Economic Impact of Trade Liberalization: The Case of Pakistan's Manufacturing Industrial Market

Javed Iqbal
Quaid-i-Azam University, Islamabad

Misbah Nosheen
Hazara University, Mansehra

Tahir Mehmood
Quaid-i-Azam University, Islamabad

The present study investigates the impact of trade on employment of skilled and unskilled workers in large scale manufacturing industries of Paksitan. We used dynamic panel data models (i.e. system-GMM and difference GMM) for 18 industries from 1970 to 2006. Empirial results show that trade liberalization has negative impact on employment of both production and non-production workers. The negative impact of trade may be attributed to low mobility of labor because of rigidity of labor markets as well as to the high protection given to most of the inefficient industries in the past.

Key Words: Production workers, non-production workers, trade, employment

Theoretically free trade is beneficial; and it is evidenced by the fact that exchange of goods takes place among individuals, companies and countries as well. According to traditional trade theories, trade tends to reallocate resources through sectors in line with the principles of comparative advantage. One of the upshot of free trade is widening of consumer choices, decrease in prices of both inputs and output, enhancement of efficiency and stimulation of economic growth. Though this reallocation of resources across sectors may result in job displacement in some sectors but at the same time it may uncover new opportunities of employment and investment in other sectors. Free trade thus tends to result in creative destruction of jobs, to use Schumpeter's familiar phrase. The theoretical underpinning lying behind the relationship between trade and employment is the H-O theorem. It postulates that countries allocate their resources towards the sector they are abundantly endowed with. In other words, countries with abundance of labor will concentrate on the production of labor inteisive goods while capital abundant countries will allocate resources towards the production of capital intensive goods. Free trade therefore, is supposed to improve efficiency in use of resources and will enhance the labor share in toal production in labor abudant countries whereas. Similarly, it will raise the share of capital in total output in developed countries. The basic idea of H-O framework is the rellocation of reseoucrces from the import orieted sector towards export oriented sector. The traditional trade theory is based on some specifc assumptions, while in real life there are different factors which may affect the trade and labor market outcomes such

as labor market conditions and regulations of the country. (Eddy, 2005).

Trade reforms in Pakistan
The economy of Pakistan in the past has been characterized as a more restricted economy with a focus on import substituting policy. The protectionist policies resulted in an inefficiency and lack of competitiveness in manufacturing sector. However, under structural adjustment program of World Bank and IMF, Pakistan initiated different market and trade related reforms by the mid 80s. In order to extricate the past protectionist policies, most of the tariff and non-tariff barriers were reduced. The table in appendix-A3 indicates the decline in import duties over time. It shows that there was a gradual decline in import duties during 1990-1995. However, after 1995, there was a smooth decline in import duties till 2013. The government of Pakistan not only relied on reduction of import duties, rather most of the non- tariff barriers were replaced with tariffs. Besides, the maximum tariff rate was reduced significantly. In 1986-87, the maximum tariff rate was 225 percent which was reduced to 45 percent during 1997-98 (Khan, 1998). Furthermore, to cascade the tariff structure, the earlier surcharges and taxes also known as Para tariffs were merged with statutory tariff (national tariffs) regimes. Most of the imports which were restricted in Pakistan, were declared as importable. However because of the concerns at the basis of religious, health a well as security considerations, imports of some of the items were kept restricted. The move from a restricted to a more liberalized regime resulted in reshuffling of resources. As a result, labor markets had to respond in term

of job creation and destruction. In particular, the low skilled workers are more vulnerable to labor market volatility and fluctuations (ILO, 1991). It remains an open question, that how these trade reforms affect labor markets of Pakistan. For this purpose, we are interested to investigate the impact of trade on wages and employment, in particular, how the employment of production (presumably low skilled) workers and non-production workers (skilled) workers respond to trade liberalization.

