

The Impact of Trade on Wages and Employment: Does Firms' Size Matter?

by

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Abstract

Recently there has been public and academic debate as to whether small and medium scale enterprises in developing countries can survive the process of world trade liberalization. This study investigates this issue by investigating the impact of trade on labor demand in Pakistan in the context of small, medium and large scale manufacturing firms. Our empirical findings do not support the idea that small scale industries would be hurt by international trade. In the post liberalization period, employment of both small and large scale industries have been increased, while that of medium scale industries have been declined. On the other hand, trade has not significant impact on wages of workers in all industries.

Keywords: Small and Medium Enterprises, Wages, Employment, Trade

1. Introduction

Pakistan initiated deregulation and liberalization of the economy in the late 1990s as a result of structural adjustment program. In the past, the economy of Pakistan subjected to different type of trade restrictions in order to protect the economy from foreign competition and to encourage industrialization in the country. The restricted trade regime resulted in inefficiency in the manufacturing sector and the economy lagged behind in competitiveness. Pakistan initiated restructuring the economy by moving towards free trade through gradual reduction in import duties and other non-tariff barriers. The government of Pakistan not only relied on reducing import duties but in most of the cases, 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. Furthermore, to cascade¹the tariff structure, the earlier surcharges and taxes also known as para tariffs were merged with statutory tariff (national tariffs) regimes. Most of the items that were not importable earlier were made importable, however, there was some exception for goods prohibited because of religious, health as well as security considerations (Khan, 1998).

¹Higer tariff for final goods and lower tariff for inputs

The ongoing process of globalization and the increasing international competition generates interesting questions on their impact on the performance of small and medium scale enterprises. However, the literature shows that the impact of increasing competition induced by free trade tends to be unclear (Colantone, Coucke, & Sleuwagen, 2010, Asiedu & Freeman, 2007). There are different views in this regard; one of the opinions is that since small firms do not have the ability to face foreign competition, hence trade liberalization and competition may have negative impact on SMEs, in particular in developing countries where capital markets are not much developed. This argument has been supported by UNCTAD (2004) which indicates that foreign firms are well established and are strong enough that infiltrate in the market of developing countries while making it a challengeable for SMEs to withstand these firms in the market. In other words trade promotes competition which is supposed to be not in favor of SMEs. This argument is justified on the basis that “being small” these firms have find it difficult to adopt and apply new technology, they have difficulty in learning because of the high cost, and they have low capacity to enjoy economies of scale. The empirical evidence on export performance shows that unlike large firms, SMEs do not perform well (see, for example, Roberts & Tybout, 1997; Bernard & Jensen, 1999).

Another view for low performance of SMEs in the face of increasing competition is the limited access of SMEs to financial markets (Cooley & Quadrini, 2001). As one of the main factors affecting access to financial markets is the type of moral hazard and adverse selection prevailing at the debtor part. Unlike large firms, SMEs are commonly more opaque, less likely to have collateral and often do not have audited financial statements (Beck, 2007). This idea has been supported by many of the empirical studies which show that growth of small firms has been limited by the inaccessibility of SMEs to financial markets [Beck, Demirgüç-Kunt, and Martínez Pería (2011) and Beck, Demirgüç-Kunt, and Maksimovic (2005)].

However, there is some argument/ views in favor of small firms in the literature. Some studies show that SMEs can more easily adapt to the changing global environment. According to Audretsch (2004), since competition in the global market has resulted in a shift towards knowledge based economy, whereas unlike, large firms, small firms have no bureaucratic structure making it much easier for them to adopt new processes and products that make small firms to survive in the market. Another argument in favor of Small firms is that they these firms could play an important role in transferring technology characterized as small scale, labor intensive and requiring technical knowhow (Buckley (1997). Colantone et al. (2010) are of the view that trade and foreign competition can have heterogeneous effect on firms on of different size due to two reasons. First, thanks to high output flexibility they find it easier to adapt to global changing demand condition. Secondly, small firms in order to escape from stiff competition of foreign firms, divert itself to specializing in specific niche markets.

