Trade Liberalisation and Labour Demand Elasticities: Empirical Evidence for Pakistan

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I. INTRODUCTION

Trade has predominantly contributed in the development of world economies for more than mere agricultural development and industrialisation. Trade involves many regions across the globe. The more the regions involved, the more will be the benefits. Trade is an interaction between economies for the exchange of goods, services, skills, knowledge and expertise, which is required for bringing in the desired changes like increase in the availability of choices, reduction of extreme poverty, and enhancement of physical and mental capability.

As the wave of market oriented moves has spread over the economic sphere, global trend has also been witnessed in the liberalisation of capital account, foreign exchange, credit, domestic consumption and trading sector of many countries. The concept, which has been predominantly emphasised by the economies, is that of "trade liberalisation", which has become the key element of any development policy since late 1970s after the fundamental change in the economic policy at global level. The concept of trade liberalisation stems from Neo-liberalism thinking that has advocated market oriented economic reforms for social order and economic prosperity that aims to improve efficiency and stability in the economy. Trade liberalisation process can be defined in many different ways. In the words of Krueger (1978), "any policy, which reduces the anti export bias will lead towards liberalisation of trade and reduction in import license premium is the fundamental step towards liberalised trade regime".

A new explanation of trade liberalisation provided by Edwards (1993), describes a liberal trade regime as one, in which all trade distortions including import tariffs and export subsidies are completely eliminated. The profitability of

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liberalisation can only be confirmed if its positive effects proliferate in the economy. In this regard argument in favour of trade liberalisation is that the process leads to higher growth, at the national and international level. As Krueger (1978) states:

> "Trade is not an end in itself but a means of exchange to direct resources to their most efficient use. Trade liberalisation facilitates economic growth rate, resulting in higher income and improved standard of living through two channels. Firstly, there is direct impact that operates through dynamic advantages including higher capacity utilisation and more efficient investment projects and secondly through promoting the performance of export growth and increasing productivity which is the indirect impact".[1]

As liberalisation policies remove the restrictions on trade between countries, producers have access to inputs to produce more efficiently, new overseas markets are opened to exporters and opportunities are broadened for existing export industries. There is also reallocation of resources according to comparative advantage and large-scale operations flourish in the field of greater economies of scale.

The formation of World Trade Organisation (WTO), in 1995 provided impetus to the process of trade liberalisation. It provides a platform for the negotiation to countries for trade related dispute settlement. The basic purpose of the institute is to play a role of facilitator in the process of liberalising the trade and other trade related aspects. A remarkable difference persists among different countries in acquiring gain from liberalisation of trade. East Asian countries moved towards an outward orientation strategy of development from import substitution and government controlled development strategy by mid 1960s.[2] Due to the alteration in development strategies, not only Gross Domestic Product growth rates and exports rose dramatically, living standard also improved and they maintained their sustainable development in 1970s after the first oil shock and in debt and recession years of the early 1980s. Per capita income in 1990s was four to five times higher than it had been in 1960s. Annual growth rates of per capita income from 1965-1990 for Hong Kong, Korea, Singapore and Taiwan were 6.2 percent, 7.1 percent, 6.5 percent, and 8.1 percent respectively [Behrman and Srinivasan (1995)].

Over the last two decades a number of developing countries have moved to liberalise their trade regimes. Proponents of this liberalisation typically argue that one of the chief beneficiaries of greater openness to trade are the workers in these countries. In particular, given abundant supplies of labour, trade liberalisation encourages producers to reallocate output toward labour-intensive goods in which developing countries have abundance. Depending on conditions in labour markets,

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[1]c.f., Edwards (1993).

[2]From mid-1950s, Taiwan provided various incentives to its export sector for the encouragement of exports. Hong Kong was a virtual laissez-faire economy. Korea applied export-oriented regime in early sixties, and Singapore started its impressive growth breaking away from Malaya in mid-sixties.

the resulting increase in the demand for labour translates into some combination of an increase in employment and/or wages. While the logic of this argument is fairly compelling and is generally supported by the experience of the early liberalised—the newly industrialised economies of East Asia (Hong Kong, Korea, Singapore and Taiwan)—more recent episodes of trade liberalisation appear not to have been associated though with large improvements in prospects for the typical worker [Robbins (1996); Wood (1997)].

The impact of international trade on the labour market is not only a problem of absolute levels: it is also worth evaluating the modifications induced in the functioning of the labour markets. In particular, as argued by Rodrik (1997), the strengthening of competition in goods market may increase the sensitivity of factor demand. Proponents of trade liberalisation generally argue that a liberalised regime is likely to have a favourable impact on employment in developing countries. According to *Human Development Report* (1995) workers stand to gain from trade liberalisation on the following counts:

(1) Trade Liberalisation leads to cheaper imports. Apart from increasing consumer choices it may allow reallocation of production factors towards higher productivity activities.

(2) Trade opens up a much larger market and frees workers from the constraints imposed by domestic demand. Reduction in trade barriers and increased international demand fuels growth in the sectors where a country is competitive. High growth of these sectors increases employment, and in most cases, increases the real wage rates.

(3) Apart from these static gains there are dynamic gains from free trade. A liberalised trade regime enables a country to expand its domestic capacity by investing in human and physical capital, and it allows it to go up the value chain by shifting from low-value products to higher-value exports. Free trade and access to international market helps this transition by allowing the benefits of scale economies. This not only increases employment opportunities but also allows the workers to move from low-skilled to high-skilled jobs.