Literature review

In the past decade, a large number of studies have investigated the impact of trade on wages and employment. Different approaches and methodologies have been used to address the issue. However, in general, the empirical evidence is a mixed one. One thing is clear that most of the studies have focused on manufacturing industries rather than sectors like agriculture, services or any informal sector (Hoekman and Winters, 2005). Different factors such as labor market policies as well macroeconomics policies, job search behavior or business fluctuations are the factors that tend to influence employment level. However, it is very difficult to differentiate among the possible sources that causes employment level to change. For example, Gaston and Trefler (1997),while analyzing the impact of Canada Us free trade agreement on employment have tied to make a distinction between the employment effects of general recession and that of trade agreement in both US and Canada.

Interestingly a study by Rama (2003) while examining the trade and employment link comes up with the finding that unemployment level went up even in countries which were considered to be more successful economies or in other words they were considered to be model economies being "a successful developing country globalizers". Only a minor portion of unemployment in these countries was attributed to globalization while the rest of unemployment was explained by the fact that people preferred public sector jobs or privileged job which in general is a case in educated urban youth.

Trade and employment outcomes are also dependent upon the nature of labor markets in term of flexibility and rigidity. For instance, Helpman.et.al (2012) shows that trade tends to result in higher unemployment in sectors where labor market frictions are low. On the other hand, in sector where labor market frictions are higher trade tends to result in lower unemployment. However, this finding too cannot be generalized. Iqbal.et.al. (2012) examining the impact of trade liberalization on employment and wages in Pakistan's manufacturing come up with the findings that trade tends to have positive impact on employment and wages if labor markets are flexible. Even in case of regulated labor markets, the results are still robust indicating that labor market regulations do not have any significant effect on labor market.

Besides the methodological issues and country specific conditions that tends to impact on trade and employment outcomes, the empirical evidence on trade and employment is mixed one. The studies which report positive impact of trade on employment include Milner and Wright (1998) for the Mauritian economy; Kambhampati, Krishna, and Mitra (2003) for India; (Grotkowska, 2005) for Poland and Abuka (2005) for South Africa.

Similarly the studies that reported negative impact of trade on employment included the study of Revenga (1992) for US; and another study by Revenga (1992) for Mexico; Hine and Wright (1998) & Hine and Wright (2000) for UK manufacturing. There is also an empirical evidence of the studies that come up with the findings that trade does not have any significant impact on employment, it included the study of Hasan (2001) & Banga (2005) for India.

The above mentioned studies do not differentiate between the skilled and unskilled workers rather they focused on overall or aggregate level employment and wages. There are many studies that investigate the impact of trade on employment and wages for different type of workers according to their skills. These include the study of Beaulieu (2000) who investigate the impact of Canada-US free trade agreement on production and non-production workers. It shows that employment of both production and non-production worker reduced in the post trade agreement but it did not have had any impact on wages of both types of workers. In an another study, D. Kstoeas (2005) while examining the impact of low wage imports on employment of production and non-production workers reported that employment of production workers reduced while it did not affect employment of non-production workers. Likewise, Oscarsson (2000) show that import liberalization in the manufacturing sector caused employment of both production and non-production workers to decline in Sweden but it did not affect wages of both types of workers.

Observing the diverse nature of results that have been reported by vast literature on trade and employment, it makes imperative to look at the impact of trade on employment of both production and non-production works for a developing country like Pakistan.

Empirical Model

In order to investigate the impact of trade on employment, we use the following Cobb Douglas model. This model is a derived labor demand equation based on profit maximizing behavior of the firm.

$$Y_{it} = A^{\gamma} K_{it}^{\alpha} N_{it}^{\beta} \qquad (1)$$

Here, Y, A, K and N represent output, technological progress, capital stock and units of labor respectively. Whereas, γ, α and β denote shares of variables used to represent production efficiency and share of capital and labor respectively, whereas the subscripts 'i' and 't' the ith

industry and the specific time period respectively. Both vary from i = 1, 2,…n and from t = 1, 2, ….T.

