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Institutions and Innovation: Evidence from Countries at Different Stages of Development

ZAFIR ULLAH KHAN, ANWAR HUSSAIN, and NASIR IQBAL

This paper empirically analyses the impact of institutions, both formal and informal, on innovation performance of sampled countries at different stages of development. Data of 72 sampled countries on Research and Development Expenditures, numbers of article published, human capital, trade openness, internet users are collected from United Nations Educational, Scientific and Cultural Organisation (UNESCO), International Country Risk Guide (ICRG) and World Bank database. Formal and informal institutions indexes are constructed using data from Country Risk Guide and The World Value Survey (WVS). Fixed effect and System GMM technique are used to estimate the dynamic relationship between innovation performance and institutional indexes. The study finds positive significant effect of institutions on innovation in case of aggregate sample of developed and developing countries. However, the effects of formal institutions are more significant in case of sample of developed countries, while in developing countries informal institutions are found more effective than formal institutions in affecting innovation performance. The results also show that both formal and informal institutions are supplementary to each other in case of developing countries. Therefore, it is suggested that focus should be given to informal institutions. Moreover, collective initiatives be encourage in developing countries to have diverse ideas from different sectors of the countries. In addition, developing countries should initiate collaborative research projects with technologically advanced countries research and education institutions so as to learn from each other's ideas and experiences.

Keywords: Formal Institutions, Informal Institutions, Innovation

1. INTRODUCTION

Institutions are considered as main drivers of Innovation [Aghion and Howitt (1992); Grossman and Helpman (1990)]. However, in the knowledge-based economy, some of the features of each society influence the ability of an economic system to adapt and translate the innovative efforts into development of new ideas. Institutions are defined as the rules of the game in society. In other words, institutions are humanly developed constraints that shape human interaction [North (1990)]. It consists of both formal and informal institutions. The former means constitution, law, rules and regulation put in place by the government, while the latter means values, norms, honesty, and religiosity which promote cooperative behaviour in society that ultimately result in the

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development of society. Empirical studies indicate that differences in innovative performance of countries are due to diversity in institutions [Sattar and Mahmood (2011); Tebaldi (2013)] but studies undermine the role of informal institutions.

Informal institutions such as values and norms (proxies of informal institutions) contain work ethic which results in cooperative behaviour leading to sharing of knowledge and experience that ultimately generates new ideas and innovation [Lesser (2000); Lucas Jr and Moll (2011)]. Similarly, hierarchies often need new ideas and proposals for the introduction of new brands in the market and if workers cooperate by sharing their ideas, it would result in the introduction of innovative products in the market. This implies that norm of accepting hierarchies most likely encourage innovation within firms. Most of the prominent growth economists consider the flow of knowledge between individuals, firms and regions to be the main sources of innovation [Romer (1986); Lucas (2010)]. Innovation is defined as the generation of new ideas resulting from social interaction between workers, aimed at solving production related problems at workplace.

Studies on innovation recognised that differential in innovation performance among countries of the world is due to differences in research and development [Romer (1990); Grossman (1991)]. But the creation of new knowledge and ideas is not only the result of activities undertaken in laboratories aimed at solving technical production related problems or development of new product design by specific technical experts. It can also be generated when economic agents interact with one another in search of knowledge and ideas [Lucas Jr and Moll (2011)].

This paper analyses the impact of institutions, both formal and informal, on innovation performance of countries that are at different stages of development.¹ The current study is different in many respects from the existing studies. Tebaldi and Elmslie (2013) analysed the impact of formal institutions on innovation while ignoring informal institutions. Similarly, Sattar and Mahmood (2010) studied the impact of intellectual property rights on innovation while missing informal institution's role in innovation. Lucas Jr and Moll (2011) highlighted the role of time spent in social interaction by focusing on how individuals allocate time optimally between the production of final goods and in search of knowledge activities. But they did not analyse the impact of informal institutions which promote cooperative environment in which workers interact with co-worker in search of knowledge and solution to problems related to production. This paper is different from Lucas in the sense that it examines the effect of institutions (as the institutions create an environment conducive to innovation) on generation of new ideas using technological change model. Romer (1990) developed Technological Change Model which states that new ideas are generated by researchers working in laboratories motivated by monopoly profit. Moreover, the model assumes that the cost of new ideas declines as the society accumulates more ideas represented by the number of new product. Further, the model assumes that the number of new ideas depends on the number of workers in Research and Development sectors. But the model ignores that ideas can be

¹This paper tries to analyse the impact of institutions, both formal and informal institution on innovation performance of countries lying in different income groups. Following World Bank, countries are classified in different income groups such as low income countries, lower-middle income countries, middle income countries and high income countries group. Further low and lower-middle income countries are combined and named the group as developing countries while middle and high income countries constitute developed countries.

developed during social interactions among workers at the time when they face production related problems and share knowledge and experiences. This paper extends Romer (1990) model by incorporating the effect of informal and formal institutions on the generation of new ideas and innovation using sample of panel countries including developed and developing countries.

2. CONCEPTUAL FRAMEWORK

The basic theme of this paper is that within a firm, whenever workers face any problem related with production at workplace, they resort to getting help from their colleagues. If workers have social value or the worker has social links with other workers, they would be able to get help from their colleague in solving problems arising at the production point. Therefore when they discuss the problem encountered, they will find new methods (at least new for these workers) to solve the problems. As a result of sharing of knowledge, new intermediate input (new ideas, new method of production) would introduce which increase the efficiency of final goods production. Thus sharing of knowledge among workers within organisation would help in generation of new production process (new ideas and innovation) which would help in pushing upwards production frontier of the firm/industry and economy as whole. This logical relationship between institutions and innovation is shown in Figure 1.

Fig. 1. Conceptual Framework

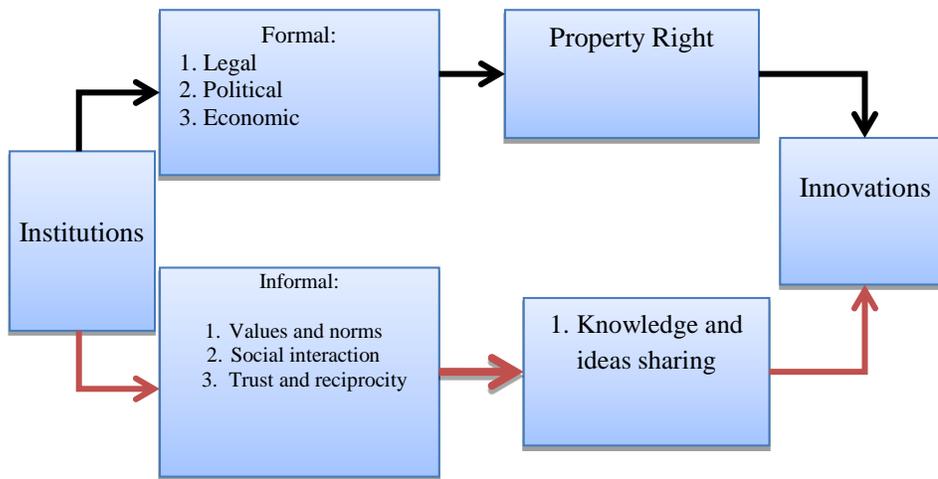


Figure 1 shows the channels through which formal institutions (here considered only intellectual property right) affect economic growth. In this paper, we follow Tebaldi (2008) who has shown theoretically that formal institutions have a positive effect on innovation. We have incorporated his idea in order to see whether formal institutions would be better in the presence of informal institutions or not?

3. DATA AND METHODOLOGY

The new growth theory suggests that generation of new ideas depends on persons engaged in research and development activities and the existence of a stock of knowledge [Romer (1990); Aghion and Howitt (1992)]. The skilled or educated workers also spend a fraction of available time on exchange of ideas, solving production and market related problems, and thus generate new ideas [Rupasinga, *et al.* (2006); Lucas (2008)].

Growth economists have used formal institutions explicitly as determinants of innovation, ignoring informal institutions, which are often considered more important than formal institutions. According to Arrow (1962), formal institutions are not sufficient to eliminate risk and uncertainty arising in business activities, particularly invention, as the moral factor limits their potential. Informal institutions create a cooperative working environment in which workers interact with other workers in search of information, knowledge and ideas that facilitate the creation of new ideas. To incorporate informal institutions, this paper assumes that individuals devote a fraction u_s of their time to social activities such as, helping other co-workers and exchanging ideas with other colleagues and workers. This non-market activity is described by social capital production, given below

$$\dot{S}[t] = P(u[t]_s H[t])^\phi S[t]^\varphi \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

Where “ P ” is the productivity parameter of social capital, $u[t]_s$, $H[t]$ is the time spent in discussing, helping and jointly solving production-related problems, which is only possible when the workers follow informal institutions. Equation (1) states that existing social capital (proxy of informal institutions) may have a positive effect on generation of current social capital.

Knowledge is the accumulation of ideas and ideas are produced by people/workers discussing production-related problems while working with machines or technology. This idea is incorporated in the knowledge production function by explicitly introducing the effect of informal institutions such as values and norms, trust, honesty and religiosity which are supposed to promote the culture of sharing of ideas and knowledge (improve existing social capital) among co-workers that would help in generation of new ideas. This paper also incorporates formal institutions as input in the production of ideas. Formal institutions such as intellectual property rights provide an incentive to undertake innovative activities as it restricts diffusion of knowledge without legal permission. The production function of new ideas is

$$\dot{A}[t] = \delta A[t]^\psi (u[t]_A H[t])^\eta S[t]^\xi T[t]^\zeta \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Where ψ is spillover effect of existing stock of ideas, ξ indicates the effect of existing informal institutions in generation of new ideas, $u[t]_A$, $H[t] = (1 - u[t]_y - u[t]_s)$, $H[t]$ time allocated to development of new idea and ζ denote the effect of formal institutions. Here $u[t]_A$, $H[t]$ are the total working hours which a worker spends in R&D sector, therefore the paper use Π_t in place of $u[t]_A$, $H[t]$ for simplicity. Since the above equation is non-linear and cannot be estimated as it is. Therefore, rewriting Equation (2) in discrete form as

$$\Delta A_t = \delta A_{t-1}^\psi (\Pi_{t-1})^\eta S_t^\xi T_t^\zeta \dots \dots \dots \dots \dots \dots \dots \quad (3)$$

Now taking logarithm of sides, we have

$$New\ ideas = \ln(\Delta A_{i,t}) = \ln \delta + \psi \ln A_{i,t-1} + \eta \ln \Pi_{i,t-1} + \xi \ln S_i + \zeta \ln T_i + v_{i,t}$$

Rewriting the above equation,

$$New\ ideas = \ln(\Delta A_{i,t}) = \beta_0 + \psi \ln A_{i,t-1} + \eta \ln \Pi_{i,t-1} + \xi \ln S_{i,t} + \zeta \ln T_{i,t} + \eta_i + \varepsilon_{i,t} \quad (4)$$

where subscript $i = 1,2,3,\dots \dots \dots$ and $t = 1,2,3,\dots \dots \dots$ represent country and time period respectively. Where $\eta_{i,t}$ unobservable country specific effect and $\varepsilon_{i,t}$ is white noise. $A_{i,t-1}$ is the initial stock of ideas across countries (initial value of Articles published in this case), $\Delta A_{i,t}$ denote the numbers of article published in country i during period t , $\Pi_{i,t-1}$ is the total time spent in R&D sectors (number of skilled labour force employed proxies with human capital), $\ln S_{i,t}$ is logarithm of informal institutions measures and $\ln T_{i,t}$ denoted logarithm of formal institutions measures.

Since the true measure of formal and informal institutions is unknown, standardised measures of these variables are used which are mostly cited in the literature. This paper uses indices of informal and formal institutions which may assume zero and negative values, in which case logarithmic transformation is not possible. Therefore, \hat{T} (Formal institutions index) and \hat{S} (Informal institution index) are used instead of $\ln S_{i,t}$ and $\ln T_{i,t}$. This paper adopts the aforementioned procedure parallel with Acemoglu, *et al.* (2001) and Hall and Jones (1990).

Including matrix of control variables $X_{i,t}$ and rewriting the fixed effect panel regression equation of innovation as

$$New\ Ideas = \ln(\Delta A_{i,t}) = \beta_0 + \psi \ln A_{i,t-1} + \eta \ln \Pi_{i,t-1} + \xi \hat{S} + \zeta \hat{T} + \theta X + \eta_i + \varepsilon_{i,t} \quad (5)$$

The coefficient of informal institutions is expected to have a positive sign as informal institutions are conducive to sharing of knowledge and experience that result in the creation of new ideas. In a working environment where workers are paid according to their contribution (if the worker reap full benefits of their innovative activities), the workers would put more effort to generate new ideas, so the expected sign of formal institutions is positive. Similarly, time spent in research and development sector proxies with the number of researchers, skilled workers employed (human capital) also expected to have a positive sign. So far the effect of existing stock of ideas and knowledge is considered; it can be positive (already accumulated stock of ideas helps in the generation new ideas) or negative (development of new knowledge becomes difficult in the presence of already accumulated knowledge). Literature shows that research and development expenditures have a positive effect on innovation [Romer (1990); Acs and Audretsch (2005)]. Therefore research and development expenditure is included as input into innovation/knowledge production function with the expected positive sign.