There are various factors that may explain the apparent divergence between the expectations of liberalisation advocates and the recent evidence. For instance, suppose that trade liberalisation leads to an inflow of new technologies from abroad. To the extent that new technologies are increasingly skill-biased, growing evidence suggests in the case that the recent episodes of trade liberalisation may lead to an increased demand for workers, but essentially the small minority with relatively high skills [Wood (1997)]. Alternatively, the available evidence may be incomplete in important ways. For example, it is widely acknowledged even among proponents of trade liberalisation that the short run effects of trade liberalisation are likely to be

adverse for labour in the aggregate. And it is required to work out long run effects also.

Objectives of the Study

This study is intended to investigate the impact of trade liberalisation on the labour market in Pakistan. An attempt is made to estimate the effect of trade liberalisation on the labour demand elasticities for the manufacturing sector of Pakistan, using a panel data approach for the year 1970-71 to 1995-96 for 24 selected industries.[3] It is expected that trade openness might induce an increase in the employment generation. It is also expected to increase the labour demand elasticity *vis á* scale effect due to the increased competition on the output market and *vis á* substitution effect generated by expanding a firm production possibility set to include additional input in manufacturing sector of Pakistan. A labour demand equation is obtained from the solution of a firm's cost minimisation problem and the Generalised Method of Moments (GMM) is applied to estimate the model.

Organisation of the Study

The rest of the paper is organised as follows. The second part deals with the review of previous studies. Third part provides a review of historical background of trade liberalisation in Pakistan. Fourth part provides the theoretical background, model specification and estimation strategy. Fifth part presents detail about data. Sixth part provides the results and interpretation. The last part concludes the paper.

II. LITERATURE REVIEW

The trade-labour linkage that has received some attention in recent years is the impact of trade on labour demand elasticities. The importance of this element of labour-market impact of trade was first emphasised by Rodrick (1997). He argued that trade makes the demand for labour more elastic which in turn leads to larger employment and wage shocks as a result of given vertical shifts in labour demand curve (arising from shocks to productivity or to output demand). The workers are expected to be placed under greater pressure as a result of trade liberalisation, through this channel. However, the vast majority of empirical literature has mainly a developed country focus. In contrast, the linkages between trade and labour markets are yet to be explored thoroughly in the context of developing countries.

Using industry-level data disaggregated by states, Ramaswami (2003) find a positive impact of trade liberalisation on labour-demand elasticities in the Indian manufacturing sector. These elasticities turn out to be negatively related to protection

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[3]The recently released Census of Manufacturing Industries (CMI) 2000-2001 is expected to yield updated empirical evidence in investigating the linkage between trade liberalisation and labour demand elasticities and to include the recent data will be the next step in our research plan.

levels that vary across industries and overtime. Furthermore, they find that these elasticities are not only higher for Indian states with more flexible labour regulations; they are also impacted to a larger degree by trade reforms. Finally, they found that after reforms, volatility in productivity and outputs gets translated into larger wage and employment volatility, theoretically a possible consequence of larger labour-demand elasticities.

A study by Giovanni, *et al.* (2002) concentrated on the measurement of constant output own-price labour demand elasticity while evaluating the impact of globalisation. A labour demand equation is obtained from the solution of a firm's cost minimisation problem. In this specification, a trade variable is included, both in interaction with the relative wage and alone as a demand shifter. This model is estimated using an industry-year panel for a number of industrialised countries, including major European countries, Japan and the US over the period 1970-96. Employment adjustment costs are accommodated by estimating a dynamic specification. The findings suggest significant positive effect of trade on labour demand elasticity only for France and the U.K. The findings state that increasing elasticity over time in absolute term for all sectors is observed for the UK and the US and decreasing for Italy, Japan and Spain. A mixed picture is obtained for France in which for only a subset of sectors (transport, traditional and chemical) the elasticity increases in absolute value.

Slaughter (2001), adopting a two-stage approach on an industry-year panel from 1961 through 1991 for the United States, provides mixed support to the view that trade contributed to increased elasticities. In the first stage, Slaughter finds that demand for production labour has become more elastic in manufacturing overall and in five of eight industries within manufacturing; the same is not true for non-production labour. In the second stage, when estimated elasticities are regressed on a set of trade variables and industry dummies are included, Slaughter finds many significant coefficients, with the expected signs. However, in a number of cases, these predicted effects disappear when time dummies are introduced. For production workers as well as for non-production workers, time results to be a very strong predictor of elasticity pattern. In sum, there appears to be a large unexplained residual for changing factor demand elasticities.

This approach has also been followed by Krishna, *et al.* (2001) and Fajnzylber and Maloney (2001), finding however no support to the conjecture of more-elastic labour demand in response to trade liberalisation. Using Turkish plant level data spanning the course of dramatic trade liberalisation, Krishna, Mitra and Chinoy (2001) investigate empirically the link between trade openness and factor demand elasticities. Their analysis suggests that the putative linkage between greater trade openness and labour demand elasticities may be quite weak. They explain this weakness by the variety of frictions that affect the labour demand decisions of firms.

Only very mixed support and no consistent patterns for the idea that trade liberalisation has an impact on own wage elasticities also emerges in the study by Fajnzylber and Maloney (2001). They used establishment level data to provide consistent dynamic estimates of labour demand functions for three Latin American countries (Chile, Colombia, and Mexico) across trade policy regimes. The results show that estimates of elasticities do change greatly in magnitude, if not significantly so, over time and that comparisons across countries should take this into account when attempting to make inference about the flexibility or efficiency of labour markets.