In this model capital and labor are rewarded according their marginal productivity, while simultaneously solving the equation (1) and eliminating the capital from this equation will result in the following model.

$$Y_{it} = A^{\gamma}\left(\frac{\alpha N_{it}}{\beta} \times \frac{w_i}{c}\right)^{\alpha} N^{\beta}{}_{it} \qquad (2)$$

Taking the natural log and rearranging equation (2), we derive the demand of the industry as follows

$$\ln N_{it} = \theta_0 + \theta_1 \ln W_{it} + \theta_2 \ln Y_{it} \qquad (3)$$

where

$$\theta_0 = -(\gamma \ln A + \alpha \ln \alpha - \alpha \ln \beta)/(\alpha+\beta), \theta_1 = -\alpha/(\alpha+\beta)$$
and $\qquad \theta_2 = 1/(\alpha+\beta)$

Just like Greenaway (1995), we also assume A as technical efficiency which is correlated with trade share and evolve over time in the following manner:

$$A_{it} = e^{\delta 0 Tit} M_{it}^{\delta 1} X_{it}^{\delta 2}, \quad \delta_0, \delta_1, \delta_2 \ > 0 \qquad (4)$$

Where T is time trend, M and X are imports and exports respectively. To allow for dynamic changes and adjustments in equation (3), the estimated labor demand equation can be written as follows:

$$\ln N_{it} = \theta_0 + \theta_1 \ln N_{it-1} + \theta_2 \ln W_{it} + \theta_3 \ln Y_{it} + \theta_4 \ln V_{it} + u_{it} \quad (5)$$

Where N, W and Y denote total employment, average real wages and industry i output in time t, where t=1, 2….T. V denote vector of variables which affect labor demand it includes variable of liberalization i.e. average tariff rate measured as import duties divided by volume of imports and other variables which affect labor demand such as exports, imports and time trend used as proxy for technology. θ_0 is intercept, while θ_1, θ_2, θ_3 and θ_4 are other unknown parameters to be estimated, whereas μ_{it} represent error term which can be decomposed further into cross sectional and time effect.

Estimation Procedure
In response to shocks such as trade shock, adjustment of employment and wages is not contemporary rather there is a time involved in adjustment; we therefore have to include lag of the dependent variable in the model. However, inclusion of dependent variable with lag has a problem that some of the standard estimators such OLS, fixed effects, random effects, and feasible generalized least squares (FGLS) tends to produce estimates that are biased and inconsistent. (Nickell 1981 and Kien and Heo 2009). To deal with this issue, IV and GMM approaches are the most appropriate methods. Nonetheless, we use GMM approach to deal with

heteroskedasticity if it is present, whereas even if there is no heteroskedasticity present, GMM estimator is still better compared to IV approach. Unlike IV approach, GMM estimator makes use of all available moment conditions and therefore, yield not only consistent but efficient estimates also. (Baum, Schaffer,and Stillman 2003). The GMM estimator consists of first-differenced GMM (DIF-GMM) and system GMM (SYS-GMM). The former is developed by Arellano and Bond (1991) and the latter is developed by Blundell and Bond (1998). The difference GMM might be subject to a large downward finite-sample bias. Therefore, in order to overcome this problem, we use both difference GMM and sys-GMM for the robustness of the model. Furthermore, to check consistency of the model, this study will use Hansen J test.

Data
In this study, we use data of 18 large scale manufacturing industries of Pakistan from 1970-71 to 2005-06. Availability of date does not allow us to use data on annual basis rather we use data with a gap of 5 years. For estimation purpose, we use data on Pakistan's Standard Industrial Classification (PSIC) at 3-digit level. Employment and wage related data for both production and non-production workers are taken from various issues of Census of Manufacturing Industries (CMI) of Pakistan. Data on commodity wise exports and imports come from various issues of Statistical Year Book. We use average tariff rate as a proxy for trade liberalization. The variable of average tariff rate is constructed by dividing total import duties over volume of imports. We also deflate nominal output with wholesale manufacturing price index. Similarly, we divide employment cost by total number of employees to form nominal wage variable while to convert it into real wages, we deflate nominal wage with consumer price index (CPI).

Results

Estimation results showing the impact of trade liberalization on employment of both production and non-production workers are presented in Appedix-A1 and A2.

Estimation results are based on difference GMM and sys-GMM. Model-1 and model-2 show that trade liberalization has negative effect on production worker's employment, while, it has significantly positive impact on real wages of production workers. Similarly, the empirical results based on sys-GMM are reported in model-3 & 4 in Appedix-A1. The results are robust as the sys-GMM based results show that the impact of trade liberalization is negative on employment while it is positive on real wages. The negative impact of trade on production workers employment may be attributed to the high protection given to inefficient [1]industries in the restricted trade regime.