Traditional growth regressions carry problems of endogeneity, measurement error and omitted variable bias [Acemoglu (2001)]. In this case, the problem of endogeneity may arise due to the reason that institution variables both formal and informal are correlated with explanatory such as human capital and the stock of knowledge, initial

level of institutions. Moreover, institutions change with time, so they are contemporarily correlated with other variables of the model. In the presence of these problems, OLS estimates are biased because of the unobserved relation between omitted variables and the explanatory of the regression equation.

In growth literature, Two Step Least Square method (2SLS) is often used to address the problems of endogeneity and error of measurement which require finding of appropriate instrument for endogenous variables. In this paper, formal and informal institutions are endogenous as they depend on others factors such as earlier institution, ethnicity, religiosity, colonisation and existence of norm and values in society. In addition, dynamic growth and innovation model given in Equation (4) also carries problem of endogeneity as the lagged value of dependent variable is correlated with the residual [Nickell (1981)]. To tackle the problem of endogeneity, system GMM is used to estimate dynamic model of innovation given in Equation (5).

This paper uses a panel data set of 72 countries over the period of 1980-2014. The selection of sample is based on data availability and prevalence of difference in informal institutions, formal institutions and the difference in innovation performance of the sample countries. The overall sample has been divided according to different stages of development i.e. the sample is divided into Low income, lower middle income, upper middle income and high income level following World Bank classification. Further low income countries and lower middle income countries are combined into a separate group called developing countries while the last two are combined to frame group of developed countries.

The literature on innovation shows patents granted as an indicator of innovation [Schmookler (1966); Griliches (1979); Griliches (1984); Romer (2002)] but the problem with the patents granted is that every new idea is not necessarily granted a patent. Moreover, the process of registering patent is cumbersome which results in failure of registering ideas [Jaffe and Trajtenberg (2002)]. Also, all the patents are not of the same quality. Therefore, in this paper, the number of articles published is used as an indicator of innovation following Castellacci and Natera (2011). Articles published is used as dependent variable in different specifications of the innovation model. As discussed above, innovation depends on R&D Expenditure; already accumulated stock of knowledge, formal and informal institutions and control variables such as Religion, Settler mortality, Ethnic diversity, corruption and income inequality.

This study uses data on institutional variables collected from the International Country Risk Guide (ICRG) which is widely used in growth and institutional related studies. Literature shows that researchers have used all components of the index or taken a few components or even a single component best suited to the objectives of their study. Knack and Keefer (1995) used a composite index of institutional quality by using five indicators which are (i) Rule of law; (ii) Corruption in government; (iii) Bureaucratic quality; (iv) Risk of expropriation of assets by the government; and (v) Repudiation of contract by the government. Rodrik (2000) uses only bureaucratic quality, Mauro (1995) employs only corruption and Sala-i-Martin (1997) uses only the rule of law, and so on. Papaioannou (2009) developed an institutional quality index by simply taking the sum of all the twelve indicators included in the ICRG dataset. This paper developed Formal institutions index by taking simple average of six indicators of institutions including (i) Government Stability; (ii) Investment Profile; (iii)

Control over Corruption; (iv) Law and Order; (v) Democratic Accountability; and (vi) Bureaucracy Quality [Papaionnou (2009)].

The literature on informal institutions shows various proxies of informal institutions such as social capital, generalised trust [Narayan and Pritchett (1999); Krishna and Uphoff (1999)], Crime rates, Gini index and corruption index as a measure of informal institutions. To measure informal institutions, researchers have used either single measure [Putnam (1993); Grootaert (1999); Narayan and Pritchett (1999); Krishna and Uphoff (1999)] or take few measures together [Rose (1999); Brehm and Rahn (1997); Doh and Acs (2010)]. As the above measures of informal institutions are likely to be correlated; therefore the present paper constructs informal institutions index by taking a simple average of trust variable, happiness index and friendship index taken from CANA database [Castellacci and Natera (2011)]. The data on the aforementioned variables is collected from World Bank, World value Survey, Country Risk Guide and CANA database [Castellacci and Natera (2011)]. Detail of Variables and data sources are given in Appendix 1.

4. RESULTS AND DISCUSSION

Fixed effect estimation results show that lag articles published (innovation indicator) shows a positive effect on innovation thereby supporting the RD growth model prediction that past discoveries help in present discoveries [Romer (1990)]. The coefficient of RD expenditure also shows a positive significant effect on innovation which implies that innovation and research and development expenditure are positively related (see Tables 1, 3, and 6).

The result of fixed effect methods shows a positive significant effect of both formal and informal institutions on innovation performance of both developed and developing countries (see Tables 3 and 6). The coefficient interaction shows a positive significant effect on innovation but becomes insignificant when time effects are introduced (see Table 3). The coefficient of internet users shows significant positive effect on innovation which implies that development of information technology increased the size of the market, strengthened formal institutions in protecting copy right and made sharing of knowledge accessible. However, the coefficient of internet users is positively insignificant in case of developing countries (see Tables 3 and 5).

The positive significant effect of informal institutions on innovation implies that innovations increase at the workplace where social values prevail i.e. where norm of cooperation, respect, trust and mutual help prevails. This empirical conclusion supports the hypothesis that researchers/worker in cooperative environment would be more productive. The significant positive coefficient of interaction term of institutions indicates that informal institutions support formal institutions in effecting innovative performance of sample countries. It also implies that informal institutions such as respect, honesty and religiosity restrict people from violation of property rights leading to increase in generation of new ideas. The empirical results concerning formal institutions effect on innovation also support the hypothesis that formal institutions protect copy rights of inventor and so it will be helpful in generation of new ideas and knowledge.

Endogenous technological change model [Romer 1990]) indicates that research and development expenditures are positively related with development of new ideas and

technology. The claim of Romer (1990) is re-examined in various specifications and the results show that expenditures on R&D as percentage of GDP has a positive and

Table 1

Table 1

Impact of Institutions on Innovation Using Fixed Effect Method: Dependent Variable is Article Published (Overall Sample of Countries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Article(-1)	0.770*** (0.013)	0.705*** (0.014)	0.763*** (0.013)	0.734*** (0.014)	0.705*** (0.015)	0.668*** (0.015)	0.566*** (0.017)	0.721*** (0.015)	0.702*** (0.016)	0.728*** (0.014)	0.704*** (0.016)	0.699*** (0.016)	0.697*** (0.016)	0.579*** (0.017)
Formal Institutions	0.076*** (0.014)							0.300 (0.016)						
Informal Institutions		6.034*** (0.333)							5.416*** (0.347)					
Interaction			0.053*** (0.008)							0.017* (0.009)				
RD Expenditure				0.186*** (0.017)	0.179*** (0.017)	0.136*** (0.017)	0.079*** (0.023)				0.164*** (0.017)	0.166*** (0.017)	0.139*** (0.017)	0.069*** (0.023)
Trade Openness					0.222*** (0.039)	0.108*** (0.040)	0.111** (0.051)					0.138*** (0.044)	0.147*** (0.043)	0.096* (0.052)
Human Capital						0.122*** (0.013)	0.144*** (0.017)						0.153*** (0.018)	0.100*** (0.021)
Internet User							0.003 (0.005)							0.024*** (0.009)
Constant	0.541*** (0.078)	-8.053*** (0.510)	0.597*** (0.074)	1.216*** (0.060)	1.487*** (0.076)	0.540*** (0.124)	0.758*** (0.165)	1.072*** (0.117)	-7.106*** (0.540)	1.069*** (0.107)	1.099*** (0.083)	1.514*** (0.093)	0.103 (0.188)	0.890*** (0.213)
Observations	2,039	1,857	1,618	2,193	2,193	2,193	1,539	2,039	1,857	1,618	2,193	2,193	2,193	1,539
R-squared	0.655	0.637	0.719	0.614	0.620	0.636	0.604	0.692	0.659	0.753	0.634	0.635	0.648	0.630
Number of c_no	70	60	57	68	68	68	68	70	60	57	68	68	68	68

Note: Dependent variable is Number of Articles published). Lagged Article (Articles Published (-1)) and other are treated as regressors. Period dummies are included but not reported. Standard errors in parentheses and asterisk denote respectively *** p<0.01, ** p<0.05, * p<0.1.

Table 2

Impact of Institutions on Innovation Using System GMM: Dependent Variable is Article Published (Overall Sample of Countries)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RD Expenditures	0.110*** (0.0253)	0.0700*** (0.0197)	0.106*** (0.037)	0.0545*** (0.0148)	0.0846*** (0.0233)	0.0928*** (0.0176)	0.0552*** (0.0144)	0.0711*** (0.0161)	0.0530*** (0.0138)	0.0523*** (0.0143)
Articles Published(-1)	0.917*** (0.0159)	0.910*** (0.0191)	0.907*** (0.023)	0.871*** (0.0173)	0.869*** (0.0242)	0.871*** (0.0163)	0.876*** (0.0182)	0.875*** (0.0182)	0.859*** (0.0191)	0.873*** (0.0185)
Informal Institution Index	0.272*** (0.0521)		0.922* (0.515)							
Formal Institution Index		0.0811*** (0.0172)	0.287** (0.141)							
Human Capital				0.0736*** (0.0103)	0.0653*** (0.0138)	0.0608*** (0.00876)	0.0696*** (0.0109)	0.0651*** (0.00967)	0.0790*** (0.0110)	0.0545*** (0.00939)
Interaction Term			-1.226 (0.785)							
Trade Openness				0.0717* (0.0380)						
Internet User					0.00521 (0.00763)					
Gini Index						0.00214** (0.000877)				
Ethnic Fractionalisation							-0.109* (0.0632)			
Muslims								0.000983** (0.000449)		
Catholic									-0.00122*** (0.000385)	
Other Religions										0.177** (0.0762)
Observations	590	852	473	936	603	590	936	936	936	936
Number of c_no	34	41	43	47	43	34	47	47	47	47
AR(1) p-value	0.000	0.000	152.000	0.000	0.002	0.007	0.000	0.000	0.000	0.000
AR(2) p-value	0.518	0.511	0.000	0.524	0.745	0.718	0.546	0.724	0.534	0.734
Sargen p-value	1.000	0.922	0.711	0.677	0.434	0.0076	1.0000	0.789	0.976	0.789

Note: All specifications include time dummies. AR(1) and AR(2) are test of the 1st and 2nd order autocorrelation in the residual of difference equation respectively. Sargen P-value test over-identification of exogenous variable. Robust standard error are in parentheses *, **, *** denote significance at 10 percent, 5 percent, 1 percent level respectively.

Table 3

Impact of Institutions on Innovation Using Fixed Effect Method: Dependent Variable is Article Published (Developed Countries)

	Country Specific Effect						Time Specific Fixed Effect					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Article(-1)	0.754*** (0.013)	0.682*** (0.016)	0.763*** (0.013)	0.661*** (0.016)	0.626*** (0.016)	0.387*** (0.018)	0.688*** (0.015)	0.664*** (0.019)	0.703*** (0.015)	0.657*** (0.017)	0.658*** (0.017)	0.393*** (0.018)
Formal Institutions	0.051*** (0.011)						-0.010 (0.012)					
Informal Institutions		6.128*** (0.325)						5.398*** (0.341)				
Interaction			0.037*** (0.007)						0.003 (0.008)			
RD Expenditure				0.208*** (0.018)	0.166*** (0.019)	0.143*** (0.024)				0.184*** (0.018)	0.158*** (0.019)	0.135*** (0.024)
Trade Openness				0.261*** (0.039)	0.162*** (0.040)	0.202*** (0.042)				0.201*** (0.044)	0.206*** (0.043)	0.164*** (0.043)
Human Capital					0.096*** (0.012)	0.110*** (0.013)					0.106*** (0.016)	0.062*** (0.016)
Internet User						0.011*** (0.004)						0.047*** (0.007)
Constant	0.855*** (0.071)	-8.061*** (0.499)	0.808*** (0.071)	1.798*** (0.084)	1.056*** (0.124)	2.019*** (0.144)	1.493*** (0.102)	-6.885*** (0.538)	1.395*** (0.104)	1.603*** (0.095)	0.819*** (0.150)	2.065*** (0.178)
Observations	1,652	1,584	1,416	1,799	1,799	1,273	1,652	1,584	1,416	1,799	1,799	1,273
R-squared	0.705	0.627	0.751	0.641	0.654	0.593	0.744	0.652	0.788	0.665	0.673	0.626
Number of c_no	56	48	48	55	55	55	56	48	48	55	55	55

Note: Dependent variable is Articles published. Lagged Articles Published (-1) and other are treated as regressors. Period dummies are included but not reported. Standard errors in parentheses and asterisk denote respectively *** p<0.01, ** p<0.05, * p<0.1.