III. HISTORICAL BACKGROUND OF TRADE LIBERALISATION IN PAKISTAN

Early trade liberalisation in the East Asian newly industrialised economies took place against a backdrop of rapid growth. Later, following the instability of the international economy in the late 1970s/early 1980s, several developing countries adopted rapid economic reforms including trade liberalisation, privatisation of state enterprises, deregulation of financial and capital markets, as well as product and labour markets, together with wide reform of the state. Prior to liberalisation, many developing countries had followed strong import substitution industrialisation strategies. In the last fifty years, inward oriented strategies were predominately applied in 1950s and 1960s in most parts of the world while outward oriented approach to development got appreciation in late seventies and late eighties in industrialist countries while some of the developing countries are still operating with the former strategy. Here a decade wise overview of Pakistan's policies regarding trade liberalisation is provided.

Early years of Pakistan's economy can be characterised by a weak industrial base, dominance of agriculture sector, lack of well-organised infrastructure, and most important of all macro economic and political instability. Pakistan adopted a restricted trade regime by imposing high tariff and non-tariff barriers to protect its domestic industries. During 1960s, the average level of protection provided by all sources (tariff plus non-tariffs) was as large as 271 percent in Pakistan compared to only 27 percent in Mexico, 33 percent in Taiwan, 49 percent in Philippines and 118 percent in Brazil. Various measures were adopted to encourage exports and to promote industrial production, including import controls, tariffs, tax holidays, accelerated depreciation allowances, and loans at very low interest rates. The most significant step that government took was the introduction of Export Bonus Scheme (EBS) in 1959, which was basically a Multiple Exchange Rate System.[4]

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[4](i) Different exchange rates for imports and exports. (ii) Different exchange rate for different import categories. High priority imported goods had over valued exchange while others, which were not on the priority, list of government had under value exchange rate system. (iii) Different exchange rate for different export categories.

1970s: Nationalisation and Devaluation

In the decade of 70s the economic activity slowed down especially performance of manufactured sector became very weak due to nationalisation of different industrial units, banks and other private units, which frustrated the process of industrialisation. Therefore industrial growth declined from 9.9 percent in 1960s to 5.5 percent in 1970s. GDP grew at 4.66 percent per annum against 6.60 percent in the previous decade. In the second half, economic activity turned towards recovery due to high growth in manufacturing sector and agriculture production after 1977-78.

An analysis of Pakistan trade liberalisation experience discussed by Khan (1998) showed that in the decade of seventies three major steps were taken in order to encourage exports; (i) devaluation of Pakistani Rupee by 57 percent in 1972; (ii) elimination of export bonus scheme that moved policy-makers towards a more uniform exchange rate system; and (iii) end of restrictive licensing in which six separate import lists were reduced to only two: the free importable items list and a tied list of items importable only from tied aid or barter sources. The incidence of import duty by economic category is presented in Table 1.

Table 1

Import Duties According to Economic Categorisation

Year	1975-76	1976-77	1977-78	1978-79	1979-80
Import Duty on Consumer Goods (%)	47	40	35	40	64
Import Duty on Capital Goods (%)	30	36	36	40	32

Source: GoP, *CBR Yearbook*, CBR.

Along with all of the steps to encourage exports, restrictions on imports were also increasing showing a biased against imports in the economy as depicted by increasing rate of duty on total imports in Table 1.

1980s: New Trade Policy and Flexible Exchange Rate System

Since 1980s Pakistan followed a combination of policies to move toward a more neutral trade regime. Despite the partial nature of trade liberalisation in Pakistan, the trend has been comparatively clear in 1980s as compared to previous decade. 1980 was the year when Pakistan trade regime experienced the most restricted stage. About 41 percent of domestic value added was protected by import bans, and another 22 percent by various forms of restrictions. These percentages of value added were declined in 1986 to 29 percent and 3.7 percent respectively through two measures; (i) explicit import quotas on non-capital imports were essentially removed; and (ii) banned and restricted imports were slowly liberalised

[Khan (1998)]. Non-tariff barriers were reduced significantly; duties on 100 commodity categories (mainly raw material and capital goods) were eliminated. The most significant changes in the trade policies of Pakistan were introduced after the formulation of new trade policy in 1987. The salient features of this trade policy were as follows; (i) tariff slabs were cut down to 10 from 17; (ii) a uniform sales tax replaced previous rates that varied across commodities; and (iii) maximum tariff rates were reduced to 125 percent from 225 percent. A brief presentation of the decline in tariff rates is given below.

Table 2

Average Level and the Dispersion of Statutory Tariffs

Tariff	Early 1980s		1987-88		1988-89		1989-90	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Economy Wide	77.1	52.6	68.9	52.2	66.3	41.4	64.8	41.4
Manufacturing	79.1	53.0	70.9	52.7	67.6	41.7	66.0	41.7
Consumer Goods	116.7	57.9	98.1	53.9	97.0	40.3	96.6	40.2
International Goods	61.3	40.2	65.4	48.3	57.2	27.6	53.9	26.8
Capital Goods	66.5	43.6	39.3	35.7	37.6	35.7	37.4	35.4

Source: GoP, *CBR Yearbook*, CBR.

This Table 2 clearly portrays the situation of changes in average tariff and dispersion in the economy. Economy wide average tariff declined to 64.8 percent in 1989-90. Most significant decline in the tariff rates was on capital goods, which declined from 66.5 percent in early eighties to 37.45 in 1989-90.

