Trade Liberalization and Industrial Growth in Pakistan: Co integration Analysis (1990-2017

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18 April 2019

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Abstract

Free trade is the absence of any restrictions either through import duties or otherwise of the commercial movements of the goods and services as well as of the finances between a particular country and the rest of the world. The importance of trade is typically expressed relative to the size of a country's economy. Through this paper we will analyze the attempts in Pakistan to liberalize her foreign trade regime. We apply co integration analysis, which will tell us about the long run relationship between trade liberalization and industrial growth. The time period of the study has been set 1990-2017 and the Error Correction Model after the existence of co-integration is applied showing the speed of adjustment i.e. the lag of error term has been found negative and significant with existence of long run relationship between trade liberalization and Industrial Growth in Pakistan with a convergence mode of relationship that confirmed that incase of any structural change or policy shocks the relationship can be bring back to its normal position with an speed of -21.

Section 1
Introduction

In recent years, the relation between trade liberalization and economic Growth in developing countries has become a central topic of debate among development economists (Ellahi & Mehmood, 2009). Does trade liberalization raise economic growth in developing countries, and if it does, why? Firstly the emergence of endogenous growth theory has provided a theoretical framework for undertaking empirical work on the relation between trade policies and economic growth. Free trade is the absence of any restrictions either through import duties or otherwise of the commercial movements of the goods and services as well as of the finances between a particular country and the rest of the world. The importance of trade is typically expressed relative to the size of a country's economy. The case for free trade presented to student as un assessable wisdom result on shallow argument and the sake grants of our value judgment shared by economists but not it seems by the general public. (Tyleor, 1981) states that if all countries carryout free trade policies the world economy can achieve a more efficient allocation of resources and a higher level of material well being than it can without trade. Usually most of the economists support free trade and offer advocacy to students rather than an accurate presentation of the benefits and costs and have dual representation about the gains and lost. Chamberlin, (2014) speculates that in economists' culture, the arguments for free trade is a kind of institution: '200 years of tradition that has short-circuited their critical thinking'. Perhaps, but something deeper may be at work. William Poole (a free trade advocate) stresses that 'the case for free international

trade is really part of a more general case for free markets and if so, what is at stake is much bigger than just whether tariffs are good or bad; it's the ideology of laissez-faire itself?

The contemporary effort to make it easy to exchange goods and services capital, labor, information and ideas across the borders is knows as trade openness. This is to integrate economies and societies at global level. Openness has helped movements of resources from developed to developing economies and helped technological advancements (Muhammad 2012). Improvement of transportation and communication has helped rediscover the opportunities at global level and identify new international markets for exchange of goods and services. This paper is motivated by the recent attempts in Pakistan to liberalize her foreign trade regime because after the adoption of Structural Adjustment Program most of the nations are following trade liberalization. Our focus in this study will be on Co-Integration and Error Correction Model because this not only shows the long run relationship but it also tells us about the speed of adjustment that resulted because of the policy shocks and structural changes while the regression methodology appears to encounter spurious regression problems if the variables of interest are non-stationary but the standard growth theories provide the conditions for only long run steady state equilibrium (Ellahi & Mehmood, 2009). The co integration analysis, on the other hand not only searches for a linear combination of non stationary time series that is itself stationary, bur also makes an attempt using an error correction term to investigate the dynamic behavior of the process of adjustments from short run disequilibria to long run equilibrium. With this background in mind, this paper empirically analysis the relationship between trade liberalization and industrial growth in Pakistan during the period 1990-2017.

Economy of Pakistan has observed many ups and down in its journey from independence 1947 to 2017. The country has taste the golden periods of 1960's and the worse of 1970's (Siddique and Iqbaal April, 2005). The adoption of Structural Adjustment Program, allowed Pakistan to make focus on free trade not only within the region but with all over the world. A dynamic process through which a nation starts with the production of primary commodities and afterwards shifts to development by embarking on secondary commodities production and eventually expanding their tertiary i.e. services sector until all these sectors of the economy are integrated because, development requires, in the first place, integration of various sectors of the domestic economy (Sultan 2008). Objective of this study is to examine the relationship between Trade Liberalization and Industrial Growth in Pakistan, and to present policy recommendations regarding the trade and industrial sector. The paper will discuss the behavior or trade liberalization with industrial growth in Pakistan. In chapter first we have briefly highlighted that what the actual problem we are looking to solve. The reminder of this paper is organized as follows. Section two spells out the relation between trade liberalization and endogenous growth related past studies. The theoretical framework of the study is presented in section three. Section four will highlight models as an aggregate industrial production function for Pakistan with empirical findings and result output. Chapter five will be the chapter of discussion of the

findings and results with policy recommendation and future research work for the new researchers in this field of interest.