Table 4

Impact Institutions on Innovation using SYS-GMM (Developed Countries): Dependent Variable is Article Published

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RD Expenditures	0.0833*** (0.0242)	0.0387** (0.0163)	0.126*** (0.0163)	0.0489*** (0.0134)	0.0512** (0.0224)	0.114*** (0.0205)	0.0510*** (0.0141)	0.0591*** (0.0149)	0.0440*** (0.0137)	0.0422*** (0.0136)
Articles Published(-1)	0.931*** (0.0157)	0.951*** (0.0161)	0.896*** (0.0109)	0.904*** (0.0155)	0.936*** (0.0207)	0.869*** (0.0169)	0.905*** (0.0158)	0.901*** (0.0160)	0.896*** (0.0167)	0.891*** (0.0169)
Informal Institution Index	0.228*** (0.0519)									
Formal Institution Index		0.0464*** (0.0144)								
Human Capital				0.0528*** (0.00888)	0.0339*** (0.0113)	0.0630*** (0.00906)	0.0515*** (0.00913)	0.0521*** (0.00856)	0.0572*** (0.00954)	0.0446*** (0.00821)
Interaction Term			-0.0539 (0.0482)							
Openness				0.0281 (0.0222)						
Internet User					0.00128 (0.00592)					
Gini Index						0.00206** (0.000860)				
Ethnic Fractionalisation							0.0225 (0.0541)			
Muslims								0.000588 (0.000397)		
Catholic									-0.00064** (0.000326)	
Other Religions										0.190*** (0.0596)
Observations	514	610	673	673	438	514	673	673	673	673
Number of c_no	29	31	37	37	33	29	37	37	37	37
AR(1) p-value	0.000	0.000	0.001	0.000	0.002	0.007	0.000	0.000	0.000	0.000
AR(2) p-value	0.518	0.511	0.543	0.524	0.745	0.718	0.546	0.724	0.534	0.734
Sargan p-value	1.0000	0.922	0.441	.677	0.434	0.0076	1.0000	0.789	0.976	0.789

Note: All specifications include time dummies. AR(1) and AR(2) are test of the 1st and 2nd order autocorrelation in the residual of difference equation respectively. Sargan P-value test over identification of exogenous variable. Robust standard errors are in parentheses. *, **, *** denote significance at 10 percent, 5 percent, 1 percent level respectively.

Table 5

Impact of Institutions on Innovation Using Fixed Effect Method: Dependent Variable is Article Published (Developing Countries)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Article Published(1)	0.786*** (0.033)	0.749*** (0.034)	0.760*** (0.042)	0.784*** (0.034)	0.768*** (0.037)	0.718*** (0.035)	0.666*** (0.039)	0.666*** (0.042)	0.775*** (0.038)	0.714*** (0.052)	0.711*** (0.041)	0.713*** (0.042)	0.719*** (0.041)	0.644*** (0.045)
Formal Institutions	0.151*** (0.048)							0.034 (0.070)						
Informal Institution		5.915*** (1.319)							4.519*** (1.349)					
Interaction			0.128*** (0.037)							0.116** (0.052)				
RD Expenditure				0.157*** (0.040)	0.156*** (0.040)	0.110*** (0.039)	0.036 (0.054)				0.083** (0.041)	0.083** (0.041)	0.070* (0.040)	0.020 (0.053)
Trade Openness					0.126 (0.108)							-0.034 (0.114)		
Human Capital						0.238*** (0.042)	0.295*** (0.067)						0.282*** (0.072)	0.240** (0.099)
Internet User							0.002 (0.018)							-0.068 (0.044)
Constant	-0.231 (0.192)	-8.131*** (1.935)	-0.333 (0.208)	0.759*** (0.104)	0.905*** (0.163)	-0.711** (0.279)	-1.510*** (0.562)	0.799* (0.418)	-7.205*** (1.985)	1.196** (0.503)	-0.156 (0.238)	0.306 (0.275)	-1.152** (0.582)	0.019 (0.772)
Observations	387	273	202	394	394	394	266	387	273	202	394	394	394	266
R-squared	0.621	0.662	0.679	0.596	0.597	0.627	0.664	0.708	0.746	0.802	0.677	0.677	0.691	0.723
Number of c_no	14	12	9	13	13	13	13	14	12	9	13	13	13	13

Note: Dependent variable is Number of Articles published. Lagged Articles and other are treated as regressors. Period dummies are included but not reported. Standard errors are in parentheses and asterisk denote respectively *** p<0.01, ** p<0.05, * p<0.1

Table 6

Impact of Institutions on Innovation Using System GMM: Dependent Variable is Article Published (Developing Countries)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RD Expenditures	0.108*** (0.0370)	0.0725** (0.0295)	0.130*** (0.0405)	0.0470* (0.0256)	0.0660* (0.0395)	0.116*** (0.0411)	0.0433* (0.0253)	0.0557** (0.0259)	0.0394 (0.0253)	0.0451* (0.0260)
Articles Published(-1)	0.825*** (0.0456)	0.836*** (0.0369)	0.890*** (0.0374)	0.842*** (0.0340)	0.783*** (0.0425)	0.815*** (0.0501)	0.850*** (0.0322)	0.826*** (0.0341)	0.839*** (0.0332)	0.849*** (0.0327)
Informal Institution	0.320*** (0.0870)									
Formal Institutions		0.109*** (0.0259)								
Human Capital				0.0587*** (0.0156)	0.0562** (0.0252)	0.0286 (0.0387)	0.0689*** (0.0188)	0.0665*** (0.0152)	0.0741*** (0.0177)	0.0579*** (0.0185)
Interaction Term			1.482*** (0.486)							
Openness				-0.0489 (0.0594)						
Internet User					0.0368* (0.0194)					
Gini Index						0.0115 (0.00716)				
Ethnic Fractionalisation							0.0917 (0.149)			
Muslims Dummy								0.00212** (0.00106)		
catholic Dummy									-0.00119 (0.000893)	
Other religion Dummy										0.104 (0.287)
Observations	76	242	263	263	165	76	263	263	263	263
Number of c_no	5	10	10	10	10	5	10	10	10	10
AR(1) pvalue	0.000	0.000	0.001	0.000	0.002	0.007	0.000	0.000	0.000	0.000
AR(2) pvalue	0.518	0.511	0.543	0.524	0.745	0.718	0.546	0.724	0.534	0.734
Sargan p-value	1.000	0.922	0.441	.677	0.434	0.0076	1.0000	0.789	0.976	0.789

Note: All specifications include time dummies. AR(1) and AR(2) are test of the 1st and 2nd order autocorrelation in the residual of difference equation respectively. Sargan P-value test over-identification of exogenous variable. Robust standard errors are in parentheses *, **, *** denote significance at 10 percent, 5 percent, 1 percent level respectively.

a significant effect in all the specifications. Moreover, the Romer model also states that the number of researcher (skilled labour or human capital) also has a positive effect on new product variety development or new ideas development. In all specifications the coefficients of human capital show a positive and significant effect on innovation supporting Romer (1990).

Trade openness indicators show positive significant effect on innovation in case of developed countries' sample which confirms Grossman and Helpman (1990) conclusion. The positive effect of trade openness indicator implies that trade liberalisation can be used as mechanism of diffusion of technology in the world. In contrast to the developed countries, trade liberalisation shows positive insignificant effect on innovation and become negative insignificant when time effect is considered.

The study also used system GMM to check the robustness of estimation result. The estimation result of system GMM shows a positive significant coefficient of past research work which implies that past innovations have a significant positive effect on current innovations. In base line specification, RD expenditures and past innovations show a positive significant effects on current innovations supporting RD growth models [Romer (1990); Hall and Jone (1991)].

The coefficient of informal institutions is positive significant in all specifications. The positive significant effect of informal institutions on innovation implies that innovations increase at workplace where social values prevail. The coefficient of formal institutions is positive significant which means that strong formal institutions create an incentive to innovate more (see Tables 2, 4, and 6).

The empirical results concerning formal institutions' effect on innovation also support our theoretical intuitions i.e. formal institutions protect copyright of researchers and so the existence of strong formal institutions helps in generation of new ideas and knowledge. This is the same result which full sample of countries shows. In contrast to developing countries, the coefficient of the interaction term is negative insignificant, which implies that formal institutions are complementary to informal institutions. The last result hints at capitalist nature of developed countries where informal networking is lacking. This result support Putnam (1990) finding that due to individualistic nature of people living in the developed countries, they lack social networking. Whereas the coefficient of interaction term is positive significant in case of developing countries which implies that social values in the form of informal institution support formal institutions in affecting innovative performance of the sampled countries. This hints at an interesting point that in order to increase innovative activities, developing countries should seek collaboration with developed countries in order to increase the stock of new ideas in those countries.

The study considers the effect of formal and informal institution and examines the individual effect of internet users on the generation of new ideas. The study of the individual result of internet user shows insignificant positive effects of internet user on innovation. RD growth model [Romer (1990)] states that the number of researcher (skilled labour or human capital) also has a positive effect on development of new product varieties or generating new ideas. In all specifications the coefficients of human capital show positive and significant effects on innovation.

The study also includes religions dummies and the results shows positive effect of Muslim dummy. Other religion dummy also shows significant positive (0.190***) effect on innovation while catholic dummy shows negative significant (-0.000640***) effect on innovation performance of developed countries (see Table 4). The result for developing countries shows that Muslims are more cooperative in sharing of knowledge as compared to other religions (see Table 6). The study also includes ethnicity as a dummy variable and the result shows positive insignificant effect on innovation. This shows that workers in workplace with heterogeneous workers would be able to create more ideas due to diversity in their specialisation. The coefficient of Gini index is positive which means that income inequality has a positive effect on innovation. This implies that workplace where each worker is paid to his/her contribution would experience an increase in innovative ideas (see Tables 4 and 6).

The overall conclusion is that informal institutions, formal institutions, human capital, Research and development expenditure, Internet usage, and trade liberalisation have a positive effect on innovation. Muslim dummy and other religion dummy shows positive effect on innovation while catholic dummy shows negative effect on innovation.

7. CONCLUSIONS AND POLICY RECOMMENDATIONS

This paper has attempted to analyse the effects of institutions, both formal and informal, on innovations in aggregate and disaggregate sample of countries. The assumption is that not only formal institutions, such as intellectual property right but informal institutions such as values, norms, traditions and religiosity affect innovation performance of sampled countries. Fixed effect method and system GMM are used for empirical analysis. Religion dummies are used as instrument of informal institutions.

Empirical results of fixed effect method show that the research and development expenditures, stock of knowledge, human capital, and informal institutions and formal institution show significant positive effect on innovation in case of the full sample and the samples of developed countries and developing countries. However formal institutions are more effective in developed countries and informal institutions in developing countries. In contrast to institutions of developed countries, in developing countries institutions are found supplementary to each other. Muslims are found to have a significant positive effect on innovation in developing countries while other religion dummy is found to have positive significant effect on innovation in case of developed countries.

Based on the results, it is suggested that attention may focus on informal institutions as these would strengthen formal institutions in developing countries. As formal institutions are found to be more effective in the developed countries, informal institutions need to be strengthened in developing countries in order to improve their innovative performance. In developing countries, organisation need to provide an environment in which workers could freely meet and share ideas with co-workers. The study concludes that collective work encourages innovation; therefore, governments of less developed countries should foster innovation activities in collaboration with industries, organisations and institutions of developed countries. To accelerate innovative activities, there is a need to encourage sharing of knowledge through better internet facilities, improved access to libraries and databases, and establishment of research infrastructure.

This paper can be extended by taking micro level study at organisation level to highlight the importance of institutions and its impact on innovation. Also this paper can be extended by taking individual measures of formal and informal institutions to examine its effect on innovation.

Appendix 1

List of Variables

Income Group	LowIncome-1, Lower middle Income-2 Upper Income-3 HighIncom-4	Data Sources
Region	Region1, Region 2, Region 3, Region 4, Region 5, Region 6, Region 7	WDI
GDP Per Capita	GDP per capita (current US\$)	WDI
Article	Scientific and technical journal articles. Number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences, per million people	World Bank; National Science Foundation, UNESCO
RD Expenditures	R&D expenditures as a percentage of GDP	OECD
Openness	Openness Indicator: (Import + Export)/GDP	UNCTAD
Human Capital	Mean years of schooling. Average number of years of school completed in population over 14	Barro and Lee (2001); World Bank
Education Expenditures	Public Expenditure on Education. Current and capital public expenditure on education	UNESCO
Internet User	Internet users per 1000 people. People with access to the worldwide web network divided by the total amount of population.	World Bank
Corruption Index	Corruption Perception Index. Transparency International Index, ranging from 0 (High Corruption) to 10 (Low Corruption)	Transparency International
Gini	Gini Index	United Nations
Family Important	Family important in life. Index ranging from 3 (very important) to 0 (not import)	World Values Survey
Trust	Most people can be trusted. Percentage of respondents who "agree" with this stat	World Values Survey
Happiness	Feeling of Happiness. Index ranging from 3 (very happy) to 0 (not happy).	World Values Survey
School Friendship	Friends important in life. Index ranging from 3 (very important) to 0 (not important)	World Values Survey
Informal Institutions Index	Informal institutions Index is the average value of Trust, Happiness and School Friendship variables	Author own calculation
Government Stability	A measure of both of the government's ability to carry out its declared program(s), and its ability to stay in office. The risk rating assigned is the sum of three subcomponents: Government Unity, Legislative Strength, and Popular Support	ICRG
Socio-economic Conditions	A measure of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction. The risk rating assigned is the sum of three subcomponents: Unemployment, Consumer Confidence, and Poverty	ICRG
Investment Profile	A measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: Contract Viability/Expropriation, Profits Repatriation, and Payment Delays	ICRG
Corruption	A measure of corruption within the political system that is threat to foreign investment by distorting the economic and financial environment, reducing the efficacy of government and business by enabling people to assume position of power through patronage rather than ability, and introducing inherent instability into the political process	ICRG
Law and Order	Two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the strength and impartiality of the legal system, and the "order" sub-component assesses popular observance of the law	ICRG

Continued—

Appendix Table I—(*Continued*)