1990s: Moving Towards a Liberalised Economy

In this period government's major focus was to enhance the role of private sector in the economy and to increase the competitiveness and efficiency of industrial sector and exports at international level. Therefore, government privatised various public units and provided a host of incentives in the form of tax holidays, tariff cuts and other fiscal incentives to exporters. Economy grew at 4.41 percent as compared to previous decade. Pakistan's import policy aimed to rationalise the import tariffs, reduction in non-tariff barriers and simplification of tariff structure, removal of tariff concession and exemptions. The maximum tariff came down from 225 percent in 1986-87 to 70 percent in 1994-95. In 1999, 32 products were on the negative list while only 28 products were restricted due to religious, health and safety reasons. Import duties according to economic classification for the decade of 1990s are tabulated below.

Table 3

Import Duties According to Economic Categorisation

Year	1990-91	1991-92	1992-93	1993-94	1995-96	1996-97	1997-98	1998-99	1999-2000
Consumer Goods (%)	38	37	41	38	43	46	23	26	18
Capital Goods (%)	39	34	32	30	31	36	28	24	21
Total (%)	39	33	35	35	34	35	23	21	18

Source: GoP, *CBR Yearbook*, CBR.

This table confirms the arguments that Pakistan is moving towards liberalising its imports by gradually declining the rates of duty on import of consumer as well as capital goods. Rate of decline in the duties was more for capital goods than consumer goods. Over all, duty rates had decline by 21 percent during the decade. In 1997, the Government introduced another Tariff Reform Package on March 28, 1997.These reforms were introduced to revive the industrial production and export promotion and recommended that maximum tariff should be reduced to 45 percent from previous level of 65 percent with the exception of automobiles; the 10 percent regulatory duty was also abolished.

Table 4

Import Duties According to Economic Categorisation

Year	1999-2000	2000-01	2001-02	2002-03
Consumer Goods (%)	19	16	17	11
Capital Goods (%)	22	20	16	11
Total (%)	18	17	15	9

Source: GoP, *CBR Yearbook*, CBR.

Duty rates for the previous three years also showed the same trend that decline in the duty rate of capital goods are higher than for consumer goods: duty rates on consumer goods have declined by 8 percent while duty rates on capital goods have declined by 11 percent.

IV. THEORETICAL BACKGROUND, MODEL SPECIFICATION AND ESTIMATION STRATEGY

1. Theoretical Background

Trade Theories

The basic precept of free trade is that it is more efficient for each country to produce goods it is more able to produce, due to supply conditions of human resources, natural and physical capital in comparison to its trade partners. Heckscher-

Ohlin (HO) theory incorporated the neoclassical price mechanism into international trade theory and used two factors of production (FOP): Capital and Labour. Regarding the trade among countries HO states that a nation will export the commodity whose production requires the intensive use of the nations' relatively abundant and cheap factor and will import that good whose production requires intensive use of scarce and expensive factor. Another theorem arises out of the Heckscher-Ohlin model is called the factor-price equalisation theorem. This basically is the corollary of the HO theorem which states that prices equalise across countries under an international mobility of factors. The theorem derives from the assumptions of the model, the most critical of which is the assumption that the two countries share the same production technology and that markets are perfectly competitive. Hence, this holds that international trade homogenises the absolute return of FOP among economies.

Starting from the picture proposed by HO theory, the theorem of Stolper-Samuelson (SS) was the first theoretical formulation to explain the effects of free trade on income distribution among production factors. This theorem demonstrates how changes in output prices affect the prices of the factors when positive production and zero economic profit is maintained in each industry. The crucial point of standard trade theory is the correspondence between prices of products and prices of factors, which implies that an increase of the relative price of a good result in an increase of the relative return of the factor used intensively to produce that good.

Labour Demand Theory

The demand for labour is derived demand, in that workers are hired for the contribution they can make towards producing some good or service for sale. Both the substitution and scale effect suggests that the demand curve for labour is a downward sloping function of the wage rate. A related concern of theory is about the responsiveness of employment to different factors especially to the changes in wages, normally measured as own-wage elasticity. Why are the changing labour-demand elasticities important? Rodrik (1997) explains three important consequences of an increase in the absolute value of the price-elasticity of labour demand.

(1) First, it modifies the sharing of non-wage cost. The fact of imposing social protection and/or an improvement in working conditions, which increase labour cost, would induce a stronger decrease in firm's labour demand in an open economy. Be it through their employment levels or through their wages, employees would then be constrained to bear a larger part of adjustment.

(2) More elastic labour demand weakens the bargaining power of unions and employers. Rent sharing is consequently distorted at the expense of workers, while the influence of union is weakened. Thus the functioning of the regulations of the labour market may be altered.

(3) A more elastic labour demand would also imply increased volatility in the labour market. Indeed an exogenous shock to labour demand has a stronger effect on wages when the elasticity of demand is higher.

The Labour Demand Elasticity

Hamermesh (1993) summarises what determines an industry's equilibrium own price labour-demand elasticity with "the fundamental law of factor demand".

The equation used for estimating labour demand elasticities is given as,

$$\eta_{LLj} = -[1-s]\,\sigma_{LL} - s\eta_j \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (1)$$

In (1), η_{LLj} is industry j's own-price labour-demand elasticity defined to be negative; s is labour's share in j's revenue; σ_{LL} is constant output elasticity of substitution between labour and other factors of production and η_j is the industry j's product demand elasticity. An increase in wage rate affects demand for labour in two ways.