Section II:
Past Studies on the Topic

Economic Literature provides empirical evidence of productivity and supply side effects of trade openness on domestic output and hence on economic growth by increasing capital formation and total factor productivity the major tools or components of industrial sectors. (Kruger 1978), concluded that trade liberalization encourages specialization in industries which have economies of scale that leads to improve efficiency and productivity in long term and (Tyleor 1981), used data for OPEC and middle income economies and concluded that a growth in manufacturing exports leads technological progress which increases absorptive capacity and in resulting raises industrial and economic growth. (Robbinson 1991), showed that growth in exports raise total factor productivity growth by increasing competitive and economies of scale while imports growth retards growth in total factor productivity. (Barro and Martin 1995), argued that in long run trade openness may contribute economic growth by diffusion technical knowledge by importing high tech imports items and from the spillover effects of foreign direct investments with the collaboration with the sources of innovations. Using Cross sectional data for 90 countries, (Romer 1990), investigated the relationship between trade openness and industrial growth, Romer pointed out that trade openness helps in getting wide range of innovations to raise domestic product and hence rate of economic growth boost up with supporting the industrial sector to shift from raw material goods to secondary and manufactured goods. (Chamberlin 2014), argued that human capital formation tends to increase the positive effect of trade openness on economic and industrial growth, with positive casual directions at certain levels of trade liberalization and then declines because of higher growing specialization lead to higher prices of the commodity and causing lower demand of the goods. (Dollar and Karray 2003), investigated the effects of trade openness and institutions on economic growth and reported that more open economies with better institutions develop faster and countries trade more with better institutions. (Romer 1990), tested the significance of an endogenous growth model, and found that economic openness by taking advantage of a wider range of innovations increases the growth rate, hence both the casual variables can be moved to a single and observed directions casually effecting each other. (Vallumea 1994), empirically analyzed that the endogenous growth model, particularly the positive effects of public policies of openness and investment in human capital, boosting up the industrial output and leading towards the expansion of countries exports promoting employment and economic growth of the state. (Ahmad 1999), studied the behavior trade liberalization and investment on human capital in case for Bangladesh and found that both are positively participating in respective manners higher the investment on human capital higher will be the industrial growth and output of the economy and expansion of the economies of scale.

Section III
Methodology and Theoretical Framework

Methodology is the key factor to analyze the impact and casual effects of the existing variables. For any time series it is important to check out the stationary problem because of to avoid spurious regression. So through Unit root test it will try to checkout that at which level the variables are stationary. After making the variables stationary the data will be run through co linearity process to check out the correlation among the dependent and independent variables. Third step we will analyze the data descriptively with their past trends and behavior, and finally we will regress the dependent check the co integration through Johnson Co integration method. The results and policy recommendation will be made after the completion of Analysis process.

The strength of any study is directly depending upon the chosen variables that can clearly describe the behavior of the phenomenon. So for ongoing project work we will make our focus on the following variables with their short past behavior.

3.1   Historical Trends in Industrial Growth
1. Growth in Industrial Sector

Pakistan Industrial sector have seen fluctuating growth and changes during its entire period. The highest growth achieved in 60's has seen the negative growth in seventies, nineties and early 20's. From the below figures we can see that the industrial sectors has observed negative growth in 1972, 2009 and 2013, while the sector have seen growth over more than 15% in 1961, 1970 and 2004 but the growth in 2000-2007 is consider as empty balloon growth in the economy where mostly nominal growth has been observed (Siddique et.al 2005)
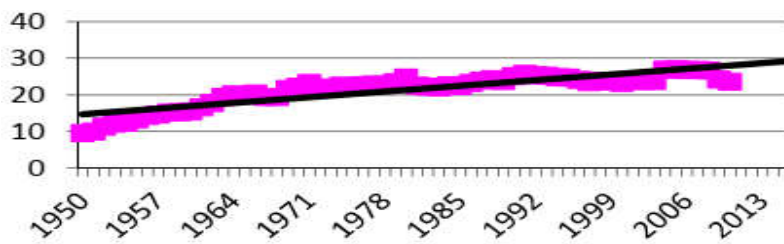
Figure 1: Growth in Industrial Sector
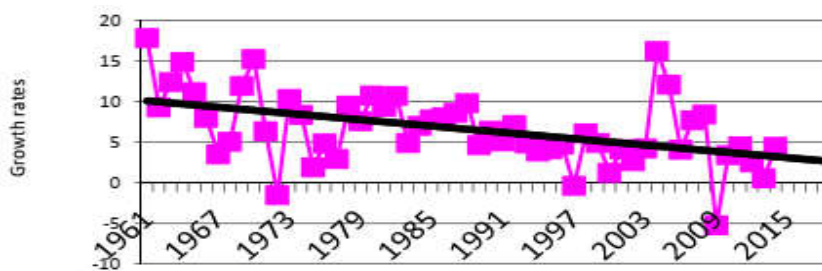
2. Contribution of Industrial Sector in GDP

