohn.

3 The Offsetting Effects of Trade Reforms on Import-Competing Employment [Kambhapati, Krishna and Mitra (1997)]

The standard argument under perfect competition is that trade reforms would lead to a contraction of import competing sectors (and an expansion of the exporting sectors) which would then hire fewer workers. Under imperfect competition, however, employment effects depend largely upon the change in the slope and position of the demand curve faced by individual producers. It is rather trivial to show that with

trade reforms, under imperfectly competitive conditions, employment could actually increase in import competing firms. Faced with a more elastic demand curve, some employers in import-competing firms may reduce their profit margins per unit output and instead produce more. This would have a positive effect on their demand for labor and this may at least to a certain extent offset the reduction in the demand for labor for the more standard reasons discussed above.

KKM start by estimating the following equation for the period 1989-1993, using a fixed effects specification to account for firm heterogeneity:

$$(L_{it}/L_{i89}) = \beta_0 + \beta_1(Trend) + \beta_2(Dum) + \beta_3(Dum * Trend) + e_{it} \qquad (4)$$

where i indexes firms and t denotes time. The "Trend" variable was set at 1 for the year 1989, 2 for the year 1990 and so on. "Dum" is the trade reforms dummy taking the value 1 for the post-reform period. "Dum*Trend" is simply the dummy term interacted with the trend variable. As evident from Table II, most of the estimates of β_2 and β_3 are insignificant indicating that the overall effects of the trade reforms on trends in and levels of labor demand at the firm level were quite insignificant.

KKM outline a simple model in which monopolistically competitive firms (endowed with Cobb-Douglas technologies) are atomistic in their demand for factor inputs (posses no monopsonistic power in the factor markets). Under the above assumptions (and to absract from factor-input substitution), KKM arrive at the following

firm-level demand for labor function (conditional on levels of other factor inputs) which is the first order condition with respect to labor:

$$l_i = a_0 + a_1 w + a_2 \theta + a_3 k_i + a_4 m_i \tag{5}$$

where, l denotes $ln(L)$ and k and m denote the natural logs of K and M respectively and θ is the price-marginal cost mark up. k and m themselves are endogenous and are also determined from the firm's profit maximizing conditions. The theory clearly says that $a_1$and a_2 should be negative and a_3 and a_4 should be positive. The estimating equation, therefore, is

$$l_i = \alpha_0 + \alpha_1 w + \alpha_2 \theta + \alpha_3 k_i + \alpha_4 m_i + \alpha_5 D + e_i \tag{6}$$

where and D is the liberalization dummy that takes the value of one in the post-reform period.

Note that liberalization will not change α_1 and α_2 as long as the Cobb-Douglas production function assumed does not change. Note further that in KKM w is the real wage with respect to firm-level price (proxied in KKM's estimation by industry-level price) and so the additional effect of industry-level average price (the prices of the rest of the firms for each infinitesimal monopolistically competitive firm) on firm-level demand is captured by the intercept term in KKM's estimation. In KMC, however,

demand is clearly specified as a function of the firm-level price as well as the industry level price. Since the firm price is endogenous, the labor demand function is clearly derived in KMC as a function of the real wage which is there explicitly with respect to the industry price. Since the real wage in the theory in KMC and KKM are quite different conceptually, the labor-demand elasticity in the former is a function of the product demand elasticity, while in the latter it is not.

Thus, the following changes are expected to take place:

1. An increase in wages (the Stolper-Samuelson effect) which would, *ceteris paribus*, reduce the demand for labor ($\alpha_1 < 0$).

2. A reduction in the markup, due to intensified competition (arising from more substitution possibilities) which would, *ceteris paribus*, cause producers to increase their demand for labor ($\alpha_2 < 0$).

In order to capture the quantitative effect of these opposing effects, we estimate the labor demand equation specified above. However, labor demand is a function of capital (K) and materials (M) which in turn are functions of labor demanded as can be easily seen by writing down the firm's first order conditions of profit maximization. This endogeneity problem is solved by instrumenting capital and materials. w, r and m, a time trend, the liberalization dummy, the tariff rates and the markup are assumed to be exogenous in our three-equation system (that consists of the factor demands or rather the profit-maximizing first-order conditions with respect to the three

factor inputs).[4] The exogeneity of markups is a strong asumption (made essential by data limitations) that is true only when a firm faces a constant elasticity demand function at any point in time.

The labor-demand equation was estimated by using data on firms from five different Indian industries. In order to capture the effect of heterogeneous behavior across firms, (5) was estimated by allowing for varying intercept terms across firms. The random effects regression (supported over fixed effects by the Hausman statistic) results are presented in Table III . First, from the table, it is clear that the labor demand is negatively associated with the wage rate. In developing countries, we would expect to see an increase in the real wage via the Stolper-Samuelson effect after a trade reform. This result implies a reduction in the amount of labor demanded in the import-competing sector and is the traditional argument regarding labor that emerges in any perfectly competitive trade model. Second and perhaps more interestingly, the regression results show a negative association between the demand for labor and markups, thus providing some empirical support for the theoretically suggested "pro-competitive" effects of trade reforms mentioned before. Thus, KKM's results suggest that trade reforms which lead to a reduction in markups, which would induce an increase in the demand for labor in import competing sectors would at least partially offset the reduction in labor demand caused by other factors.

[4]The system is then identified by both rank and order conditions.