Ethnic Tensions	A measure of the degree of tension attributable to racial, national, or language divisions. Lower ratings (higher risk) are given to countries where tensions are high because opposing groups are intolerant and unwilling to compromise	ICRG
Democratic Accountability	A measure of, not just whether there are free and fair election, but how responsive government is to its people. The less responsive it is, the more likely it will fall. Even democratically elected government can delude themselves into thinking they know what is best for the people, regardless of clear indication to the contrary from the people	ICRG
Bureaucracy Quality	Institutional strength and quality of the bureaucracy is a shock absorber that tends to minimise revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure	ICRG
Formal Institution Index	Informal institutions index is the average value of i) Government Stability ii) Investment Profile iii) Control over Corruption iv) Law and Order v) Democratic Accountability and vi) Bureaucracy Quality	Author own calculation
Settler Mortality	Log of the mortality rate faced by European settlers at the time of colonisation	The Quality of Government Institute, http://www.qog.pol.gu.se
Ethnic Fractionalisation	The variables reflect the probability that two randomly selected people from a given country will not share a certain characteristic, the higher the number the less probability of the two sharing that characteristic	The Quality of Government Institute, http://www.qog.pol.gu.se
Linguistic Fractionalisation	Reflects probability that two randomly selected people from a given country will not belong to the same linguistic group. The higher the number, the more fractionalised society	The Quality of Government Institute, http://www.qog.pol.gu.se
Religious fractionalisation	Reflects probability that two randomly selected people from a given country will not belong to the same religious group. The higher the number, the more fractionalised society	The Quality of Government Institute, http://www.qog.pol.gu.se
Colonial	This is a tenfold classification of the former colonial ruler of the country. 0=never,1= Dutch,2= Spanish,(3) Italian,(4) US,(5) British,(6) French, (7) Portuguese (8) Belgian (9) British-French (10) Australian	The Quality of Government Institute, http://www.qog.pol.gu.se
Catholics	Catholics as percentage of population in 1980	The Quality of Government Institute, http://www.qog.pol.gu.se
Muslims	Muslims as percentage of population in 1980	The Quality of Government Institute, http://www.qog.pol.gu.se
Other Religion:	Other Denomination	The Quality of Government Institute, http://www.qog.pol.gu.se
Population Density	Population density (people per sq. km of land area)	WDI
Population Growth	Population growth (annual %)	WDI
Death Rate	Death rate, crude (per 1,000 people)	World Bank
Distance	Distance to frontier score (0=lowest performance to 100=frontier)	World Bank
Droughts		World Bank

Appendix 2

Names of Countries, Regions and Groups

Country No.	Country Name	Regions	Income Group
1	Algeria	Middle East and North Africa	Upper Middle income
2	Argentina	Latin America and Caribbean	Upper Middle income
3	Armenia	Europe and Central Asia	lower middle income
4	Australia	East Asia and Pacific	High-income OECD
5	Austria	Europe and Central Asia	High-income OECD
6	Azerbaijan	Europe and Central Asia	Upper Middle income
7	Bangladesh	South Asia	Low Income
8	Belgium	Europe and Central Asia	High-income OECD
9	Bolivia	Latin America and Caribbean	lower middle income
10	Botswana	Sub-Saharan Africa	Upper Middle income
11	Brazil	Latin America and Caribbean	Upper Middle income
12	Bulgaria	Europe and Central Asia	Upper Middle income
13	Canada	North America	High-income OECD
14	Chile	Latin America and Caribbean	High-income OECD
15	China	East Asia and Pacific	Upper Middle income
16	Colombia	Latin America and Caribbean	Upper Middle income
17	Costa Rica	Latin America and Caribbean	Upper Middle income
18	Croatia	Europe and Central Asia	High Income non-OECD
19	Czech Republic	Europe and Central Asia	High-income OECD
20	Denmark	Europe and Central Asia	High-income OECD
21	Dominican Republic	Middle East and North Africa	Upper Middle income
22	Ecuador	Latin America and Caribbean	Upper Middle income
23	Egypt	Middle East and North Africa	lower middle income
24	El Salvador	Latin America and Caribbean	lower middle income
25	Finland	Europe and Central Asia	High-income OECD
26	France	Europe and Central Asia	High-income OECD
27	Georgia	Europe and Central Asia	lower middle income
28	Germany	Europe and Central Asia	High-income OECD
29	Greece	Europe and Central Asia	High-income OECD
30	Honduras	Latin America and Caribbean	lower middle income
31	Hungary	Europe and Central Asia	Upper Middle income
32	India	South Asia	lower middle income
33	Indonesia	East Asia and Pacific	lower middle income
34	Iran	Middle East and North Africa	Upper Middle income
35	Ireland	Europe and Central Asia	High-income OECD
36	Israel	Middle East and North Africa	High-income OECD
37	Italy	Europe and Central Asia	High-income OECD
38	Jamaica	Latin America and Caribbean	Upper Middle income
39	Japan	East Asia and Pacific	High-income OECD
40	Malaysia	East Asia and Pacific	Upper Middle income
41	Mauritius	Sub-Saharan Africa	Upper Middle income
42	Mexico	Latin America and Caribbean	Upper Middle income
43	Moldova	Europe and Central Asia	lower middle income
44	Netherlands	Europe and Central Asia	High-income OECD
45	New Zealand	East Asia and Pacific	High-income OECD
46	Nicaragua	Latin America and Caribbean	lower middle income
47	Norway	Europe and Central Asia	High-income OECD
48	Pakistan	South Asia	lower middle income
49	Panama	Latin America and Caribbean	Upper Middle income
50	Paraguay	Latin America and Caribbean	lower middle income
51	Peru	Latin America and Caribbean	Upper Middle income
52	Poland	Europe and Central Asia	High-income OECD
53	Portugal	Europe and Central Asia	High-income OECD
54	Romania	Europe and Central Asia	Upper Middle income
55	Russia	Europe and Central Asia	High Income non-OECD
56	Singapore	East Asia and Pacific	High Income non-OECD
57	Slovakia	Europe and Central Asia	High-income OECD
58	Slovenia	Europe and Central Asia	High-income OECD
59	South Africa	Europe and Central Asia	Upper Middle income
60	Spain	Europe and Central Asia	High-income OECD
61	Sri Lanka	South Asia	lower middle income
62	Sweden	Europe and Central Asia	High-income OECD
63	Switzerland	Europe and Central Asia	High-income OECD
64	Thailand	East Asia and Pacific	Upper Middle income
65	Trinidad and Tobago	Latin America and Caribbean	High Income non-OECD
66	Tunisia	Middle East and North Africa	Upper Middle income
67	Turkey	Europe and Central Asia	Upper Middle income
68	Ukraine	Europe and Central Asia	lower middle income
69	United Kingdom	Europe and Central Asia	High-income OECD
70	United States	North America	High-income OECD
71	Uruguay	Latin America and Caribbean	High Income non-OECD
72	Venezuela	Latin America and Caribbean	Upper Middle income

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Trade Liberalisation and Industrial Productivity: Evidence from Manufacturing Industries in Pakistan

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This study examines the impact of trade liberalisation on the industrial productivity for a panel of twenty seven 3-digit manufacturing industries in Pakistan over the period 1980-2006. Using a variant of the Cobb-Douglas production function for industrial sector, we estimated output elasticities. The results show positive output elasticities with respect to labour, capital and raw materials for the pre-trade liberalisation period (1981–1995) as well as post-trade liberalisation period (1996-2006). For the pre-liberalisation period, we observe positive output elasticity with respect to energy, while it turns out to be negative in the post-liberalisation period probably due to energy crisis in Pakistan. In the second stage, we calculate total factor productivity (TFP) and examine the impact of trade liberalisation on TFP for pre-and post-trade liberalisation periods. The results reveal that trade liberalisation proxied by import duty has positive but negligible impact on the TFP in the pre-as well as post-liberalisation periods. On the other hand, effective rates of protection exert large negative impact on the TFP in the post-liberalisation than the pre-liberalisation period.

JEL Classifications: F14, F13, O53, L60

Keywords: Trade Liberalisation, Total Factor Productivity, Manufacturing Sector of Pakistan

1. INTRODUCTION

Manufacturing sector in Pakistan confronts lack of advanced technology, skilled labour force, shortage of energy and inconsistent trade policies, which adversely affect the productivity of manufacturing industries. Mahmood, *et al.* (2007) reported that import substitution policies and high tariffs are the major constraints that undermine the efficiency of manufacturing sector in Pakistan. Low quality products of exporting industries are unable to compete with the world's exports in international markets. Due to lack of competitiveness in the world market, domestic producers do not expand their market share.¹ Manufacturing industries in Pakistan are lagging behind in terms of technological advancement and adaptation of advanced technology which cause low value added and low quality product segments of exports [Mahmood, *et al.* (2009)].

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¹Mahmood (1989) and Mahmood and Siddiqui (2000) noted that slow growth of large scale manufacturing industries could be due to slow total factor productivity growth of manufacturing industries in Pakistan.

Trade liberalisation has widely been recognised as a key component of industrial development of a country, which refers to dismantling tariff and non-tariff barriers such as quotas, prohibitions, and technical requirements. Trade liberalisation is believed to promote industrial development through specialisation, diffusion of knowledge, learning by doing, provision of advanced technology, innovation of new products and improvements in product's quality which enhances access to foreign markets.² Furthermore, trade liberalisation can increase industrial efficiency by eliminating monopoly profits, increasing capacity utilisation and allowing optimal resource allocation [Sheikh and Ahmed (2011)]. The theory of industrial organisation has acknowledged the role of international trade in the determination of industrial efficiency through its impact on productivity, profitability and exports. According to the World Bank (2002), reduction in barriers to the international trade could accelerate economic growth, provide stimulus to new forms of productivity, enhances specialisation, jobs creation and poverty reduction around the world.

The traditional theories of international trade predicted that trade liberalisation can increase the value of production in the economy. Trade generates a static improvement in output and allocative efficiency of the economy [Lopez (2005)]. The Ricardian model explains that trade could be beneficial when a country specialises in the production of goods in which it has a comparative labour-productivity advantage; and these goods are exported. On the other hand, the Heckscher and Ohlin (HO) model pointed out that trade arises due to differences in relative prices of various commodities, factor prices and resource endowments between the countries. They demonstrated that trade could be beneficial when countries export those commodities that use their abundant factors more intensively in their production process.³ As the economy opens, there is a shift in resources towards the sectors that use more abundant factors, and the value of total productivity increases [Lopez (2005)]. Samuelson (1948, 1949) extended the HO model and concluded that factor prices equalised between the trading nations when resources are reallocated from less efficient industries to more efficient industries. MacDougall (1951, 1952) empirically analysed the comparative advantage and HO theories using data from British and American manufacturing industries and concluded that both countries could produce more by enhancing trade. The endogenous growth models and standard partial equilibrium model of trade hypothesised that trade liberalisation can play an important role in boosting exports and hence economic growth through technology transfer [Hoque and Yusop (2010)]. Krugman (1979, 1991) found that value of total productivity increases following a movement from autarky to free trade in some models of economies of scale with monopolistic competition. Nataraj (2011) reported that new trade and endogenous growth models predict a variety of channels through which trade liberalisation could increase productivity among domestic firms including increased managerial efforts, innovations, knowledge spillover,

²Kemal, *et al.* (2002) and Amjad, *et al.* (2012).

³Salvatore, D., *International Economics*, 8th (eds.) John Wiley and Sons, Inc, pp. 33-36. First, this concept was explained by the Adam Smith (1776) in his famous book 'An Inquiry to the Nature and Causes of the Wealth of Nations' and then David Ricardo (1817) in 'On the Principles of Political Economy and Taxation'. They explained that trade could be beneficial when countries could specialise according to the principles of absolute and comparative advantages. Detailed review of trade theories can be seen in Lopez (2005).

technological advancement, exploitation of economies of scale, specialisation in research and development (R&D), increased labour skill and industrial learning, and exit for the least productive firms [see for example, Grossman and Helpman (1990); Romer (1990); Rodrik (1992a, 1992b); Krueger (1998); Melitz (2003); Aghion, *et al.* (2005)].

The proponents of trade liberalisation argue that opening of domestic markets to foreign competition and Foreign Direct Investment (FDI) can lead to more efficient allocation of resources that may result in the improvements of productivity of local industries, which in turn lead to higher economic growth. However, the opponents of trade liberalisation argue that domestic firms may not be able to absorb efficiency gains because of credit constraints that prevent adaption of foreign technology as well as investments in new technology [Young (1991); Pack (1994); Topalova and Khandelwal (2011)]. Similarly, the Keynesian economists believed that reduction of import duties contributes to an excess of imports over exports and hence the trade deficit. Furthermore, trade liberalisation can raise unemployment and wage inequality in developed countries, whereas it may increase exploitations of workers, de-industrialisation and marginalisation, increase poverty, global inequality and degradation of the environment in developing and low income countries [Froyen (1996); ILO (2001)]. These two conflicting views about trade liberalisation have important implications for trade policy. If the latter holds, benefits of trade may not have realised unless additional policies are formulated to facilitate technology transfer as well as ease credit constraints [Topalova and Khandelwal (2011)]. Therefore, examining the impact of trade liberalisation on industrial productivity is crucial for policy analysis.