The share of Industrial sector in GDP have been improved significantly with its share less than 5% in 50's brought it to 23% in 2017. From the linear trend in the graph suggest that we have positive growth been recorded in the share of Industrial sector in GDP but with slow in co-efficient terms.

Figure 2: Secotrial Share in GDP (%)

3. Contribution of Industrial Sector in Exports:

Figure 1.3 is showing that contribution of industrial sector in exports is decreasing with the passage of time. Data series was achieved by dividing the export data to industrial sector data. In Years 1972 and 1983 contribution of industrial sector in exports was more than two percent while its 0.5% or low in years 1981, 1996,1997, 1998 and 2013 according to data series. Overall trend shows that contribution of industrial sector is decreasing in exports; the reason behind it may be the energy crisis in year 2013.
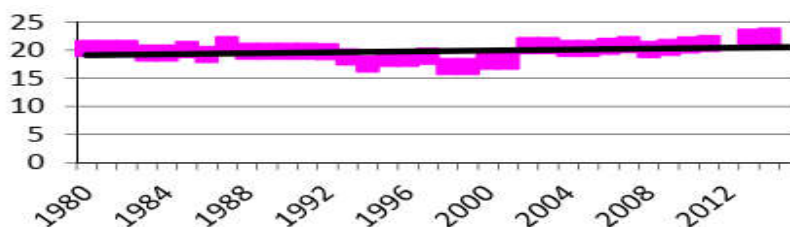
Figure 3: Contribution of Industrial Sector in Total Exports
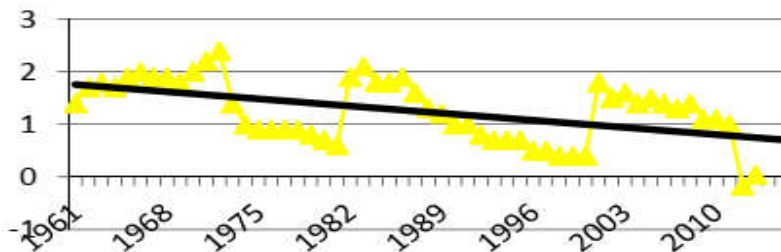
4. Employment Contribution of Industrial Sector:

To find out the graphical position of employment contribution of each sector of GDP as employment in agriculture, industry and services as % of total employment, data have been taken from World Development Indicators (Ahmad, 1999). Data of labor force in Industrial sector was divided by the data of total employed labor force to calculate the employment contribution of industrial sector. Actual graph is showing that employment contribution of industrial sector remained in between 15% to 25%.

Figure 4: Industrial Sector Contribution in Employment:

It is clear from the linear trend lines that employment contribution of industrial sector is increasing above mentioned changes in industrial sector and its contribution into economic growth, exports and employment

created the following question; which factors determine industrial growth? And what policy options government should follow to boost up industrial sector growth in the country like Pakistan?

3.2   Theoretical Frame Work and Research Methodology

A voluminous literature is available describing relationship between international trade and industrial growth using growth accounting approach. The nature of relationship between trade openness and economic growth is an open question for researchers and academicians. The ambiguity in findings may be due to various definitions of indicators of trade openness and misspecification of models. The empirical studies indicated exports led growth or import led growth or trade led growth hypotheses assuming exports, imports or trade are main determinants to enhance domestic production. So for our current study we will make focus on the following equation model. The link between trade liberalization and the growth rate of industrial production is verified by using an aggregate production function framework. We specify an industrial production function for in the following way.

$$Y = f(K, L, H, TL) \qquad\qquad Eq\ (1)$$

Where Y is the industrial value added, while K, L, H, and TL represents Capital, Labor inputs, Human Capital and an index of Trade Liberalization respectively.