In order to empirically test this idea, Holmes and Stevens (2010) come up with a study in which they bifurcates industries in two major groups; large industries Vs. small industries. Large industries are apparently those producing standardized goods while small industries are assumed to produce custom or specialty goods. The authors using US imports from Chinese companies as a proxy for foreign competition, analyzes the impact on large and small firms. The empirical findings corroborate the prediction of the model by concluding that unlike small firms, large firms were more profoundly affected with foreign competition.

In the literature the studies investigating performance of SMEs are mostly related to developed countries. Only few of the studies are there which focus on developing countries. It is evidenced by the fact that David B. Audretsch (2003) has compiled and edited 24 papers on SMEs and trade liberalization and globalization but on one of the study is related to developing countries.

With regard to developing countries, some hold that small firms will have difficulty to survive greater trade liberalization because of their inability to meet the increased export demand as they have very low capacity of production. Therefore, it is difficult for small producers to sustain their exports even if they have access to international markets. Trade liberalization may, therefore, imply an adverse impact on labor markets in small firms (Tewari and Jeffery Goebel, 2002). On the other hand, large scale industries lobby government for subsidies, technology transfer, import of machinery and inputs; therefore, they are beneficiary of protection (Tybout, 2000).

Peres and Stumpo (2000) using a sample of Latin American countries to explore the impact of economic reforms on employment and productivity of SMEs. It shows that those small firms are not the loser over all despite the heterogeneous performance with the SMEs. Álvarez and Vergara (2013)² examines the impact of the relationship between survival, employment growth and firm size in the context of small and medium sized enterprises. The study finds no evidence on negative impact of trade on SMEs performance. In terms of employment, there is no evidence that SMEs are more negatively affected by higher international competition.

The Impact of Trade on Domestic Firms

According to Tambunan (2007; 2008a) the impact of trade on domestic firms can be explained in four different channels. First free trade results in increasing trade competition through reduction in tariff and non-tariff barriers. It results in an increasing flow of goods in the domestic market which puts a competitive pressure on local firms to increase its efficiency through reducing its excessive cost components, adopting latest technology, exploiting economies of scale and by applying better management procedures/ practices. According to the new international trade theory, trade expands market size which in turn has an effect on economies of scale. Scale economies helps firms to adopt better technologies through R & D that results in cost advantage to the firms. Furthermore, according to the export literature, large firms are able to have access to information in the international markets and can easily tackle the issue of uncertainties prevailing at foreign markets. Secondly, increasing openness to trade results in inflow of cheap raw materials and inputs. Cheaper imports help small firms with their price competitiveness and they are in better position to compete in domestic as well in foreign markets. However, this hypothesis is contingent upon two assumptions; first is that other factors such as labor costs and transportation cost remain constant whereas, the other assumption is that many of the domestic firms are dependent upon imported inputs rather than the domestic inputs and trade helped them in declining input prices compared to domestic inputs. The third channel is the increasing or expanding export markets opportunities by free trade. The expanding export market helped small firms to increase its efficiency of the firms involved in exports. This hypothesis too is impinging upon the assumption that other factors affecting the efficiency of the firms such as production capacity, labor and energy costs, and government regulations do not change. Finally the fourth channel through which trade is supposed to affect SMEs negatively is that free trade also encourages export of local inputs at the expense of locally produced final output. If domestic inputs are to receive better price in the foreign markets than the domestic markets, it will result in lower supply of local inputs in local markets and will result in scarcity of inputs supply to domestic production.

²We in particular do acknowledge that we have much benefitted from the recent paper of Álvarez and Vergara (2013) on literature on SMEs.

2. 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.

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

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 $i = 1, 2, \dots, n$ and from $t = 1, 2, \dots, T$. In this model capital and labor are rewarded against their marginal productivity, while simultaneously solving the equation (1) and eliminating the capital from this equation will result in the following model.

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

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

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

where

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

$$\text{and} \quad \theta_2 = 1 / (\alpha + \beta)$$

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:

$$A_{it} = e^{\delta_0 Tt} M_{it}^{\delta_1} X_{it}^{\delta_2}, \quad \delta_0, \delta_1, \delta_2 > 0 \quad (4)$$

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 $t=1, 2, \dots, T$. 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 u_{it} represent error term which can be decomposed further into cross sectional and time effect.