The main objective of the present study is to examine the impact of trade liberalisation on industrial productivity by considering twenty seven 3-digit manufacturing industries in Pakistan for the period 1981-2006.⁴ Examining the impact of trade liberalisation is useful because it help to identify the mechanisms through which trade policy reforms affect industrial productivity. It is worth noting that the Government of Pakistan (GoP) launched a series of macroeconomic reforms in the late 1980s and early 1990s that included trade liberalisation and exports promotion besides inflation, fiscal and current account management [Afzal and Ali (2008); McCartney (2015)]. The objective of these reforms was to improve efficiency of domestic manufacturing industries, encourage exports and imports through gradual reduction of import tariffs and simplification of non-tariff barriers. Over a short period of time, Pakistan has drastically reduced tariff and non-tariff barriers to stimulate trade. Existing empirical evidence with regard to trade liberalisation and firm productivity are conflicting. For example, Tybout, *et al.* (1991) find no evidence of increased firm productivity following the trade liberalisation, whereas Krishna and Mitra (1998), Harrison (1994), Tybout and Westbrook (1995), Pacvnik (2002), Treffer (2002), Fernandes (2007), Amiti and Konigs (2007) and Topalova and Khandelwal (2011) have found support for the hypothesis that manufacturing sectors productivity increases following trade liberalisation.

In Pakistan numerous studies have been carried out, inter alia, Ali (2012), Din, *et al.* (2003), Yasmin, *et al.* (2006), Majeed, *et al.* (2010), Sheikh and Ahmed (2011), Amjad, *et al.* (2012), Khan and Qayyum (2007), Qayyum and Khan (2009), Khan and Ahmad (2012), among others. These studies found positive relationship between trade liberalisation and economic growth. One major problem with these studies is that they utilised sum of exports

⁴Details of industries are given in Appendix A.

and imports relative to GDP as a measure of trade liberalisation. However, both exports and imports are directly impacted by trade openness, that is, lower import duties and effective rates of protection results in more trade.⁵ This creates a potential problem of endogeneity and simultaneity which was not addressed by previous studies while examining the impact of trade liberalisation on economic growth. Furthermore, no study so far is available that examined the impact of trade liberalisation on firm's productivity in Pakistan. The present study is significantly different from earlier studies carried out in Pakistan in at least two aspects: First, it examines the impact of trade liberalisation on industrial productivity; the present study applied standard approach following Amiti and Konings (2007), Fernandes (2007) and Hamid and Pichler (2009). Initially, we estimate parameters of industrial production function using the methodology outlined by the Levinsohn and Petrin (2003) in order to construct industrial productivity measures. In the next stage, we examine the impact of trade liberalisation on the manufacturing sector's Total Factor Productivity (TFP). We focus on pre-and-post trade liberalisation periods to compare the impact of exogenous variations in trade protection⁶ Second, to deal with the endogeneity problem from production function, the present study utilises proxy variable approach following Olley and Pakes (1996), Levinsohn and Petrin (2003) and Kilinc (2013). Moreover, Fernandes (2007) and Nijikam and Cockburn (2011) removed the endogeneity problem from production function and analysed the impact of trade policy reforms on firm's productivity at plant-level in different countries. Recently, Kilinc (2013) estimated unobserved productivity of entrant firms by introducing inverse demand function approach in the structural model. Following Levinsohn and Petrin (2003) and Kilinc (2013), this study uses an inverse demand function approach to estimate the structural production function. This methodology is more appropriate to control for the endogeneity of inputs due to productivity shocks. After estimating the TFP, an impact of trade policy reforms is analysed for pre-and-post-trade liberalisation periods. Besides, the present study uses import duties and effective rates of protection as alternative measures of trade policy rather than outcome indicator such as a sum of exports and imports as percentage of GDP. This has the benefit of being a direct measure of trade liberalisation and of being exogenous and more relevant than the sum of exports and imports relative to the GDP.

The rest of the paper is organised as follows: Section 2 overviews the trade liberalisation in Pakistan. Section 3 presents the literature review. Model specification, data and econometric methodology is presented in Section 4. Empirical results are discussed in Section 5, while the conclusions along with policy recommendations are given in the final section.

2. AN OVERVIEW OF TRADE LIBERALISATION IN PAKISTAN

There is a general consensus among the economists and policy-makers that economies with liberal trade policies and greater openness show stronger growth and better overall economic performance. Trade liberalisation increases trade openness, brings domestic prices closer to international prices, fosters domestic market competition and facilitates technology diffusion and upgradation [World Bank (2006)].

⁵It is worth mentioning here that lowering import duties and effective rates of protection stimulates trade only when country reduces domestic resource costs on continuous basis. This point is indicated by reviewer 1. We are thankful.

⁶This study considers pre-WTO and post-WTO regimes as pre-and-post trade liberalisation periods respectively.

These developments strengthen firm-level productivity growth and efficiency in resource allocations, thereby boosting exports performance and economic growth. The theoretical justification of free trade and benefits of international specialisation have been discussed in the writings of Bhagwati (1978) and Krueger (1978). Through the 1950s to 1980s, many developing countries adopted inward-looking trade and investment policies as an integral part of their development strategy. The main feature of this policy regime was high tariff and a range of non-tariff barriers such as industrial licensing and controls at home coupled with import and exchange controls externally [Chaudhary, *et al.* (2007) and McCartney (2015)]. However, import substitution policy regime was an unsuccessful across developing countries. This evidence provided theoretical and empirical rationale for outward-looking trade and investment policies in many developing countries including Pakistan in the late 1980s and early 1990s [McCartney (2015)]. Particularly, developing countries including Pakistan have shifted towards globalisation and the World Trade Organisation (WTO) regime. The main objective of outward-looking economic policies was to increase competitive pressure on the incumbents by easing the entry of new producers, encourage more imports of inputs and intermediate goods, transfer of know-how, increase positive externalities in the form of technology transfer and productivity improvements [Mukherjee and Chanda (2016)]. Being a founder member of the General Agreement on Tariffs and Trade (GATT) in 1947 and the WTO in 1995, Pakistan continuously supported open, transparent and rules-based multilateral trading system [WTO (2015)].⁷ The trade liberalisation under the WTO regime has produced far-reaching implication for the trade policy in Pakistan. Before the trade liberalisation and formation of the WTO, Pakistan adopted protectionist and import substitution policies in the 1950s and 1960s with the objective to achieve self-sufficiency and protect its domestic infant industries from foreign competition.⁸ Under the restricted trade policy regime, average protection was exorbitant at 271 percent in 1963-64, which caused to inefficiencies, low quality products, unskilled labour and isolation of Pakistan's industry from foreign markets and resulted many domestic industries with negative value added [Ahmed (2014)].⁹ In order to stimulate industrial productivity and to expand industrial base, Pakistan followed a partial trade liberalisation policy during the period 1965-1969 through devaluation of domestic

⁷The formation of the WTO in January 01, 1995 under the Marrakech Agreement, replaced the GATT. The WTO provides a forum to promulgate trade related rules and regulations for bilateral and multilateral trade agreements between the countries. It is a platform for handling trade related disputes between trading nations. The purpose of this organisation is to promote market friendly investment environment through the elimination of trade distortions across countries. It facilitates countries in the process of trade liberalisation and provides excess to foreign markets by reducing tariff and non-tariff barriers. The WTO has also rules with regard to dumping, transfer pricing mechanism, quality issues, labour standards, environmental issues, government regulations, etc. [Nasir (2012)].

⁸The period 1950-60 to 1964-65 also witnessed a number of changes in the Pakistan's economy. These include (i) introduction of the Export Bonus Scheme (EBS) and host of other incentives to strengthened exports, (ii) a substantial increase in foreign aid, (iii) liberalisation of imports and other direct controls, and (iv) beginning of the green revolution in agriculture sector [Saeed (1995)].

⁹During 1963-64, the effective rates of protection on furnished goods was 883 percent, followed by manufacturing sector (271 percent), intermediate goods (155 percent) and capital goods (88 percent) [Lewis and Guisinger (1968)]. In the presence of high effective rates of protection, domestic value added of some key industries was very low or negative in terms of international prices [Haque (2015)]. For example, during the 1963-64 the share of GDP at domestic prices was 7 percent, whereas the share of GDP at international prices was 0.4 percent [Saeed (1995)].

currency in 1967, establishment of a dual exchange rates system in 1968, foreign exchange reforms coupled with tariff reductions and selective relaxation of import controls [Kemal, *et al.* (2002)].¹⁰ These measures brought down effective rates of protection from 271 percent in 1963-64 to 125 percent in 1968-69.¹¹ However, the growth gained in 1960s was taken off by the nationalisation of commercial banks, insurance companies and a large number of industrial units in the early 1970s. Besides nationalisation, the GoP abolished the multiple exchange rate system, the EBS and devalued domestic currency by about 58 percent *vis-à-vis* US dollar in 1972. These measures altered the incentives offered to the manufacturing sector [Saeed (1995)]. As a result, the manufacturing sector growth decreased from 9.9 percent in the 1960s to 5.5 percent in the 1970s [Ali (2012)]. However, the industrial policy during the 1980s reversed the nationalisation process started during the 1970s. During the 1980s, high priority was given to restore the businesses confidence which was eroded due to nationalisation policy regime. Beside the denationalisation of a number of public enterprises, the GoP started a series of restructuring reforms to liberalise and deregulate the economy. Furthermore, the GoP also provided a number of incentives to revive private investment. As a consequence, the share of private investment increased from 41.39 percent in 1980-81 to 44 percent in 1989-90 [Din, *et al.* (2007)]. In short, prior to the 1990, high nominal tariff rates, excessive non-tariff barriers, complex imports and investment licensing system, exchange controls and progressive import substitution was the main cornerstone of trade policy regime in Pakistan. The actual reforms period was started since the late 1980s under the umbrella of Structural Adjustment and Stabilisation Programmes (SAP); however, major changes in industrial policy were introduced in the early 1990s. Since 1990, the GoP embarked on a series of policy measures including liberalisation of FDI, liberalisation of exchange rate and payment systems, removal of the requirements of operating licenses in most industries, relaxation of import licensing requirements for capital and intermediate goods, reduction of harmonised tariffs across industries and deregulation of administrative controls including elimination of quantitative restrictions on imports [Din, *et al.* (2007)].

Pakistan has made significant progress in liberalising its trade and investment regime through the gradual reduction of tariff rate and the number of tariff lines, and removal of non-tariff barriers. For example, the maximum tariff rate on imports has come down from 225 percent in 1986-87 to 13.5 percent in 2012. The average tariff rate was cut down from 66 percent in 1990 to 14 percent in 2008. Further, the number of tariff slabs was reduced from 14 in 1996-97 to 5 (i.e. 5 percent, 10 percent, 15 percent, 20 percent and 25 percent) in 2008, while other quantitative restrictions on imports were lifted except for those items related to security, health, public morals, religion and culture. All the para-tariffs (e.g. Iqra surcharge, flood relief surcharge, regulatory duties and the import license fee) were merged in to the statutory tariff regimes and import duties on 4000 items were reduced. These measures have brought down effective rates of protection, reduced anti-export bias and promoted competitive business environment in

¹⁰Pakistan adopted multiple exchange rate system in the late 1960s that included import taxes and export subsidies. Due to this the effective exchange rate for exports was 50 percent greater than official exchange rate [Dorosh and Valdes (1990)].

¹¹During 1968-69, the effective rates of protection of furnished goods was 179 percent, followed by manufacturing sector (125 percent), intermediate goods (61 percent) and capital goods (58 percent) [Kemal (1978)].

Pakistan [Hussain (2005); Qayyum and Khan (2009)].¹² The simple average tariff rate (unweighted) on industrial products decreased from 20.2 percent in 2001 to 14.08 percent in 2008, while the number of Statutory Regulatory Orders (SROs) that exempted certain industries from import duties has fallen from 35 in 2002 to 14 in 2008.¹³ A number of laws were promulgated to bring the trade regime in line with the WTO regulations.¹⁴ Furthermore, the government trading monopolies and interventions were eliminated in the agriculture sector to boost exports [Pursell, *et al.* (2011)]. It is expected that the removal of government controls and regulations, and the opening up of local markets to foreign competition can stimulate the exports and productivity of manufacturing industries.

Unfortunately, the reform process backtracked after the onset of the Global Financial Crisis (GFC) in 2008.¹⁵ The maximum tariff increased from 25 percent in 2009 to 35 percent in 2013; simple average tariff (unweighted) increased from 14.08 percent in 2008 to 14.78 percent in 2009, and thereafter it followed declining trend and reached 13.90 percent by 2013. Number of tariff slabs increased from 5 to 9 in 2010. These trade-reducing measures reversed trade-to-GDP ratio from 36.73 percent in 2008 to 30 percent by 2013.

As a part of tariff and non-tariff reforms, Pakistan liberalised its exchange rate and investment regime to integrate domestic economy with the world economy. For example, restrictions on the capital transactions were partially relaxed and foreign borrowing and outward investments were allowed in 1994. Full convertibility of the Pakistani Rupee was established on current international transactions in 1994. Exchange rate system was unified in 1999; interbank foreign exchange market was established in 2000 and switched over from the managed to free floating exchange rate system in July 2000. In 2013, the GoP launched Strategic Trade Policy Framework (STPF) 2012-2015 to enhance Pakistan's export competitiveness in the short as well as in the long run and to increase Pakistan's cumulative exports to US \$95 billion during the period 2012-2015. Furthermore, STPF expected to strengthen the trade sector regulations, strengthen governance and institutional capacity, and to enhance exports competitiveness.¹⁶ Since the enforcement of STPF 2012-15, Pakistan's exports crossed \$25 billion mark for the first time in 2013-14. However, the pace of exports growth was disrupted due to exogenous shocks coupled with domestic factors and the exports registered about 4.87 percent decline during the year 2014-15. Besides other measures,

¹²For example, the effective rates of protection of import-competing production in all traded goods sectors in 2003 was 25 percent as compared to 58 percent in 2001 and 72.2 percent in 1997 [Din, *et al.* (2007)]. Din, *et al.* (2007) also found anti-export bias in the liberal trade regime to be much smaller in magnitude as compared to the price raising impact of the existing import tariff structure.