---

[1] An example of the of few industries which were inefficient and highly protected included industries like textile, wearing apparel, leather, footwear, industrial chemical, electrical apparatus and

In the aftermath of trade liberalization, these inefficient industries were not able to withstand foreign competition. However, it is noteworthy that trade liberalization may have negative impact on labor demand in the short run, but in the long run trade may have favorable/positive impact on labor demand. Other independent variables such as output and wages have signs according to theory. Both lag of employment and real wages have significantly positive effect on its current level in almost all model specifications of Appedix-A1.

Exports have positive effect on production workers' employment while it has positive but insignificant effect on production workers' wages indicating that rising export intensity increases labor demand. This can be attributed to the fact that Pakistan's exports are more labor-intensive than imports. This result has an important implication for Pakistan's labor market. It implies that exports have generated new jobs for Pakistan's abundant labor force, thus reducing its unemployment level.

Hence, an increase in export volume will bring employment opportunities for Pakistan's abundant labor force. As far as import penetration is concerned, it is interesting to note that its estimated coefficient is positive but statistically insignificant. Appedix-A2 indicates estimation results regarding the impact of trade liberalization on employment and wages of non-production workers. The empirical results are based on first difference GMM and sys-GMM as well. Difference-GMM based results show that trade liberalization measured as average tariff rate has significantly negative impact on employment but it has significantly positive impact on wages of non-production workers. The empirical results obtained with Sys-GMM show trade liberalization have negative impact on employment while it has no significant impact on wages of non-production workers.

Real wages as well as output have expected signs. Imports have almost positive effect both on employment and wages of non-production (relatively high-skilled) workers. Imports of developing countries are usually assumed to be skill-biased and are expected to have positive effect on labor demand of non-production workers.

On the other hand, exports have positive but insignificant effect on employment and wages of non-production workers. However, in case of sys-GMM, the results show that exports have insignificantly positive impact on employment but it has significantly positive impact on wages of non-production workers. Our empirical results on the impact of trade on employment and wages of production and non-production workers show that they almost confirm the empirical findings of (Revenga, 1997). Our empirical

results also supports the findings of Oscarsson E. (2000) and Bruno and Menezes (2006).

Diagnostics tests

We have used instrumental variable technique; difference-GMM and system-GMM approach in order to account for the endogeneity problem. As the use of GMM approach requires using instruments. The instruments used are mostly the 1st and second lag of the difference variable. However, the validity of instrumental variables need to be checked though Hansen J-test under null hypothesis that the validity of over-identifying restrictions is supposed to be satisfied if there is no second order correlation of the residuals. The p-values of Hansen-J test indicate that we are unable to reject the hypothesis of the validity of instruments used. Furthermore, all estimates are based upon HAC (Hetroskedasticity-Auto-correlation Consistent) robust standard errors; hence there is no issue of hetroskedasticity and autocorrelation.

Conclusion

Trade liberalization is a key for economic growth and development. The traditional trade theory presumes that a labor abundant country should focus on export of labor intensive goods compared to capital intensive goods. Increasing trade liberalization is also supposed to result in reshuffling of jobs across sectors. This study aimed to investigate how labor in manufacturing industries is affected with free trade. Unlike the expectation, trade liberalization tends to have negative effect on both skilled and unskilled labor in Pakistan. The negative impact is more severe for unskilled workers compared to the skilled workers. This negative impact may be attributed to low mobility of labor and rigidity of labor markets. Furthermore, the negative impact of trade may be also be attributed to the past restricted trade policy of Pakistan when most of the inefficient industries got highly protected. With increasing trade and openness these firms had to face up stiff competition from foreign companies which resulted in displacement of labor

References

Abuka, Charles A. (2005). 'An Empirical Analysis of Impact of Trade on Productivity in South Africa's Manufacturing Sector,' PhD dissertation, University of Pretoria.

Arellano, M. and Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, Vol. 58.