Thus in equation 1, the Lucas model is augmented by the TL variable, based on the availability of time series data and relevance to industrial production function for Pakistan, we use two measures of trade liberalization in this paper; real exports and an outcome based measure and the average import tariffs collection rate as the incidence based measure (Muhammad, 2012). In the first measure real depreciation of the domestic currency is used because such depreciation usually raises the prices of tradable relative to that of non tradable, resources start moving out of the non tradable sectors into the tradable sectors. In the case of second measure the decline in imports price relative to export price due to the reduction in imports tariffs rate causes resources to move from imports to exports (Sultan, 2008). Thus as a result of a real exchange rate base trade liberalization policy, for real exports would be expected to rise. So our final model to be used for analysis is given below;

$$\ln INDUSVA_T = \beta_0 + \beta_1 \ln CAPITAL_t + \beta_2 \ln LABOR_t + \beta_3 \ln EXPORTS_t + \beta_4 \ln TARRIF_t + \epsilon_T$$

It is expected that the elasticity parameters (β_0, β_1, β_2, β_3)>0 and β_4<0. Since we are interested to find the short run as well as long run relationship and all the variables have time series characteristics, and in the presence of unit root, the simple regression model will cause spurious regression. Therefore to avoid spurious regression and to make the significant relationship among the variables, Cointegration procedure will be followed according to which if the error terms of the above discussed equation model have stationary at level

than it means there is Co-integration exists among the variables otherwise there will be not. When the error term "ϵ_T", is stationary at level then we can find short run and long run relationship between the variables under consideration but we also need the speed of adjustment through which the structural breaks and policy shift cause the variation among the data set. This lead to the specification of a general ECM of the Industrial production functions of the following form.

$$\Delta INDUSVA = \beta_0 + \Delta\beta_1(INDUSVA) + \beta_2\Delta CAPITAL_t + \beta_3\Delta LABOR_t + \beta_4\Delta EXPORTS_t + \beta_5\Delta TARRIF_t + \beta_6\epsilon_{T-1} + \epsilon_T$$

The term ϵ_{T-1} shows the speed of adjustment in both short run and long run relationship and Ect-1 represents the error correction term one lagged period value and for its significance its value should always be negative and probability of the value should be less than 0.05.

Section IV

Empirical Results and Findings

Data on Industrial, Capital, Labor, Exports and Tariff for the period 1990-2018 periods are shown in Table 1, with their mean, standard deviation, coefficient of variation and annual compound growth rate.

4.1 Descriptive Statistics

The below table tells us about the descriptive features of variables under consideration where we can see the mean value of dependent and independent variables with their standard deviation and coefficient of Variation with the average annual growth rate of the variables.

Table 1: Descriptive Analysis:

Variable	Mean	SD	CV	Growth
Industry	109744	49044.91	0.45	7
Capital	110021.8	47357.24	0.43	7.1
Labor	35.04	0.59	0.02	0.1
Exports	844.17	463.72	0.55	7.8
Tariff	24.81	4.82	0.19	2.1

4.2 Unit Root Test

The data used in the empirical investigation cover the period from 1990 to 2017. In this section we perform unit root tests for stationary on the levels and first differences of all 5 variables. The Dickey Fuller and Augmented Dickey Fuller unit root tests shows the existence of Unit root problem and therefore data is non stationary in the levels but they become stationary at first difference.

Table 2: Unit Root Test:

		DF		ADF		Conclusion
	Difference	without Trend/ Drift	With Trend/ Drift	without Trend/ Drift	With Trend/ Drift	
Industrial	Level	-0.3212	-2.8323	-0.3125	-2.29432	I(1)
	First Difference	-5.6932	-5.5837	-2.7776	-2.6498	
Capital	Level	-2.92	-4.55	-2.32	-5.35	I(0)
	First Difference	-3.38	-3.46	-3.56	-3.85	
Labor	Level	-3.23	-2.93	-2.88	-2.76	I(0)
	First Difference	-3.05	-2.84	-2.24	-1.86	
Exports	Level	-0.54	2.68	-0.22	-2.33	I(1)
	First Difference	-5.28	-5.11	-2.75	-2.51	
Tariffs	Level	-3.87	-2.94	-3.69	-2.43	I(0)
	First Difference	-4.83	-5.32	-2.57	-2.99	

(i) Unit root tests are performed using Eviews, 9 and the significance been set 5%

4.3   Co integration Test

After having found that all the variables are integrated of order 1 and zero, our next step is to determine whether any combinations of the variables are co integrated (Paulino and Amelia 2006). Before undertaking the co integration test, we first specify the relevant order of lags of the vector auto regression (VAR) model. Since the sample size is relatively small, we select 1 for the order; the results obtained from the Johansen Juselius method are presented in table three.