4 Labor Market Imperfections and Other Effects of Trade Reforms on Wages and Employment [Revenga (1997) and Currie and Harrison (1997)]

There are other effects on trade policy on wages and employment if we allow for imperfections in labor markets in addition to those in output markets. The fact that trade reforms make product markets more competitive results in lower profits for domestic firms. This may have a negative effect on wages and employment in the import-competing sector if workers are unionized and can capture part of these rents. This is in addition to the straight forward negative effect of the downward shift of output demand and thereby of labor demand. Revenga (1997) shows using Mexican data that this was indeed the case there. Besides the negative impact through the standard channels, a significant proportion of the decline took place through the adverse effect on rents.

Her analysis was done in several steps. In the first step, she regressed firm-level wage on quasi-rents and the alternative wage (measured as the industry level average wage).[5] Another regression was run where the dependent variable was the quasi-rent and independent variables included a vector of trade policy variables and some other control variables. In further steps, reduced form wage and employment regressions

[5]Quasi-rent per worker was evaluated as (value of output - value of materials - rental costs - wage bill evaluated at the alternative wage rate)÷employment

with a vector of trade policy variables among other variables on the right hand side are run. Combining the results of all these regressions, Revenga is able to break down the negative effect of trade policy on wages and employment into effects through the rent sharing and other channels.

Using firm level data from Morocco, Currie and Harrison (1997) find that employment and wages generally were not affected by trade reforms. They then empirically investigate two theoretical possibilities. The first is that there are barriers to labor mobility - a labor market imperfection. The second is that trade results in more elastic product demand and smaller markups as well as induces higher productivity through a pro-competitive effect. All these have positive effects on employment which can counter the standard negative effects on an import-competing firm. Modifying the growth accounting equation to allow for imperfect competition, Currie and Harrison are able to estimate the effect of trade policy (tariffs and quotas) on markups and productivity growth. They find that reduction in protection led to lower markups and higher productivity growth, thus showing evidence of a channel that has positive effects on employment. Labor market imperfections on the other hand do not seem to be important.

5 Conclusion

This paper looks at the recent empirical literature on the effects of trade reforms on firm level wages, employment and labor demand elasticities in import-competing sectors. The focus is empirical investigations using frameworks that allow for imperfect competition. Imperfect competition in product markets allows for changes in elasticities and markups through trade reforms and thus brings about additional effects on firm-level employment and wages. Further, there is the theoretical possibility of this change in firm-level product demand elasticity leading to a change in firm-level labor labor demand elasticity. These issues are investigated in Kambhapati, Krishna and Mitra (1997) and Krishna, Mitra and Chinoy (forthcoming). In this paper, I discuss the theory, methodologies and results of both of these papers. Further, I investigate the benefits of bringing in imperfect competition in the labor market into this framework and in that context discuss some of the recent literature.

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Table I: Own Price Labor Demand Elasticity Estimates: Fixed Effects and Random Effects

ISIC	Fixed Effects		Random Effects	
Code	δ_w	$\Delta\delta_w$	δ_w	$\Delta\delta_w$
341	-0.66 (0.10)	0.04 (0.11)	-0.51 (0.10)	0.07 (0.12)
351	0.02 (0.17)	-0.02 (0.18)	0.014 (0.02)	-0.02 (0.18)
352	-0.43 (0.05)	0.02 (0.05)	-0.34 (0.06)	0.01 (0.06)
361	-1.03 (0.11)	0.18 (0.15)	-1.00 (0.12)	0.20 (0.15)
372	-0.94 (0.05)	0.11 (0.10)	-0.9 (0.06)	-0.15 (0.10)
381	-0.63 (0.05)	-0.10 (0.05)	-0.53 (0.05)	-0.11 (0.05)
382	-0.57 (0.06)	-0.12 (0.07)	-0.49 (0.06)	-0.14 (0.06)
383	-0.56 (0.06)	-0.14 (0.06)	-0.42 (0.06)	-0.18 (0.06)
384	-0.53 (0.10)	-0.1 (0.09)	-0.24 (0.11)	-0.14 (0.11)
385	-0.33 (0.09)	-0.06 (0.10)	-0.06 (0.10)	-0.04 (0.10)

Note: Figures in parentheses are standard errors

Table II: Employment Trends in India

Estimating Equation:

$$(L_{it}/L_{i89}) = \beta_0 + \beta_1(Trend) + \beta_2(Dum) + \beta_3(Dum * Trend) + e_{it}$$

Industry	β_1	β_2	β_3
Overall	0.13*	7.03	-0.77
Diversified	0.21	7.37	0.09
Electrical Machinery	0.05	20.48	-0.21
Non-electrical Machinery	0.04*	2.72	-0.30
Electronics	0.46*	-32	-0.34
Transport Equipment	0.07*	-1.75	0.02

Note: * indicates statistical significance at the 5 per cent or lower levels.

Table III: Labor Demand, Wages and Mark-ups

Estimating Equation: $l_{it} = \alpha_0 + \alpha_1\omega + \alpha_2 \ln\theta + \alpha_3 k_{it} + \alpha_4 m_{it} + \alpha_5 D + e_{it}$

	Overall	Electrical Machinery	Non-electrical Machinery	Electronics	Transport Eqipment
Wage	-0.99*	-0.68*	-0.84*	-1.06*	-0.85*
Mark-up	-0.54*	-0.88*	-0.55*	-0.19	-0.67*
Liberalization dummy	0.32	0.04	0.09	-0.04	0.02
R^2	0.63	0.67	0.67	0.57	0.63

Note: * indicates statistical significance at the 5 per cent or lower levels.