Banga, R. (2005). Liberalization and Wage Inequality in India. Council for Research on International Economic Relations ICRIER. Working Paper No. 156.

---

textile machinery and many other industries. For further details please see Naqvi S.N.H. and Kemal A.R. (page 104 to 108, 1991).

Baum, C. F.; Mark E. Schaffer; and Steven Stillman. (2003). Instrumental Variables and GMM: Estimation and Testing. Boston College Working Paper no. 545. Chestnut Hill, Mass.: Boston College.

Blundell, R, and Stephen B. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics* 87, no. 1: 115–43.

Belman, D. and T. M. Lee**. (**1996). International Trade and the Performance of U.S. Labor Markets, in *U.S. Trade Policy and Global Growth: New Directions in the International Economy*, edited by Robert A. Blecker. M.E. Sharpe.

Beaulieu, E. (2000). The Canada-U.S. Free Trade Agreement and Labour Market Adjustment in Canada. *Canadian Journal of Economics*, Vol. 33(2), pp. 540-63.

David Greenaway & Robert Hine & Peter Wright, (2000).Further evidence on the effect of foreign competition on industry level wages, *Review of World Economics* (Weltwirtschaftliches Archiv), Springer, vol. 136(3), pages 522-538, 09

Edwards, L. and R.Z. Lawrence. (2010). US Trade and Wages: The Misleading Implications of Conventional Trade Theory. NBER Working Paper, No. 16106, forthcoming in Rising Tide: Is Growth in Emerging Markets Good for the United States?, Peterson Institute for International Economics, Washington.

Gaston, N. and Trefler, D. (1997). The Labour Market Consequences of the Canada–US Free Trade Agreement', Canadian Journal of Economics 30(1): 18-41.

Grotkowska, G. (2005). 'Impact of International Trade on Employment in Polish industrial sector'. (www.seminar.wne.uw.edu.pl/index.php?n=Main. RS0506w (Accessed on 1-1-2009).

Giovannetti B. and Menezes-Filho N. (2006**).** Trade Liberalization and Demand for Skill in Brazil", IBMEC Working Paper – WPE, September, 2006

Hasan, R. (2001). Impact of Trade and Labor Market Regulations on Employment and Wage: Evidence from Developing Countries,' East-West Working Papers No.32.

Hasan, R., Mitra D. and K.V. Ramaswamy (2007). Trade Reforms, Labor Regulations and Labor-Demand Elasticities: Empirical Evidence From India. *Review of Economics and Statistics*, 89(3): 466-81.

Helpman, E., O. I. M. Muendler and S. R. (2012). Trade and Inequality: Fro Theory to Estimation,.NBER Working Paper, 17991.

Hoekman, B. and Winters, A. (2005). Trade and Employment: Stylized Facts and Research Findings, Policy Research Working Paper 3676, Washington, DC: World Bank.

Hine, Chris R., Wright, P. W., (1998). 'Trade with Low Wage Economies, Employment and Productivity in UK Manufacturing,' *The Economic Journal*, Vol. 108, 1500-1510.

Iqbal, J, Mahmood, Z. and Nosheen M. (2012). How do Wages and Employment Adjust to Trade Liberalization? A Case of Pakistan, Journal of Business & Economics, Vol 4. No. 1 2013.

Khan, A. H., (1998). The Expereince of Trade Liberalization in Pakistan. *The Pakistan Development Review,* 37: 4 Part II Winter 1998 pp. 37:4,661-685.

Kien, T. N. and Yoon H. (2009). Impacts of Trade Liberalization on Employment in Vietnam: A System Generalized Method of Moments Estimation. *The Developing Economies* 47, no. 1: 81–103.

Krishna, P., Jennifer P. P., and Mine Z. S. (2012). Trade, Labor Market Frictions, and Residual Wage Inequality across Worker Groups. *American Economic Review*, 102(3): 417-23.

Lee, Eddy (2005). 'Trade Liberalization and Employment,' DESA Working Paper No.5. (http://www.un.org/esa/desa/papers/2005/wp5_2005.pdf (Accessed on 01-01-2014).