3. Research Methodology

Estimation Procedure

In response to shocks such as trade shock, adjustment of employment and wages is not contemporary rather there is a time lag 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). Furthermore, estimation of labor demand and wage equation involve the possibility of endogeneity in the model. To deal with endogeneity issues, 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, a GMM estimator makes use of all available moment conditions and therefore, yields not only consistent but efficient estimates also. (Baum, Schaffer, and Stillman 2003).

Data

The data set consist of a panel of time series data covering a period of 1970-71 to 2005-06 and a cross section of 18 large scale manufacturing industries. The data are used with a gap of 5 years continuous as time series data were not available on regular basis. For the analysis, this thesis uses industries at 3-digit level according to Pakistan Standard Industrial Classification (PSIC).

The industries are classified into three groups; small, medium and large on the basis of size of employment. A firm in which average daily persons per establishment employed are 10 or less than 50 persons is classified as small industries, whereas firms having employees above 50 or less than 249 are classified as medium scale industries. Finally, industries with 250 persons or above per establishment are labeled as large scale industries.³

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).

4. Results Analysis

Estimation Results

To investigate the impact of trade on labor markets, we initiate by relating the changes in employment and wages of small scale manufacturing industries with changes in average tariff rate

³Since most of the industries reported by CMI lie in the range of 50-249 employed persons, therefore, they were classified as medium scale industries. The classification of enterprises into small and medium vary from country to country. Until 2005, in Pakistan, there was not any formal definition of small and medium enterprises but in 2005, the State Bank of Pakistan defined that the enterprises in which the number of employed persons is less than 50; are small, whereas, the enterprises having the number of employees above 50 and less than 250; are medium scale enterprises. (See detail on <http://www.gcu.edu.pk/publications/vc-sme.pdf>). Our data are based on CMI, where the industries are classified under different segments by size of employees; I have selected the medium scale enterprises / industries, as those, where number of employees lie in the range of 50 to 249.

and domestic demand. We report the empirical results in table-1. It shows that in the aftermath of trade liberalization, employment in small scale industries have increased further with reduction in import duties. Turning to the impact of trade on changes in wages rate, the results indicate that trade liberalization has no significant impact on wages of small scale industries though the sign of trade coefficient is negative. These results indicate that in the face of increasing competition induced by free trade, small scale industries have relied on reducing inputs and other production related cost. In the literature it is known as competition effect (Tambunan, 2011). Domestic demand does not have any significant effect on employment of small scale industries; however, it has significantly positive impact on wages of small scale industries. The signs of other independent variables are almost according to the theory and show an interesting pattern. Exports have significantly positive impact on employment but have significantly negative impact on wages of small scale industries. This effect is not surprising. As to improve the efficiency and competitiveness, small scale firms compete by curbing input costs. On the other hand imports have significantly negative impact on employment but have positive impact on wages of small scale industries. This finding indicates an interesting pattern that imports have employment displacing impact on small scale industries.

Table 1 Regression Results of Small Scale Industries

Variable	Employment		Wages	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Intercept	4.615	(0.821)	2.975	(1.90)*
Employment			1.090	(18.57)**
Employment lag	0.144	(1.057)		
Wages	0.776	(10.955)**		
Wage lag			0.113	(1.14)
Output	-0.024	(-0.496)	0.123	(2.43)**
Average tariff rate	-0.207	(1.774)*	0.008	(0.07)
Exports	0.121	(3.172)**	-0.081	(-2.37)**
Imports	-0.222	(-2.450)**	0.069	(0.68)
Time trend	0.030	(2.420)**	-0.014	(-0.90)
No. of Observation	104	104	104	104
No. of Industries	13	13	13	13
Hansen J-Test :P-value	0.158		0.198	
Wald Test (Joint Significance): p-value	0.00		0.00	

Notes: *significant at 10% level, ** significant at 5% level

a) Robust t-statistics are given in parentheses. b) Standard errors are HAC (heteroskedasticity-and autocorrelation-consistent) or Newey-West standard errors

Empirical results correlating trade variables with labor demand of medium scale industries are reported in Table-2. Trade variables, average tariff rate, exports and imports do not have favorable impact on employment of medium scale industries. Employment has been reduced as result of trade liberalization induced by reduction in import duties. Domestic output and exports surprisingly have affected employment in the medium scale industries negatively. As far the impact of trade on wages of medium scale industries is concerned, it shows that trade has positive but insignificant impact on

wages of medium scale industries. Other variables have expected signs. Domestic output have favorable impact on wages, whereas, exports and imports have no significant impact on wages.