¹³Actually large number of SROs could distort the effectiveness and transparency of trade policy and promotes rent-seeking culture in Pakistan [Iqbal, *et al.* (2015)].

¹⁴Such as anti-dumping, countervailing measures, intellectual property rights, etc.

¹⁵In the wake of global financial crisis in 2008, over 30 percent of the tariff lines of the WTO members could be increased ultimately without providing compensation to affected trade partners [Handley (2014)].

¹⁶Recently, the GoP launched STPF 2015-18 to achieve the targets to raise exports to \$35 billion mark.

Furthermore, improvement of exports competitiveness, transition from factor driven economy to efficiency driven and innovative driven economy, and increasing share in regional trade through competitiveness and market access are the key features of the STPF 2015-18. The STPF 2015-18 is based on the following four pillars: (i) product sophistication and diversification, (ii) market access, (iii) institutional development, and (iv) strengthening and facilitation of trade [The News (2016)].

the GoP has strengthened institutional capacity and governance structure under the STPF 2012-15.¹⁷

Like other developing countries, Pakistan opened up its economy under the regulations of the GATT for foreign firms. Under the WTO regulations, Pakistan was bounded to reduce tariffs on agricultural and manufacturing goods. 81 percent of tariffs on agriculture imports were bounded, while non-agricultural commodities such as minerals, leather products, travel goods, wood-products and transport equipments were bounded at 20-30 percent of tariffs. The export-oriented industries were allowed to import machinery without trade restrictions and were duty free. Further, foreign exchange was easily available for industries and commercial importers [Chudhary (2004)]. However, after the onset of GFC of 2007-08, trade reforms back tracked and average import duties were increased for some products. For example, import duties on beverages and tobacco increased from 46.8 percent in 2008 to 48.9 percent in 2012, duties on electrical machinery increased from 14.5 percent in 2008 to 14.7 percent in 2012 and duties on non-electrical machinery increased from 9.1 percent to 9.3 percent during the same period [WTO (2014)]. However, import duties on some products remained the same or showed a little decrease. For instance, import duty on chemicals and transport equipments showing no change. Similarly, import duty on leather and footwear products decreased from 16.5 percent to 14.9 percent, whereas import duty on cotton products also decreased from 8 percent to 7 percent and petroleum products from 13.1 percent to 10.6 percent during 2008 to 2012 [WTO (2014)].

Reduction in tariffs on manufactured products stimulates investors to increase production as well as exports. Relaxation of trade impediments and easy excess to foreign markets foster the exports and imports of manufactured goods. Table 1 depicts the tariff structure and terms of trade after the existence of the WTO in 1995.

As shown in Table 1, Pakistan reduced tariff rate on all products (unweighted) from 50.10 percent in 1995 to 13.5 percent in 2012, which stimulated exports and imports of manufacturing industries as well as overall exports and imports during the period 1995-2012. The indices of manufactured exports increased from 186.63 in 1995 to 641.15 in 2012, recorded 253.54 percent growth, while imports of manufacturing goods were increased from 161.17 to 823.33 during the same period, registering 410.85 percent growth. Similarly, conspicuous increased in overall exports indices from 168.61 in 1995 to 679.44 in 2012, whereas imports indices increased from 164.22 to 1233.49 during the same period.

Figure 1 illustrates that reduction in MFN average tariff rate enhanced the imports of machinery and technical products that caused to increase the productivity of manufactured goods and exports as well. It is evident from Figure 1 that after 1995 tariff rate followed a gradual declining trend, while the imports and exports of manufactured products followed an increasing trend after 1995, exports seemed to be larger than

¹⁷These measures include: (a) establishment of (i) domestic commerce wing, (ii) Pakistan Land Authority (PLA), (iii) EXIM Bank, (iv) Leather Export Promotion Council, (v) Services Trade Development Council, (vii) Trade Dispute Resolution Organisation, and (viii) Resource Management Unit. (b) Rationalisation of tariff policy, (d) Strengthening of training and product development institutes, (e) Revamping of exports promotion agencies and the trade monitoring mechanism, and (f) constitution of a trade committee headed by Minister of Commerce [WTO (2015)].

imports of manufactured products. After 2003, there is sharp increase in both exports and imports; however, increase in imports seems to be larger than exports (Figure 1).

Table 1

Terms of Trade and Indices of Unit Value (1990-91=100)

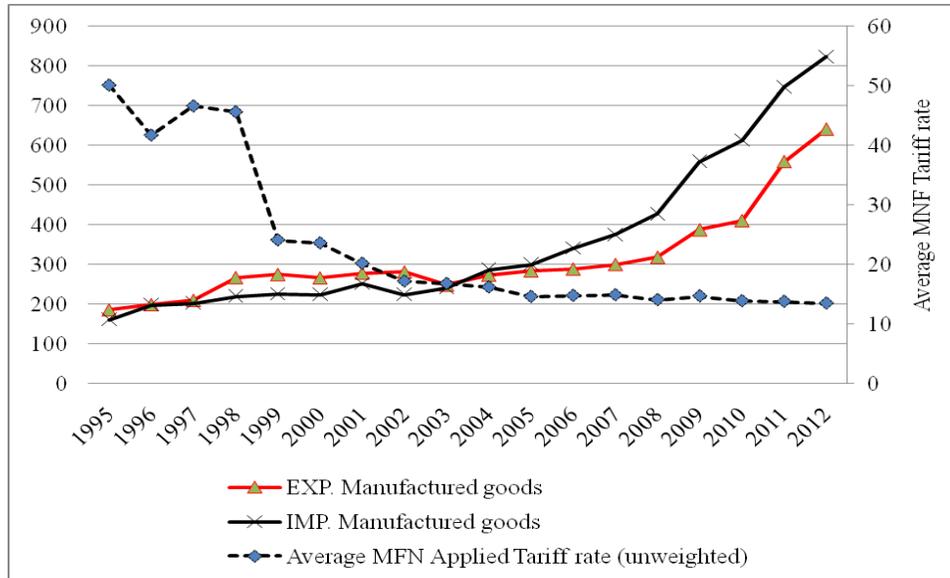
Year	Tariff Rate, MFN (Unweighted) Mean, all Products (%) ^a	Exports of Manufactured Goods	Imports of Manufactured Goods	Exports of all Goods	Imports of all Goods
1995	50.10	186.63	161.17	168.61	164.22
1996	41.70	199.88	198.76	185.36	185.48
1997	46.60	210.74	203.43	204.85	201.71
1998	45.60	267.89	220.74	245.62	198.87
1999	24.10	275.59	226.26	258.4	223.32
2000	23.60	266.96	224.61	253.77	259.03
2001	20.20	279.04	251.50	271.47	298.44
2002	17.20	281.83	224.97	271.18	298.56
2003	16.80	248.93	240.82	254.02	309.52
2004	16.20	274.02	287.80	279.65	355.43
2005	14.61	284.72	301.00	288.84	392.45
2006	14.79	289.58	340.71	299.31	460.38
2007	14.90	300.76	375.06	310.03	495.33
2008	14.08	318.97	427.6	350.40	632.30
2009	14.71	387.90	559.24	450.40	790.82
2010	13.90	411.00	612.77	478.07	839.60
2011	13.80	559.56	747.32	593.19	1,013.10
2012	13.50	641.15	823.33	679.44	1,233.49

Source: State Bank of Pakistan, Statistical Bulletins with base year (1990-91=100).

^adata on tariff rate is available at <http://www.indexmundi.com/facts/pakistan/tariff-rate>.

MFN stands for most favoured nation.

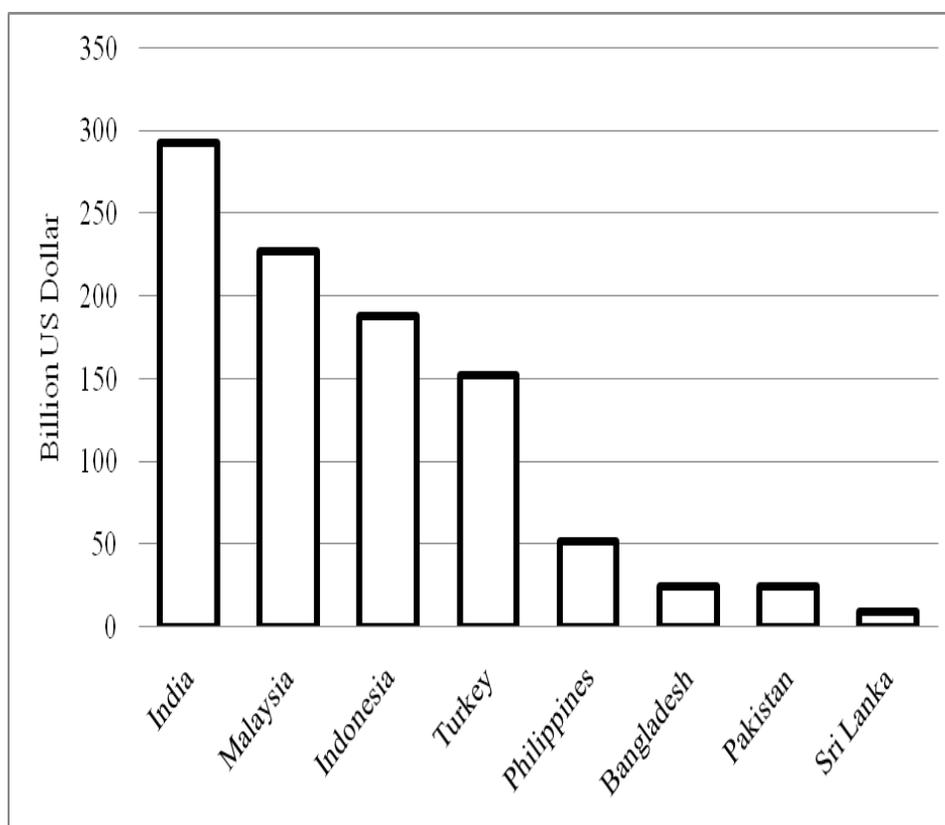
Fig. 1. Trends in Tariff Rate, Exports and Imports Indices (1995-2012)



Based on the trade policy review we may deduce that despite extensive trade liberalisation measures, Pakistan's exports performance is not satisfactory when compared with other developing countries. Figure 2 compares Pakistan's exports performance against its neighbouring and regional economies.¹⁸ It is evident from Figure 2 that in 2012 India ranked top position with US \$293.2 billion exports, followed by Malaysia (\$227.4 billion), Indonesia (\$188.1 billion), Turkey (\$152.6 billion), the Philippines (\$52 billion), Bangladesh (\$25.0 billion), Pakistan (\$24.6 billion) and Sri Lanka (\$9.5 billion). The main reason of low exports could be that Pakistan is still pursuing some form of inward-looking trade policy. For instance, in 2012-13, 40 percent of the Pakistan's tax revenues were received from imports, while for other competing countries this figure was less than 15 percent [Ahmed (2014)].

Fig. 2. Comparison of Pakistan's Exports Performance (2012)

¹⁸During the 1960s Pakistan was a relatively outward-looking country and its economic activities are more integrated with the rest of the world. Its volume of manufacturing exports exceeded the Philippines, Indonesia and Malaysia. However, in 2012, Pakistan's exports are only a fraction of the exports of any of these individual countries [Ahmad (2014)].



Source: Statistical Yearbook for Asia and the Pacific 2013.

In order to boost trade, Pakistan needs to further reform its trade policy regime because tariff rates on key exports of Pakistan's competitors is significantly low (Table 2).

Table 2

Comparison of Average MFN Applied Duties on Industrial Products (2015)

Commodity Group	China	India	Indonesia	Malaysia	Sri Lanka	Pakistan
Fish and Fish Products	10.6	29.9	5.9	0.7	15.1	10.7
Mineral and Metals	7.8	7.9	6.4	7.6	7.7	11.5
Chemicals	6.7	7.9	5.1	2.7	3.0	9.0
Wood Papers, etc.	4.5	9.0	4.4	10.18	11.7	13.9
Textiles	9.6	11.8	9.2	8.8	3.3	14.7
Clothing	16.0	12.3	14.4	0.2	14.7	19.9
Leather, Footwear, etc.	13.5	10.1	8.6	10.7	15.0	13.7
Non-electrical Machinery	8.2	7.1	4.8	3.5	3.0	8.6

Electrical Machinery	9.0	7.2	5.7	4.3	7.1	13.6
Transport Equipments	11.4	9.4	9.8	11.1	6.2	24.1
Manufactures, n.e.s.	11.6	8.8	6.7	4.5	9.1	11.9

Source: WTO (2016). n.e.s.= not elsewhere specialised.

As shown in Table 2, Pakistan's average MFN applied duties on industrial products are the highest among other developing countries. Unlike other developing countries, Pakistan has not eliminated its import substitution policies despite the implementation of the WTO agreement on trade related investment measures (TRIMS) in 2000.