The first part of Equation (1), $-[1-s]\,\sigma_{LL,}$ deals with "Substitution Effect" and second $s\eta_j$ with "Scale/Output Effect". The first part tells us that for a given level of output, how much the industry substitutes away from labour towards other factors when wages rise. This term is often called the constant-output labour-demand elasticity. The second part tells us how much labour demand changes after a wage change due to change in the industry's output. Higher (lower) wages imply higher (lower) costs and thus, moving along the product-market demand schedule, lower (higher) industry output. When wages rise both the effects reduce labour demand. The industry substitutes labour with other factors and with higher costs industry produces less output, so labour demand slopes downwards.

Trade and Labour Market Linkages

There are various paths through which globalisation is channelled to the labour market. Mainly two approaches are applied in the literature to find out the impact of trade on the labour market: through its impact on wage and employment and through labour demand elasticities. Regarding its impact on labour demand elasticity trade might induce an increase in this elasticity via a scale effect due to the increased competition on the output market and/or via a substitution effect generated by expanding the firm production possibility set to include additional inputs. This channel also encompasses the wage and employment effect. Trade and labour market linkages are being widely analysed in literature like Revenga (1992), Kambhampati, *et al*. (1997), Arbache (2001) and Hasan (2001). By and large, these studies focus on the relationship between trade policy and employment and wage levels. While some other like Slaughter (2001), Giovanni, *et al.* (2002), Jean (2000) and Krishna, Mitra and Chinoy (2001) focus on labour demand elasticities.

The most commonly used analytical framework for understanding the links between trade and labour market is that of HO model of international trade. Under the assumptions of the standard trade theory, 2 factors and 2 good version of the model, the movement from autarky to trade is associated in both countries with an increase in the relative price of the good which makes intensive use of the relatively abundant factor. Assuming each country produces both goods, the relative price of the more labour intensive of the two goods will increase in the labour abundant country leading profit seeking firms there to switch production towards the labour intensive good while the opposite will happen in the capital abundant country. These changes entail an increase in the demand for labour in the labour abundant country.

IV. II MODEL SPECIFICATION AND ESTIMATION STRATEGY

The model adopted in this study to examine the impact of trade liberalisation on labour demand elasticities is based on a labour demand equation that is obtained from the firm's cost minimisation problem. It is based on the approach used by Giovanni, *et al.* (2002) and has the advantage of introducing a dynamic labour demand equation. It avoids the two-stage approach used by Slaughter (2001).

In this study, the firm is assumed to choose a level of production *y*, taking a given relative labour price *w* and the level of trade liberalisation *g*. Since the focus is on domestic labour demand, we will start directly by first specifying the domestic labour demand as follows;

$$ln\ L = (\beta_w + \beta_{wg}\ ln\ g)\ ln\ w + \beta_y\ ln\ y + \beta_g\ ln\ g\ + e \qquad \ldots \qquad \ldots \qquad (2)$$

where, β_y, β_w, β_{wg}, β_g and β_x are constant parameters. The β_g measures the impact of *g* as a demand shifter, whereas β_{wg} measures the impact of *g* on the relative wage elasticity of the labour demand function, which is given as

$$\varepsilon_{lw} = \partial\ ln\ L\ /\ \partial\ ln\ w = \beta_w + \beta_{wg}\ lng \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (3)$$

The economic interpretation of β_g parallels that of β_w, in that β_g is the intercept of the labour elasticity with respect to *g*. In fact,

$$\varepsilon_{lg} = \partial\ ln\ L\ /\ \partial\ ln\ g\ = \beta_g + \beta_{wg}\ lnw \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (4)$$

The variable *g* is the key variable of the model; a measure of trade liberalisation. This can be measured by multiple factors; exports plus imports as percentage of GDP (share of trade in GDP (openness)), average tariff rates computed by dividing import duties by volume of total imports, technology infusion measured by time trend or by using a dummy variable for post and pre-trade liberalisation. Trade liberalisation may influence labour demand in many ways like it might exert an impact on the production possibility set by bringing

with it new production techniques and inputs to the firm. It might also enhance the productivity of existing inputs by new foreign knowledge and useful information, or simply by performing as a yardstick of performance in the time series required. Overall, these factors may influence labour demand elasticity as well as may bring about a direct effect on labour demand, with *g* acting as a demand shifter. This is worth noting that tariff rate is better indicator as compared with openness, as this is more direct while openness is considered to be the consequence of trade liberalisation.[5]

The model used to estimate the impact of liberalisation on labour demand elasticities involves the estimation of labour demand equation. Here comes a general identification problem typically arising in the estimation of equilibrium relationships. In theory both labour demand and labour supply depend on relative wages. It is therefore not clear what combination of labour-demand and labour-supply elasticities is obtained from the model. In order to overcome this problem, we make a similar assumption to that made by Slaughter (1997) and Greenaway, *et al.* (1999) and Faini, *et al.* (1999). In particular, labour supplies are assumed to be perfectly elastic. In this way, shifts in the labour supply curve, as measured by movements in wages, are able to trace out the labour-demand curve (whose position is controlled for by the other regressors included in the model that are thought to leave the labour supply schedule unaffected). If this assumption holds, the coefficient on the relative wage may be interpreted as the elasticity of labour demand.

The sector heterogeneity is accommodated by allowing *u* to vary across sectors. This yields sector specific coefficients in Equation (2). Thus the baseline equation is modified as,

$$ln\ L_{it} = (\beta_w + \beta_{wg}\ ln\ g_{it})\ ln\ w_{it} + \beta_y\ ln\ yit + \beta_g\ ln\ g_{it} + u_i + \varepsilon_{it}, \qquad \dots \qquad (5)$$

where $t = 1, ..., T$, the number of time periods and $i = 1, ..., N$, the number of sectors.