Naqvi, S. N. H and Kemal, A.R. (1991). Protectionism and Efficiency in Manufacturings: a case study of Pakistan, A co-publication of International Center for Economic Growth and Pakistan Institute of Development Economics, ICS Press San Francisco, California.

Nickell, S. 1981. Biases in Dynamic Models with Fixed Effects. *Econometrica* 49, no. 6: 1417–26.

Oscarsson, Eva (2000). 'Trade, Employment and Wages in Sweden 1975-93', Department of Economics, Stockholm University.(HTTP://WWW.NE.SU.SE/PAPER/WP00_08.PDF ACCESSED ON 1-1-08).

Rama, M. (2003a): Globalisation and the Labour Market, The World Bank Research Observer, Vol. 18 (2), pp. 159-186.

Revenga, A. (1992). 'Exporting Jobs: The Impact of Import Competition on Employment and Wages in U.S. Manufacturing', *Quarterly Journal of Economics*, 107: 255-285.

Revenga, A., (1997). Employment and Wage Effects of Trade Liberalization: The Case of Mexican Manufacturing, *Journal of Labor Economics*, Vol. 13, No. 3, Part 2, pp. S20-43.

Riihimaki, E., (2005). Economic Integration and the Elasticities of Labor Demand: Econometric Evidence from Finland, HECER Discussion Paper No. 46 , University of Helsinki.

Slaughter, M.J. (2001). International trade and labor-demand elasticities, *Journal of International Economics*, 54, 27-56.

Yasin, M. (2007). Trade Liberalization and Its Impact on the Relative Wage and Employment of Unskilled Workers in the United States, *Southwestern Economic Reviews*, 34(1), 89-101.

Wood, A. (1997). Openness and Wage Inequality in Developing Countries: the Latin American Challenge to East Asian Conventional Wisdom*, The World Bank Economic Review*, *Vol. 11, No. 1*

Appendices

Appendix-A1 Regression results (Production Workers)		
	Differenced GMM	System GMM
Variables	Employment	Employment
	Model-1	Model-3
Real wages	-2.446 (-2.145)**	-0.226 (-3.114)**
Employment lag	0.424 (4.668)**	0.228 (4.568)**
Employment	-	-
Wage lag	-	-
Output	0.105 (2.098)**	0.257 (3.098)**
Liberalization	0.175 (2.206)**	0.173 (2.654)**
Exports	0.124 (2.556)*	0.173 (1.994)**
Imports	-0.073 (-1.754)	-0.063 (-1.654)
Time Trend	-0.018 (-1.182)	-0.048 (-1.162)
R-squared	0.6449	0.7321
No. of Observation	144	144
No. of Industries	18	18
Hansen J-Test: P-value	0.09341	0.24438
Wald Test (Joint Significance): p-value	0.0000	0.0000

Note: *Significant at 10% level, ** significant at 5% level a) Robust t-statistics are given in parentheses) Standard errors are HAC heterosckedasticity-and autocorrelation-consistent) or Newey-West standard errors

Appendix-A2 Regression results (Non-Production Workers)		
	Differenced GMM	System GMM
Variables	Employment	Employment
	Eq-1	Eq-3
Real wages	-1.527 (-2.136)**	-1.517 (-2.146)**
Employment lag	0.428 (4.568)**	0.328 (2.568)**
Employment	-	-
Wage lag	-	-
Output	0.057 (2.098)**	0.422 (2.098)**
Liberalization	0.073 (1.754)*	0.034 (1.685)**
Exports	0.446 (1.145)	0.226 (1.114)
Imports	0.024 (2.668)**	0.028 (1.868)*
Time Trend	0.048 (1.862)*	0.048 (1.182)
R-squared	0.6621	0.6321
No. of Observation	144	144
No. of Industries	18	18

Hansen J-Test: P-value	0.2003	0.2443
Wald Test (Joint Significance): p-value	0.000	0.000

Note: *Significant at 10% level, ** significant at 5% level a) Robust t-statistics are given in parentheses.
b) Standard errors are HAC heterosckedasticity-and autocorrelation-consistent) or   Newey-West standard errors