Table 3: Johansen -Juselius Maximum Likelihood Co integration Tests:

	Maximum Eigen Values:		
Null	Alternative	Statistic	95% Critical
r<0	r=0	42.4055	39.8233
r<1	r=1	32.1238	33.6434
r<2	r=2	26.61138	27.4242
r<3	r=3	13.6155	21.1242
r<4	r=4	9.14	14.88
	Trace Test		
Null	Alternative	Statistic	95% Critical
r<0	r>0	128.3702	95.8217
r<1	r>1	85.9212	70.4439
r<2	r>2	53.7308	48.8148
r<3	r>3	26.0578	31.5764
r<4	r>4	12.3992	17.8766

Notes: where "r" denotes the Eigen vectors

The maximum Eigen value test suggest r=1, while the trace statistics shows r=3, from the Mont-Carlo method, its being found that Johansen-Juselius maximum value test has over all least distortions over trace statistics, so we can take R=1. From the findings of co-integration of our annual data the propostion that in Pakistan there exists long run relationship between indicators of trade liberalization i.e. real capital stock, the labor force participation, real exports and the import tariff rate with the industrial value added. Estimates of long run co integration vectors are given in table 4.

4.4: Long Run Co Integrating Vectors

Table 4: Estimates of Long-Run Co integrating Vectors (Linearised):

LINDUSVA	LRCAPITAL	LLABOURP	LREXPORT	LTARIFF
1	0.91	-7.62	-0.512	-0.3198
	(-0.69)	(-5.65)*	(-0.75)	-0.49

Notes: 1. the long-run equilibrium relation is:
LINDUSVA = 0.9123 LRCAPITAL - 7.6221 LLABOURP - 0.512 LREXPORT - 0.3198 LTARIFF +ϵ_T
2. Numbers in parentheses indicate standard errors.

4.5   Estimation of an Error Correction Model
In this section we will estimate an error correction model (ECM), The ECM shown in table 5 is found to fit the data best.

Table 5: Estimated Error-Correction Model:

Dependent Variable: lnINDUSVA

Repressor	Estimate Parameter	T- Ratio	P-Value
Intercept	-5.13	-2.41**	0.032
D^2LRCAPITAL	0.09	1.64***	0.10
D^2LABOURP(-1)	2	5.42*	0.00
DLREXPORT(-1)	0.07	2.34**	0.04
DLTARIFF(-1)	-0.01	-0.32	0.75
EC(-1)	-0.210	-2.43**	0.031
Adj R2	0.79		
Durban Watson	1.79		
Serial Correlation	1.31	(0.25)	
RESET	0.01	(0.92)	
Normality	0.46	(0.79)	
HET	0.02	(0.89)	

Note: Figures in bracket indicate p -values.
9*, **, *** shows the significance of the variables at 1%, 5% and 10% respectively)

From the findings we can see that the growth rates of labor force participation in one year lagged , the lagged of real exports and real fixed capital formation at above the 10% level of significance have emerged as significant determinants of the growth rate of industrial value added sector in Pakistan. The error correction co efficient estimated at -0.210 is statistically significant at 5% level has the correct sign and suggests a moderate speed of convergence to equilibrium. The diagnostic test statistics shows no evidence of misspecification, no serial correlation, or any problem of Heterosecdasticity and no problem of non normality in the residuals.

Section V

Conclusion and Policy Recommendation

5.1   Conclusion

This paper studies the relationship between trade liberalization policies and industrial growth in Pakistan using co integration and error correction model is taken as the theoretical framework for undertaking empirical work on the relationship between trade liberalization and industrial growth in Pakistan. In the empirical investigation of the aggregate growth function of industrial value added in Pakistan, co integration and error correction modeling approaches have been applied. A unique co integral relation between the industrial value added function and its major determinants of the real capital formation, the labor force, real exports and the import tariff collection rate is found.

Through the method of Error correction model it's been tried to see the relationship in short run dynamics with long run as well. The findings suggest that there is significant impact of real export, labor

participation and capital accumulation. The speed of adjustment confirmed the convergence of trade liberalization and industrial value added. In case of any policy shocks or structural change if we observed any change in the dynamics than it can be bring to original position by keeping or changing the focused variable participations.

5.2 Policy Implications and Future Research Gap

The policy implications are simple. The results of the study seem to suggest the importance as well as the imperative for developing countries to embark on comprehensive trade liberalization policies in order to accelerate and sustain economic growth. However, one of the major limitations of the study is the aggregate nature of the model. So for effective policy analysis further studies may be undertaken using data at a disaggregate level. Another limitation of the study is the exclusion of an important variable education that is clearly a perfect measure of industrial growth. So for a better measure of human capital accumulation education can be used in the future

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