Finally, the empirical findings on the impact of trade on labor demand of large scale industries are reported in Table-3. As per our expectation, trade (average tariff rate) has significantly positive impact on employment of large scale industries. The impacts of other explanatory variables are according to the theory. Domestic output and exports carry expected signs but both tends to have insignificant impact on employment however, imports have a significant employment displacing effect on large scale industries.

Table 2 Regression Results of Medium Scale Industries

	Employment		Wages	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic
Intercept	1.325	(0.224)	0.975	(1.30)
Employment			1.089	(-18.569)**
Employment lag	0.144	(1.057)		
Wages	0.776	(10.954)**		
Wage lag			0.113	(-1.141)
Output	-0.024	(0.496)	0.122	(-2.431)**
Average tariff rate	-0.207	(-1.774)*	0.008	(-0.069)
Exports	0.121	(3.172)**	-0.081	(-2.365)**
Imports	-0.223	(-2.449)**	0.069	-0.681
Time trend	0.030	(2.419)**	-0.014	(-0.898)
No. of Observation	104	104	104	104
No. of Industries	13	13	13	13
Hansen J-Test :P-value	0.750		0.658	
Wald Test (Joint Significance): p-value	0.00		0.00	

Notes: *significant at 10% level, ** significant at 5% level

a) Robust t-statistics are given in parentheses. b) Standard errors are HAC (heteroskedasticity-and autocorrelation-consistent) or Newey-West standard errors

On the other hand, wages tends to have not been affected by increasing trade liberalization. The remaining independent variables especially, domestic output, exports and imports have positive impact on wages but the coefficients of exports and imports are insignificant.

Our results confirm results of (Birch 1987). Birch analyzing the performance of small and large firm in response of liberalization found that small firms equally performed better in term of employment along with the large firm after liberalization. Similarly, our results also confirm results of Álvarez and Vergara (2013) and Wilson and Stumpo (2000).

Diagnostics Tests

We have used instrumental variable technique; the GMM approach in order to account for the endogeneity problem in estimating the employment and wage equation. As the use of GMM approach requires using instruments. We have checked the validity of instrumental variables 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 almost in all cases.⁴ Furthermore, all estimates are based upon HAC (Heteroskedasticity-Auto-correlation Consistent) robust standard errors; hence there is no issue of heteroskedasticity and auto correlation

Table 3 Regression Results of Large Scale Industries

Variable	Employment		Wages	
	Coefficient	t-Statistic	Coefficient	t-Statistic
	4.615038	(0.821)	2.97466	(1.902)*
Employment			0.843527	(7.503)**
Employment lag	0.494373	(1.702)*		
Wages	0.427484	(2.297)**		
Wage lag			-0.393679	(-1.570)
Output	0.12573	(0.581)	0.2831	(2.617)**
Average tariff rate	-0.313163	(-1.866)*	0.008727	(0.098)
Exports	0.076206	(0.565)	0.030847	(0.590)
Imports	-0.523596	(-2.190)**	0.105038	(1.798)*
Time trend	0.010909	(1.107)	0.017352	(2.613)**
No. of Observation	104	104	104	104
No. of Industries	13	13	13	13
Hansen J-Test :P-value	0.486		0.032	
Wald Test (Joint Significance): p-value	0.00		0.00	

Notes: *significant at 10% level, ** significant at 5% level

a) Robust t-statistics are given in parentheses. b) Standard errors are HAC (heteroskedasticity-and autocorrelation-consistent) or Newey-West standard errors

5. Conclusion

The empirical evidence on employment and wages in small, medium and large scale industries show that in the post liberalization period, employment in small, medium and large scale industries have been increased, whereas it has been decreased in medium scale industries. On other hand, trade liberalization does not have any significant impact on wages of all type of workers in small, medium and large scale industries. Unlike our expectation, in the face of increasing trade liberalization, both small and large scale industries perform better in term of employment. However, wages do not show any improvement which indicates that the adjustment of labor to trade shock is through wages and not employment. However, one question needs to be answered is that the workers in medium scale industries do not show any increase in employment and wages. There are a large number of workers in firms which have been characterized as medium scale industries. Further research in this area would be important.