Appendix -A3 Average rate of Import Duty with and without Exemption/Concessions					
Year	Average Tariff rate*	Average Tariff rate**	Year	Average Tariff rate*	Average Tariff rate**
1990-91	23.0	39.0	2001-02	9.1	15.1
1991-92	17.9	32.6	2002-03	9.3	15.6
1992-93	20.8	35.3	2003-04	4.8	7.5
1993-94	20.6	34.7	2004-05	8.8	13.3
1994-95	21.6	33.5	2005-06	8.1	13.1
1995-96	21.6	34.6	2006-07	7.1	13.1
1996-97	19.6	22.9	2007-08	6.5	12.7
1997-98	15.7	20.7	2008-09	5.7	11.7
1998-99	13.5	17.7	2009-10	5.7	12.5
1999-00	12.3	17.7	2010-11	5.6	12.7
2000-01	10.5	17.0			

*With dutiable imports, ** Without dutiable imports
Source: Various issues of CBR/FBR

Appendix-A4 Production workers employment							
Industries	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06
Beverages	5042	6116	2608	2564	5743	11416	7806	3439
Drugs &Medicines	4780	9900	14500	8100	10013	9500	4213	3771
Electrical machinery	10435	3486	53170	4503	3865	27071	44315	11587
Food	25627	722	9650	43408	57736	54971	10132	90982
Glass , Products and Non-Metalic Products	12660	5981	1136	7172	19226	33133	10068	32635
Industrial Chemicals	342	43408	2564	7091	15973	7338	5596	48007
Iron & Steel	19746	14596	14426	7208	54971	2206	4847	44299
Leather and Footwear	8802	16203	1004	35255	1643	9500	16700	21593
Metal Products	19238	11496	85298	16575	12538	14292	6390	6817
Non-Electrical Machinery	1387	7387	14638	25285	4972	14041	14051	19434
Other Chemicals	15131	9241	12693	6962	403	8566	17007	3708
Other Manufacturing	13459	19229	8638	12023	15420	15718	10408	11553
Petroleum & Coal Products	36341	7306	14841	12099	11873	14121	17736	2416
Rubber Products	2806	4568	204192	16841	11493	14344	10811	7048
Textiles	6185	8374	575	2549	9543	3990	7789	37070
Tobacco	11672	7764	10001	11908	2258	28010	1579	3858
Transport Equipment	12783	12910	14612	11362	8212	2103	2804	14856
Wearing Apparel	7692	55	8185	16927	14136	9717	11757	54016
Wood , Printing and Paper products	3495	7336	13698	6488	2964	3986	455	11174

Source: Various issues of CMI

Appendix-A5 Non-Production workers employment								
Industries	1970-71	1975-76	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06
Beverages	3941	2727	2069	3520	1004	2947	2079	4998
Drugs &Medicines	854	3587	3139	1845	3207	3959	6945	13452
Electrical machinery	3418	427	2013	3298	4974	4490	6763	3186
Food	16554	738	2910	19185	223	1893	8129	37564
Glass , Products and Non-Metalic Products	5129	2937	603	1170	5935	10940	1706	7280
Industrial Chemicals	286	22216	3520	2622	30562	1635	1480	9791
Iron & Steel	4879	4075	4240	497	23241	2465	854	5480
Leather and Footwear	2443	5140	498	16825	2019	3223	2700	3078
Metal Products	33995	2180	2735	5334	8501	5745	2647	1823
Non-Electrical Machinery	411	1500	4526	7914	1382	3233	6276	4482
Other Chemicals	4878	5957	6676	3065	1792	2912	4901	873
Other Manufacturing	3746	5060	1820	2201	3834	4254	797	863
Petroleum & Coal Products	6499	1536	3911	5070	5480	260	8149	1535
Rubber Products	2695	1406	33862	2793	3107	4562	7205	2130
Textiles	3756	24314	13711	11684	34090	13841	31758	66670
Tobacco	2563	1949	2392	3656	2982	18874	3756	519
Transport Equipment	2791	3494	10005	4269	2406	484	1120	5053
Wearing Apparel	2307	600	170	12989	3387	2261	3413	8116
Wood , Printing and Paper products	657	2074	4240	4444	3832	2964	2322	4495

Source: Various issues of CMI