Equation (5) is static in nature and fails to incorporate slow adjustment of employment to changes in the relative wage in the presence of adjustment cost. This will be taken into account by including lags on employment into the baseline equation. Hence Equation (5) is modified accordingly.

$$ln\ L_{it} = \gamma\ ln\ L_{i,t-1} + (\beta_w + \beta_{wg}\ ln\ g_{it})\ ln\ w_{it} + \beta_y\ ln\ y_{it} + \beta_g\ ln\ g_{it} + u_i + \varepsilon_{it} \quad \dots \quad (6)$$

Moreover, the impact of technical progress is captured by appending a time trend *ln t*, alone ($\beta_t\ ln\ t$) and interacted with *lnw* ($\beta_{wt}\ lnw\ lnt$), to both Equations (5) and (6).

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[5]These are the most commonly used indicators in literature. The data is unavailable for non-tariff barriers so this indicator cannot be used.

$$ln\ L_{it} = \gamma\ ln\ L_{i,t-1} + (\beta_w + \beta_{wg}\ ln\ g_{it} + \ \beta_{wt}\ ln\ t)\ ln\ w_{it} + \beta_y\ ln\ y_{it} + \beta_g\ ln\ g_{it}$$
$$+\ \beta_t\ ln\ t + u_i + \varepsilon_{it} \quad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (7)$$

The long-run wage elasticity can also be measured that depends on *lng, lnt* according to the following formula:

$$\mathring{a}l_w = \hat{a}_w + \hat{a}_{wg}lng + \hat{a}_{wt}lnt \quad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (8)$$

This completes the model specification.

It is well known from the dynamic panel data literature that the standard within estimator applied to a first order autoregressive model yields consistent estimates only when the number of time periods T is large [Nickell (1981)], which is not the case for this panel. To solve such a problem, econometricians have suggested various instrumental variable approaches [Arellano and Bond (1991); Ahn and Schmidt (1995)]. Here we have followed the Generalised Method of Moments—Instrumental Variable—(GMM-IV) approach suggested by Arellano and Bond, widely used in most recent dynamic panel data applications. They introduced lagged dependent variable into the model to account for dynamic effects. The problem from correlation of the lagged endogenous and the disturbance term may circumvent by using the proxy variable or instrument. This method provides us more consistent and efficient estimates in the presence of simultaneity bias in the model. This method also exploits all available linear orthogonality conditions. The linear orthogonality conditions are explained as.

Suppose that at each observation, i, we observe a vector of j variables, z_i, such that z_i is uncorrelated with ϵ_i. And z is recognised as instrumental variables. The assumptions thus far have implied a set of orthogonality conditions,

$$E\ [z_i\,\epsilon_i] = 0$$

Which may be sufficient to identify (if $J = K$) or even overidentify (if $J > K$) the parameters of the model. For the class of linear models,

$$y_i = \beta`x_i + \epsilon_i$$

GMM estimation can be based on the following orthogonality conditions,

$$E\ [z_i\,(y_i - x_i`\beta)]$$

The estimation of the model is carried out in E-Views 5.1.

V. DATA AND VARIABLE CONSTRUCTION

Table 5 provides the definition, method of construction and the expected signs of the variables in detail.

Table 5

Data and Variable Construction

Variables	Definition	Construction
Employment: Dependent Variable (L)	Average daily persons engaged in total manufacturing includes employees, working proprietors, unpaid family workers and family workers and home workers.	This variable is measured in 1000.
Production (y)	This consists of the value of finished products and by-products, receipts for work done for others, receipts of repairs and maintenance, value of sale of semi-finished products and by-products, waste and used goods, value of electricity sold, value of sales of good purchased for resale, the net increase in the value of work in the process and the value of fixed assets produced by the establishment for its own use.	The gross value of manufacturing production is measured in 1000 and is converted into real values by deflating with wholesale manufacturing price index (WPI = 1980-81 = 100). The output is expected to have positive impact on employment due mainly to nature of derived demand for labour.
Wages/ Employment Cost (w)	This includes wages and salaries paid plus cash and non-cash benefits paid to the workers.	This is measured by dividing the annual wages and salaries by the total number of employees in manufacturing, in 1000, converted into real values. The expected sign is negative according to standard labour demand theory.
Trade Liberalisation (g) (a) Import Duties	Import duties are given commodity wise.	Import duties are measured in 1000, converted into real values and taken as ratio of the volume of total imports. The variable will be taken alone and in interaction with wage. The factor is expected to have negative impact on employment.
(b) Openness	This is measured as exports plus imports as percentage of manufacturing production.	Imports plus Exports are measured in 1000, converted into real values and taken as ratio of production in manufacturing. The variable will be taken as independent and in interaction with wage. The expected sign is positive.

Sources of Data

The study covers the time-period from 1970-71 to 1995-96 for 24 manufacturing units in Pakistan. As continuous time series data is not available at industry level, it is used with a gap of 5 years. The industries are selected according to Pakistan Standard Industrial Classification (PSIC), which is comparable at 3-digit level of ISIC (provided in Appendix in detail). According to Economic Survey 2004-

05, the share of large scale manufacturing sector in overall manufacturing is 69.5 percent, whereas the whole manufacturing sector contributed about 18.3 percent in GDP. Mining and manufacturing sectors are also accommodating about 5.73 million persons out of the total employed labour force. In manufacturing sector of Pakistan, private sector plays the prominent role. According to Census of Manufacturing Industries 1995-96, 4474 manufacturing units were in private sector compared to only 42 in public sector [Khan 2001].