⁴Except in wage equation for large scale industries, the p-value of Hansen J test is significant at 10 percent.

References

- Alvarez R. and Vergara S. (2013). 'Trade exposure, survival and growth of small and medium-size firms', *International Review of Economics and Finance*, 25 (2013) 185–201.
- Asiedu, E., & Freeman, J. A. (2007). 'The effect of globalization on firm profits: Do owners' race/ethnicity matter?' *American Economic Review*, 97(2), 368–372.
- Audretsch, D. B. (2004). 'Sustaining Innovation and Growth: Public Policy Support for Entrepreneurship', *Industry and Innovation*, 11(3), 167–191.
- Bernard, A. B., & Jensen, B. J. (1999). Exceptional exporter performance: Cause, effect, or both. *Journal of International Economics*, 47(1), 1–25.
- Beck, T. (2007). 'Financing Constraints of SMEs in Developing Countries: Evidence, Determinants and Solutions,' mimeo, World Bank.
- Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2005). 'Financial and legal constraints to growth: Does firm size matter,' *The Journal of Finance*, LX(1), 137–177.
- Beck, T., Demirgüç-Kunt, A., & Martínez Pería, M. S. (2011). 'Bank financing for SMEs: Evidence across countries and bank ownership types,' *Journal of Financial Services Research*, 9(1–2), 35–54.
- Birch, David L. (1987). 'Job Creation in America: How Our Smallest Companies Put the Most People to Work,' Free Press, New York,
- Blundell, R, and Stephen B. (1998). 'Initial Conditions and Moment Restrictions in Dynamic Panel Data Models,' *Journal of Econometrics* 87, no. 1: 115–43.
- Buckley, P. (1997). 'International technology transfer by small and medium-sized enterprises,' *Small Business Economics*, 9(1), 67–78.
- Colantone, I., Coucke, K., & Sleuwagen, L. (2010). 'Low-cost import competition: Do small firms respond differently?': Katholieke Universiteit Leuven.
- Cooley, T., & Quadrini, V. (2001). 'Financial markets and firm dynamics,' *American Economic Review*, 91(5), 1286–1310.
- Holmes, Th. J., & Stevens, J. J. (2010). An alternative theory of the plant size distribution with an application to trade. *NBER working paper* no. 15957.
- 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 Experience 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.

Peres, Wilson and Giovanni Stumpo(2000), ‘Small and Medium-Sized Manufacturing Enterprises in Latin America and the Caribbean under the New Economic Model’, *World Development*, Vol.28, No. 9, pp. 1643-1655

Roberts, M., &Tybout, J. (1997). The decision to export in Colombia: an empirical model of entry with sunk costs. *American Economic Review*, 87(4), 545–564.

Tambunan, T. T. H. (2007). Trade and investment liberalization effects on small and medium-sized enterprise development: a literature survey and case study of Indonesia. In UNESCAP (Ed.) *Towards coherent policy frameworks: Understanding trade and investment linkages*. Studies in trade and investment no. 62. Bangkok: UNESCAP.

Tambunan, T. T. H. (2008a). Trade liberalization effects on the development of small and medium-sized enterprises in Indonesia: A case study. *Asia-Pacific Development Journal* 15(2), 35–59.

Tambunan, T. T. H. (2010). *Trade liberalization and SMEs in ASEAN*. New York: Nova Scotia Science

Tewari, M. & Goebel, J. (2002, April). Small firm competitiveness in a trade liberalized world: lessons for Tamil Nadu (Research paper). New Delhi: Global Development Network.

Tybout, J. R. (2000). Manufacturing firms in developing countries: How well do they do, and why? *Journal of Economic Literature* 38(1), 11–44.

United Nations Conference on Trade and Development (UNCTAD) (2004). *Promoting the export competitiveness of SMEs*, issues note by UNCTAD secretariat.