Among other factors, poor quality governance and management structure and lack of coordination among the implementing and management agencies could be the main reasons of trade policy ineffectiveness in Pakistan [Pakistan (2011)]. Therefore, Pakistan may revisit its trade liberalisation programme, further rationalise tariff structures, eliminate regulatory duties and further strengthen governance structure in order to increase exports relative to imports. To this end, Pakistan must learn from the trade policies adopted by the most successful developing nations like Turkey, Indonesia and Malaysia if Pakistan wants to achieve the same levels of trade and development.¹⁹

2.1. Identification of Reforms Period

Previous studies conceived reform period by ignoring a structural break in data with reference to trade liberalisation and productivity growth nexus. The present study finds evidence of a structural break in data in 1995 using the Chow (1960) structural break test. Following the Chow's (1960) structural break test, data is divided into before and after the break sub-periods.²⁰ We observed a structural break around 1995, after the existence of the WTO, when tariffs and other trade barriers were reduced and moved towards free trade regime.²¹ Figure 3 highlights the behaviour of Effective Rates of Protection (ERP) for manufacturing industries.²² As shown in Figure 3, Pakistan liberalised its trade regime through reduction in trade protection after formation of WTO in 1995.

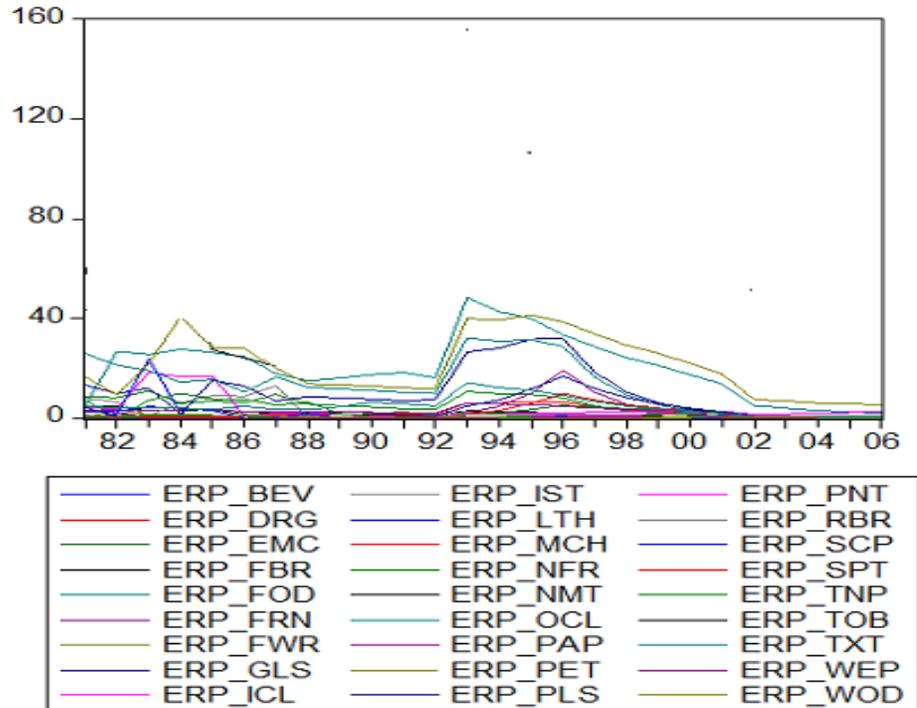
Fig. 3. Trend of Effective Rates of Protection in Manufacturing Industries

¹⁹In 1980, Pakistan and Turkey had \$3 billion worth of exports. Pakistan retained protectionist policies, raising tariffs and encouraging import substitution policies. In contrast, Turkey integrated its economy with the European Union (EU) by dismantling import substitution policies. In 1996, Turkey lowered its tariffs to the level comparable to those of the EU countries. Today, Turkey's exports are over \$170 billion, while Pakistan's exports are yet to surpass \$25 billion. Turkey per capita income is around \$9,000, while Pakistan's per capita income is just \$1,000 [Ahmad (2014)].

²⁰Break shows the impact of WTO reforms in 1995 which reduced tariffs and other non-tariff barriers that affect industrial productivity [Chaudhary (2004)].

²¹The structural break methodology is given in the Appendix B.

²²In the absence of data on ERP, we calculated ERP as import duty divided by value added for each industry following Chand, *et al.* (1998) and Njikam and Cockburn (2011). This measure is conceptually analogous to the measure of ERP [Njikam and Cockburn (2011)].



3. REVIEW OF LITERATURE

Most theoretical models of trade predicted that trade liberalisation increases firm's productivity [Samuelson (1948, 1949); MacDougall (1951); among others]. Trade reforms could result in reallocation of resources from less productive to more productive firms [Melitz and Ottaviano (2008); Bernard, *et al.* (2003); Melitz (2003)]. Trade policy reforms increase competition which may force domestic firms to improve their efficiency by moving down their average cost curves [Helpman and Krugman (1985)], trade reforms force firms to concentrate on core competency products [Bernard, *et al.* (2006)], reduce management slack and increase X-efficiency gains [Hicks (1935)], raise innovation incentives among local firms to prevent entry from foreign competitors [Aghion, *et al.* (2005)]. Furthermore, theoretical trade models also predict productivity gains resulting from better access to superior inputs and technology that increase technical efficiency [Grossman and Helpman (1991); Rivera-Batiz and Romer (1991); Topalova and Khandelwal (2011)]. Helpman and Grossman (1990) and Rodrik (1992) suggested that trade liberalisation enhance productivity under imperfect competition through diffusion of knowledge, upgradation of domestic technology and skills development. It is worth mentioning here that all the theoretical trade models do not predict that trade liberalisation increases aggregate productivity [Topalova and Khandelwal (2011)]. For example, Young (1991) argues that trade liberalisation may restrict developing countries into a particular sector that are not conducive to economic growth. Bolaky and Fredund (2004) and Hoekman and Javorick (2004) found that the

potential gains from trade liberalisation will not be realised unless complementary policies are in place. Particularly, Bolaky and Fredund (2004) find that trade does not stimulate economic growth in countries with excessive business and labour regulations and these regulations could prevent reallocation of resources among different sectors of the economy. Similarly, Harrison (1994) and Karishna and Mitra (1998) denounced that resources are not allocated in the areas of comparative advantages. They suggested that trade could be made more beneficial by reducing monopolies and increasing competition. Trade liberalisation lowers workers bargaining, reduces supernormal profits enjoyed by domestic firms and the price-cost markups [Harrison (1994); Krishna and Mitra (1998)]. Gosh (2011) showed that productivity growth is not reliably higher after reforms than prior to reforms in case of India. He finds that at sectoral level, interest rate channel, financial acceleration and labour market variables play an important role in determining productivity growth. However, at macro level, trade policy, FDI and credit availability are found to be important in accounting for productivity growth. Ahsan and Mitra (2014) find that trade liberalisation led to increase labour's share in revenue for small labour-intensive firms, but a reduction in this share is observed in case of large less labour-intensive firms. The study also finds that trade liberalisation, in general, led to a decline in bargaining power of workers.

Numerous studies with reference to Pakistan found positive relationship between trade liberalisation and economic growth. For example, Kemal, *et al.* (2002) found long-run causality between real GDP and exports in Pakistan. Yasmin, *et al.* (2006) demonstrated that trade liberalisation enhanced economic growth, availability of consumer goods and employment opportunities. However, few studies examined the impact of trade reforms on industrial productivity. For instance, Khan and Ahmed (2012) showed that trade liberalisation stimulates productivity growth through different channels such as private sector investment, manufactured exports and imports of capital goods. Ali (2012) analysed the impact of trade reforms on textile, leather and surgical, and sports industries and concluded that imports are the main driver of exports and by reducing tariff would increase exports because imports of industrial inputs become cheaper. Sheikh and Ahmed (2011) found positive effect of trade liberalisation on technical efficiency of agro-based manufacturing industries of Pakistan.

Overall literature, cited above, concludes that trade reforms such as reduction in trade barriers and adoption of outward-oriented policies are conducive to industrial productivity in developing countries like Pakistan. There is a need to further analyse trade dynamics in manufacturing industries in Pakistan. The present study tries to investigate the pre-and post-trade liberalisation impact on industrial productivity by subjecting the simultaneity problem from production function. Furthermore, this study not only examines the effect of import duty on TFP of industrial sector but also considers the impact of effective rates of protection on firm's TFP.

4. DATA DESCRIPTION, MODEL SPECIFICATION AND METHODOLOGY

4.1. Data Description

This study is based on the balanced panel data of twenty seven 3-digit manufacturing industries of Pakistan over the period 1981-2006.²³ This data is taken from Census of Manufacturing Industries (CMI) of Pakistan published by the Pakistan Bureau of Statistics, GoP. The missing data is interpolated using the compounding growth rate formula. Following Fernandes (2002) and Kim (2000) Effective Rates of Protection (ERP) is used as a proxy of trade liberalisation.²⁴ The industrial value added is used as dependent variable, whereas energy (costs of fuel, electricity and water), capital (all fixed assets), labour cost in terms of employment cost (including non-cash benefits), raw materials including raw and semi-finished materials which consist of imported as well as those domestically produced, and ERP are used as independent variables. The ERP is calculated as import duty divided by industrial value added following the Chand, *et al.* (1998) and Nijikam and Cockburn (2011). Import duty is also used as an additional measure of trade liberalisation.

To capture the effect of price changes, we deflated all the variables by Wholesale Price Index (WPI) considering 2005 as base year.²⁵ The data on WPI is collected from various issues of Statistical Bulletin published by the State Bank of Pakistan.

4.2. Model Specification and Methodology

The present study utilises a variant of Cobb-Douglas production function for the estimation of industrial productivity. Since, in estimating the industrial production function, it is important to account for the correlation between input and productivity levels, as profit maximising firms respond to increase in productivity by increasing use of factor inputs [Ghosh (2013)]. Therefore, Ordinary Least Squares (OLS) method ignores this potential endogeneity problem and assumes that inputs are exogenous and not correlated with external shocks [Griliches and Mairesse (1995)]. However, in real world inputs choices are endogenous and correlated with unobserved productivity shocks because each firm has its own material choices and management skills. To deal with endogeneity problem, this study adopted Levinsohn and Patrin's (2003) methodology and uses firm's raw material inputs as the control variable to correct for the endogeneity in the firm's production function because it is more likely to be correlated with unobserved productivity shocks [Fernandes (2007)]. To analyse the effect of trade policy on industrial productivity, a two-stage approach is adopted [Pavcnik (2002); Javorcik (2004); Amiti and Konings (2007); Topalova and Khandelwal (2011)]. In the first-stage, we estimate the industrial production function specified by Equation (1) following the Olley and Pakes (1996) methodology. To compute unobservable demand shocks, we control for the simultaneity problem as suggested by the Levinsohn and Patrin (2003) and De Loecker (2011). Following Banga and Goldar (2007) the industrial production function is specified as:

²³Twenty seven 3-digit manufacturing industries are included and details are given in Appendix A. The latest available data of CMI is up to 2006.

²⁴One important limitation of this measure is that if a country lower tariffs on raw material, while tariffs on furnished products are not lowered or not lowered as much, then ERP will show an increase in protection.

²⁵WPI is more relevant to manufacturing products. Capital is deflated by building and material component, raw material is deflated by raw material component in terms of WPI, energy is deflated by fuel, lighting and lubricants, excise duty is deflated by manufacturing productivity and other variables are deflated by general WPI.

$$Y_{it} = \alpha + \beta_L L_{it} + \beta_K K_{it} + \beta_{EF} EF_{it} + \beta_{RM} RM_{it} + \omega_{it} + \varepsilon_{it} \quad \dots \quad \dots \quad (1)$$

Where Y_{it} denotes valued-added of industry i at time t , L_{it} , K_{it} , EF_{it} and RM_{it} denotes firm's employment; capital; consumption of electricity and fuel, and cost of raw materials respectively. The term ω_{it} is the unobserved industry-specific productivity shocks that may be correlated with the firm's inputs, and ε_{it} is the random error term which is assumed to be independently and identically distributed (*iid*). All variables are transformed into logarithmic form. The estimation of Equation (1) takes two steps.²⁶ In the first step, we estimate raw materials demand function specified by Equation (1a):²⁷

$$RM_{it} = RM_{it}(\omega_{it}, K_{it}) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1a)$$

Inversion of the raw materials demand function give an expression for productivity shocks (ω_{it}) as a function of firm's raw materials and capital. The productivity shocks function now depending on the observable industrial variables, such as:

$$\omega_{it} = g_t^{-1}(RM_{it}, K_{it}) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1b)$$

Using Equations (1a) and (1b), we can transform Equation (1) in the following ways:

$$Y_{it} = \alpha + \beta_L L_{it} + \beta_{EF} EF_{it} + \phi_{it}(RM_{it}, K_{it}) + \varepsilon_{it} \quad \dots \quad \dots \quad \dots \quad (2)$$

Where

$$\phi_{it}(RM_{it}, K_{it}) = \beta_0 + \beta_{RM} RM_{it} + \beta_K K_{it} + g_t^{-1}(RM_{it}, K_{it}) \quad \dots \quad \dots \quad (2a)$$

Olley and Pakes (1996) suggested that Equation (2a) can be estimated by OLS, whereas Nijikam and Cockburn (2011) applied forth order polynomial expansion to estimate first stage parameters. However, we used Feasible Generalised Least Squares (FGLS) as an alternative approach which is useful in the presence of autocorrelation and heteroscedasticity. To this end, we first generated the conditional expectations function of the form: $E(Y_{it} | RM_{it}, K_{it})$, $E(L_{it} | RM_{it}, K_{it})$ and $E(EF_{it} | RM_{it}, K_{it})$ to compute first stage parameter estimates of labour, and energy and fuel (i.e. $\hat{\beta}_L, \hat{\beta}_{EF}$). Assume that $E(\varepsilon_{it} | RM_{it}, K_{it}) = 0$, the difference between Equation (2) and its expectations conditional on raw materials and capital is given by:

$$Y_{it} - E(Y_{it} | RM_{it}, K_{it}) = \beta_L(L_{it} - E(L_{it} | RM_{it}, K_{it})) - \beta_{EF}(EF_{it} - E(EF_{it} | RM_{it}, K_{it})) + \varepsilon_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Equation (3) is estimated by OLS method, and once the conditional expectations are estimated using OLS regressions of output, labour and energy on raw materials and

²⁶Fernandes (2007, p. 56).