The data on output (y), wages (w) and employment (L) is collected from *Census of Manufacturing Industries* (CMI) (various issues) published by Federal Bureau of Statistics (FBS). The data on imports and exports is from *50 Years of Pakistan in Statistics* (FBS). This is available according to major commodity groups which are arranged in accordance with the industrial division. The data on import duties is taken from *CBR Yearbook* published by Central Board of Revenue (CBR).

VI. EMPIRICAL RESULTS AND INTERPRETATION

Table 6 provides the results from estimation of Equations (6) and (7) along with the mean elasticities for pre and post trade liberalisation. The results with and without trend are provided for both measures of trade liberalisation; openness and import duties, with a one-year lag to take account of adjustment lags between change in trade policy and its effects on labour market. The results with trend are larger in magnitude. This shows the robustness of all variables in the presence of time trend. And the time is appeared to be a strong predictor of elasticity pattern, as also advocated by Slaughter (2001). The signs for coefficients of the two measures of trade liberalisation are opposite to each other as expected. In general, the estimates using both measures reveal the results in accordance with the expectations and are in line with standard trade theory.

Regarding other test statistics, adjusted R^2 is reasonably high for all equations keeping in view the cross section variations. Durbin-Watson statistics indicates non-existence of autocorrelation. The results are robust to white hetroscedasticity as well.

The trade liberalisation has appeared to be positively (negatively) significant for openness (import duties) alone and in interaction with wages. In terms of magnitude, the impact of import duties is larger for employment as compare to openness. This may be due to the fact that import duties are a more direct measure for trade liberalisation as compared with openness, which is considered as a consequence of trade liberalisation. Hence, the results with time trend and import duties as trade liberalisation measure are more reliable, though the signs go in the same direction for all results.

Moreover, the coefficients for liberalisation measure alone are larger in magnitude as compared with liberalisation in interaction with wage. This postulates that the direct role of trade liberalisation as a demand shifter is more powerful. As Pakistan has adopted a stance in favour of trade liberalisation over time, and the

Table 6

Regression Results (GMM-IV)

Variables	Without Trend		With Trend	
	Eq. 1 (Open)	Eq. 2 (Impd)	Eq. 3 (Open)	Eq. 4 (Impd)
ln L(−1)	0.037	0.034	0.104	0.1149
	(1.294)	(1.191)	(1.438)	(1.690)*
ln y	0.683	0.735	0.975	0.9505
	(13.70)*	(20.32)*	(17.13)*	(16.989)*
ln w	−0.239	−0.469	−0.304	−0.1588
	(−10.43)*	(−4.06)*	(−3.253)*	(−1.535)
ln g(−1)	0.084	−0.434	0.272	−0.595
	(2.697)*	(−1.79)*	(3.279)*	(−5.631)*
lnw*lng(−1)	0.027	−0.194	0.1147	−0.2469
	(2.248)*	(−2.06)*	(3.469)*	(−6.201)*
ln Year	–	–	−68.66	−58.37
			(−3.964)*	(−3.012)*
lnw*ln Year(−1)	–	–	0.0162	0.0165
			(1.703)*	(1.726)*
ϵl_w	−0.1448	−0.2068	−0.241	−0.345
	(0.066)	(0.392)	(0.306)	(0.564)
ϵl_w Pre-trade	−0.1547	−0.195	−0.194	−0.340
Liberalisation	(0.068)	(0.437)	(0.319)	(0.628)
ϵl_w Post-trade	−0.1349	−0.2183	−0.287	−0.350
Liberalisation	(0.062)	(0.348)	(0.291)	(0.501)
Adjusted R^2	0.713	0.631	0.589	0.496
D-W Statistic	1.891	2.10	2.10	2.10
J-Statistic (p-value)	0.080	0.090	0.066	0.089

Note: (1) Values in parentheses provides *t*-values for coefficients and standard deviation for elasticities.
　　　(2)*Indicates significance at least at 10 percent level of significance.

effective rate of protection has reduced very sharply since the early 1990s it can thus be judged from the results that there has been a consequential shift from capital-intensive production to more labour-intensive production that is in keeping with the perceived static comparative advantage and, in turn, has led to increased employment generation because of the greater incentives afforded to labour intensive exports in particular. This increase in demand for labour may be due to technical infusion over the time that enhances the labour productivity hence labour demand, may be due to increased demand for exports and availability of input in the form of imports.

The wage variable has negatively significant effect on employment according to standard labour demand theory. Due to both substitution effect and scale effect an increase in wage rate increases the relative cost of labour and induces employers to use less of labour and more of other factors (substitution effect), while a wage increase causes the marginal cost of production to rise and puts pressure to increase product prices and reduce output causing a fall in employment (scale effect).

As the demand for labour is a derived demand and depends on the demand for output, the output has a positive and significant effect on employment. It works according to "Hicks-Marshall law of factor demand". The law asserts that, other things equal, the own-wage elasticity of demand for labour is high when the price elasticity of demand for product being produced is high. Regarding the results with trend, the coefficient for time trend appears to have a statistically negative and significant effect on employment that shows a declining trend in employment over the time. While the variable time trend in interaction with wage turns out to be positive which may be the result of technical progress overtime that is expected to enhance labour productivity, hence leading to an increase in the demand for labour.

The dynamic framework of the paper allows estimating both the short and long run constant output labour demand elasticities based on Equations (3) and (8) of the model. The mean value of elasticities lies within the range suggested by Hamermesh (1993), i.e., –0.15 to –0.75 on the basis of estimates of other studies surveyed by him and are robust to changes in trade liberalisation measurements and estimates. The short-run elasticities are –0.1448 and –0.2068 for openness and import duties respectively while the long-run elasticities are –0.241 and –0.345 for the same. The long-run elasticities are larger in absolute term as compare to short-run elasticities. Here again the time trend plays an important role in explaining the elasticity behaviour.

Along with the positive significant direct impact of trade liberalisation on labour demand elasticities in manufacturing sector in Pakistan, the mean values for the labour demand elasticities of trade liberalisation are also estimated for pre and post trade liberalisation. The period before 1989-90 is specified as pre-liberalisation while after 1989-90 as post-liberalisation. The result shows that the elasticities have increased over the time. For the long run, elasticities for pre-trade liberalisation time period are –0.194 and –0.340 that have increased to –0.287 and –0.350 respectively in post-trade liberalisation time period. Though in absolute magnitude the elasticities are low (less than 1), but the point is that they have increased after reducing the tariff rates and opening up of the economies. And this put a pressure on the wage and employment of labour.

VII. CONCLUDING REMARKS

In this paper, we have looked at how trade liberalisation has affected the employment and labour demand elasticities in the manufacturing sector of Pakistan

over the time period 1970-71 to 1995-96. The results indicate that trade liberalisation has positively contributed towards employment generation in the manufacturing sector. The results are in line with the perception of standard trade theory that the movement to free trade is associated with an increase in the relative price of the good which makes intensive use of the relatively abundant factor in a country, which is further translated into higher demand for the abundant factor i.e., labour in our case. The labour-demand elasticities also increase with reduction in protection and appear to have the effects that theory predicts.

Keeping in view these results, it is clear that a move towards trade liberalisation in Pakistan has affected the labour demand in the manufacturing sector by increasing its elasticity as well as through its direct impact. This also suggests that trade liberalisation has motivated the economy to produce labour-intensive goods in the long run. As Pakistan posses comparative advantage in the textile sector, it is expected that increased market access in conjunction with an open and export-led trade and development policy will lead to a significant boost in employment in this sector. Overall, the results of this study point towards the role of trade liberalisation in affecting the employment scenario and labour market dynamics in Pakistan.

Table A1

Description of Industries and Codes

No.	ISIC	Industry Description
1	311/2	Food
2	313	Beverages
3	314	Tobacco
4	321	Textiles
5	322	Wearing Apparel
6	323	Leather and Products
7	324	Footwear
8	331	Wood Products
9	341	Paper and Products
10	342	Printing and Publishing
11	351	Industrial Chemicals
12	352	Other Chemicals
13	353	Drugs and Medicines
14	354	Petroleum and Coal Products
15	355	Rubber Products
16	356	Plastic Products
17	362	Glass and Products
18	369	Non-Metallic Products
19	371	Iron and Steel
20	381	Metal Products
21	382	Non-Electrical Machinery
22	383	Electrical Machinery
23	384	Transport Equipment
24	390	Other Manufacturing

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Comments

In this paper, the authors have addressed an important issue that is of profound significance for a developing economy like Pakistan. Like many developing countries, Pakistan has initiated wide-ranging trade reforms in the past and the thrust of Pakistan's trade policies in recent years continues to be greater openness through trade liberalisation with minimal tariff and non-tariff barriers. The ongoing trade liberalisation programme comprises reduction of import tariffs, simplification and rationalisation of tariff structure, and deregulation of administrative controls including quantitative restrictions on imports. The maximum rate of custom duty has been reduced to 25 percent with only 4 tariff slabs, para-tariffs have been eliminated and the scope of the negative list has been drastically reduced over the years; imports being restricted generally on very specific religious, health, and security considerations.

It is generally believed that trade liberalisation has far-reaching implications for the labour markets. However, so far little attention has been paid to a systematic analysis of the impact of trade liberalisation on labour demand, particularly the labour demand elasticities in Pakistan. In this sense, the authors have made an important contribution by rigorously examining the impact of trade liberalisation on labour demand elasticities in Pakistan especially at a time when Pakistan has made major strides in liberalising its trade regime. The analysis is based on a well-established theoretical framework which leads to a labour demand equation that includes production, wage rates, and measures of trade liberalisation. Using the instrumental variables Generalisation Method of Moments (GMM) techniques, it is shown that trade liberalisation has a positive and significant influence on employment when total trade is used as a measure of openness, whereas it is negatively associated with employment when import duties are used as a measure of trade liberalisation. As is expected, the wage variable has a negative impact on employment.

I have a few short comments on the paper;

First, the estimation technique is not fully elaborated. For example, the paper states that the GMM technique exploits all linear orthogonality conditions without explaining what these conditions are, which variables are involved in these conditions, and how are these fed into the empirical estimations.

Second, the empirical results are not adequately explained in the paper. For example, why is it the case that the results with trend are larger in magnitude than those obtained by using no trend. Similarly, why is it the case that the long-run elasticities are larger in absolute term as compared with short-run elasticities.

Third, it appears that the authors have used exports plus imports as a measure of openness. However, there is a need to control for the size of the economy by using the ratio of total trade to GDP.

Let me conclude by saying that the authors have made an important contribution to the literature on the impact of trade liberalisation on labour demand in Pakistan. A clear exposition of the estimation technique coupled with a careful interpretation of the results would greatly improve the substance of the paper.

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