²⁷Levinsohn and Petrin (2003) argued that if demand function for intermediate inputs is monotonic in the firm's productivity at all levels of capital, then raw materials can serve as valid proxy for the unobservable demand shock [Topalova and Khandelwal (2011); Fernandes (2002, p. 8); Nijikam and Cockburn (2011)].

capital (RM_{it}, K_{it}) , we then obtain consistent parameter estimates for labour and energy. The raw materials demand function $RM_{it} = RM_{it}(\omega_{it}, K_{it})$ does not explicitly depend on plant-level input and output prices, we partially address this issue by allowing that materials demand function (along with the productivity function resulting from its inversion $(g_t^{-1}(RM_{it}, K_{it}))$) differ across two periods [see Fernandes (2002)].²⁸ To get the consistent parameter estimates of the function $\phi_{it}(\cdot)$, we employ FGLS method to regress $V_{it} = (Y_{it} - \hat{\beta}_L L_{it} - \hat{\beta}_{EF} EF_{it})$ on (RM_{it}, K_{it}) .

In second stage, we use two moment conditions, which are consistent with over-identification conditions to derive consistent estimates (β_K, β_{RM}) . It is assumed that productivity shocks (ω_{it}) follows a first order Markov process, i.e. $\omega_{it} = E(\omega_{it} | \omega_{it-1}) + \xi_{it}$, where ξ_{it} is unexpected productivity shock which is assumed to be independent and identically distributed (*iid*). Following Olley and Pakes (1996), we generate two moment conditions depicted by Equations (4) and (5) that are estimated by employing Two Stage Least Squares (TSLS) method. The first moment condition stated that capital at time t is uncorrelated with the unexpected productivity shock at time t . The second moment condition indicated that raw materials at time $t-1$ are uncorrelated with the unexpected productivity shock at time t . That is:

$$\begin{aligned} E[Y_{it} - \beta_L L_{it} - \beta_{EF} EF_{it} - \beta_{RM} RM_{it} - \beta_K K_{it} - E(\omega_{it} | \omega_{it-1}) | K_{it-1}] \\ = E(\varepsilon_{it} + \xi_{it} | K_{it-1}) = 0 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4) \end{aligned}$$

$$\begin{aligned} E[Y_{it} - \beta_L L_{it} - \beta_{EF} EF_{it} - \beta_{RM} RM_{it} - \beta_K K_{it} - E(\omega_{it} | \omega_{it-1}) | RM_{it-1}] \\ = E(\varepsilon_{it} + \xi_{it} | RM_{it-1}) = 0 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (5) \end{aligned}$$

Where the residuals in the moment conditions $\varepsilon_{it} + \xi_{it}$ are estimated as:

$$\varepsilon_{it} + \xi_{it}(\beta_K^*, \beta_{RM}^*) = Y_{it} - \hat{\beta}_L L_{it} - \hat{\beta}_{EF} EF_{it} - \beta_{RM}^* RM_{it} - \beta_K^* K_{it} - E(\omega_{it} | \omega_{it-1}) \quad (6)$$

Where $(\beta_K^*, \beta_{RM}^*)$, the initial values might be the OLS values obtained from the estimation of industrial production function. We begin by noting that,

$$E(\omega_{it} | \omega_{it-1}) = E(\omega_{it} + \varepsilon_{it} | \omega_{it-1})$$

The conditional expectations $E(\omega_{it} | \omega_{it-1})$ can be estimated using following regression model:

$$\hat{\omega}_{it} + \varepsilon_{it} = \hat{\omega}_{it0} + \hat{\omega}_{it-1} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

Where;

$$\hat{\omega}_{it} + \varepsilon_{it} = Y_{it} - \hat{\beta}_L L_{it} - \hat{\beta}_{EF} EF_{it} - \beta_{RM}^* RM_{it} - \beta_K^* K_{it} \quad \dots \quad \dots \quad \dots \quad (7a)$$

²⁸ Pre-WTO regime (1981-1995) and post-WTO regime (1996-2006).

$$\hat{\omega}_{it-1} = \hat{\phi}_{it}(RM_{it-1}, K_{it-1}) - \hat{\beta}_{RM}^* RM_{it-1} - \hat{\beta}_K^* K_{it-1} \quad \dots \quad \dots \quad \dots \quad (7b)$$

Finally, we obtain parameter estimates $\hat{\beta}_K$ and $\hat{\beta}_{RM}$ by applying TSLS method, where TSLS function weights moment conditions by their variance-covariance matrix. We included over-identifying conditions as mentioned by Levinsohn and Petrin (2003), population moment conditions given by vector of expectations $E[(\xi_{it} + \varepsilon_{it})Z_{it}]$. Where Z_{it} is the vector of instruments, namely $\{K_{it-1}, RM_{it-1}, L_{it-1}, EF_{it-1}, RM_{it-2}\}$. Finally, we estimate $\hat{\beta}_K$ and $\hat{\beta}_{RM}$ by estimating the following TSLS function.

$$Q(\beta^*) = \{\sum(\xi_{it} + \varepsilon_{it})Z_{it}\} = 0 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

Since the main focus of this study is to investigate the impact of trade liberalisation on the industrial productivity using effective rates of protection (ERP_{it}) and excise duty on imports as measures of trade policy.²⁹ The total factor productivity (TFP_{it}) based on Equation (1) can be expressed as:

$$\hat{\omega}_{it} + \varepsilon_{it} = Y_{it} - \hat{\beta}_L L_{it} - \hat{\beta}_{EF} EF_{it} - \hat{\beta}_{RM} RM_{it} - \hat{\beta}_K K_{it} = TFP_{it} \quad \dots \quad \dots \quad (9)$$

Where pr_{it} is the TFP_{it} computed from combining the estimated function $\phi_{it}(\cdot)$.

$$\hat{\omega}_{it} = \hat{\phi}_{it}(RM_{it}, K_{it}) - \hat{\beta}_{RM} RM_{it} - \hat{\beta}_K K_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad (9a)$$

$$TFP_{it} = \beta_0 + \lambda_t + \beta_1 ED_{it} + \beta_2 ERP_{it} + \alpha_i + u_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad (10)$$

The TFP_{it} is computed after controlling for the endogeneity and simultaneity problem, excise duty on imports (ED_{it}) and ERP_{it} . Having obtained the TFP_{it} , first we examine the impact of industry-level inputs on the industrial productivity. Subsequently, we examine the impact of trade liberalisation on the TFP_{it} . Particularly, we mainly focus on the impact of trade liberalisation on the TFP_{it} in the pre-and-post liberalisation periods.

5. EMPIRICAL RESULTS AND DISCUSSION

Based on the Chow's (1960) structural break test, we divided data sample into two sub-periods, that is, from 1981-1995 (pre-trade liberalisation) and 1996-2006 (post-trade liberalisation) and estimated output elasticities with respect to inputs for the both periods separately. The industrial production function is estimated by employing the Pooled-based Ordinary Least Squares (POLS) model, Fixed Effects (FE) and Random Effects (RE) models. To account for cross-sectional heterogeneity, we have

²⁹Edward (1998) criticised the use of trade volume as proxy of trade liberalisation. He argued that trade volume is not related to the actual trade orientations of a country. He argued that tariff levels and quota reflect the degree of government interventions and trade policy and its opening raises the productivity.

estimated FE and RE models using cross-sectional weights. Therefore, the estimates are robust to cross-correlation and differenced error-variances in each cross-sectional unit. Our estimation results obtained by the POLS, FE and the RE models are approximately close to each other. To choose between the FE and the RE models, we apply the Hausman statistics and the results supporting for the appropriateness of the RE model.

5.1. Estimates of Industrial Production Function

Table 3 presents the estimates of industrial production function for the pre-and-post-liberalisation periods. The results reveal that the coefficient on energy, labour and raw materials exerts positive and statistically significant impact on the industrial output.

Table 3

Estimates of Industrial Production Function

Dependent Variable: Y_{it}						
Variables	Pre-liberalisation (1981-1995)			Post-liberalisation (1996-2006)		
	POLS (1)	FE (2)	RE (3)	POLS (4)	FE (5)	RE (6)
Constant	1.27*	1.78*	1.51*	1.50*	0.54*	0.67*
	(21.67)	(16.72)	(6.55)	(64.66)	(2.53)	(2.95)
EF_{it}	0.13*	0.14*	0.12*	-0.06*	-0.07*	-0.14*
	(10.78)	(8.61)	(4.03)	(-10.51)	(-2.48)	(-3.33)
L_{it}	0.17*	0.17*	0.17*	0.25*	0.50*	0.46*
	(9.73)	(8.14)	(3.33)	(13.31)	(22.20)	(8.21)
K_{it}	-0.03	0.01	0.03	0.26*	0.12*	0.21*
	(-1.44)	(0.84)	(0.96)	(13.34)	(4.22)	(5.61)
RM_{it}	0.73*	0.64*	0.67*	0.53*	0.55*	0.55*
	(61.00)	(30.98)	(14.67)	(48.97)	(14.18)	(10.54)
R^2	0.99	0.99	0.86	0.99	0.99	0.88
\bar{R}^2	0.99	0.99	0.86	0.99	0.99	0.88
F -stat	8936.71	4989.97	621.99	8739.96	2562.43	554.47
CRS	0.79	13.36	1.34	0.79	13.36	4.58
	[0.373]	[0.000]*	[0.248]	[0.373]	[0.000]*	[0.033]**
Hausman	-	-	1.91	-	-	0.00
Test: χ^2 (4)			[0.752]			[1.000]

Note: * Indicate significant at the 1 percent level of significance. Values in the parenthesis are the t-statistics. OLS, FE and RE indicate Ordinary Least Squares, Fixed Effects Model and Random Effects Model respectively. CRS= Constant Returns to Scale. The RE model is estimated by employing the Swamy and Arora estimator of component variance. [.] indicate p-values.

The results shown in columns (2) to (4) of Table 3 are similar in terms of their size and signs of the coefficients. However, the Hausman test supports the results reported in column (3). Thus, we preferred to explain the results based on the RE model. The results reveal that the coefficient of energy and labour are positive and statistically significant, and equals 0.12 and 0.17 respectively, confirming the theoretical predictions

that increase in labour and energy inputs causes industrial productivity to increase in the pre-liberalisation period. The coefficient of capital is positive and equals 0.04, but remains statistically insignificant. The reason could be the inefficient allocation of capital resources in the large scale manufacturing industries in Pakistan during the pre-liberalisation period. These results are in line with those by Burki and Khan (2004). The coefficient of raw materials is positive and equals 0.67 which implies that increase in raw materials exerts significant positive impact on industrial productivity. The bias in the coefficients of capital and raw materials could be due to possible correlation among the inputs and productivity shocks [Ghosh (2013)]. The results suggest that a 1 percent increase in energy supply, labour and raw materials would lead to increase industrial productivity by 0.12 percent, 0.17 percent and 0.67 percent respectively in the pre-liberalisation period. Finally, the estimated elasticities verify the constant return to scale property of the production function because the sum of the elasticities in the case of the RE model is 0.99 in the pre-liberalisation period. This implies that all decision making units are operating at optimal scale [Mahmood (2012)].

The output elasticities with respect to inputs for the post-liberalisation period (1996-2006) are shown in columns (5) to (7) of Table 3. The results reveal that production elasticities with respect to labour, capital and raw materials are positive and statistically significant, whereas the elasticity of energy supply has negatively signed and statistically significant using either of the estimation method. The output elasticities under the RE model are relatively higher than that of POLS and FE models. The Hausman test confirms the appropriateness of the RE model.

The results show that a 1 percent increase in labour, capital and raw materials would increase industrial output by 0.46 percent, 0.21 percent and 0.55 percent in the post-liberalisation period respectively. However, the output elasticity with respect to energy supply is negative and significant, which implies that the reduction in energy supply would reduce industrial output in the post-liberalisation period. The negative impact of energy on the industrial productivity could be due to frequent power failure, load-shedding and high prices of electricity. Mahmud (2000) has noted that energy crisis is perpetual and major constraint for the manufacturing industries in Pakistan. Similarly, Siddiqui (2004), Mahmood (2012) and Shakeel, *et al.* (2013) also reported that energy outages adversely affected exports and trade benefits in Pakistan.³⁰

Overall, we may deduce that output elasticities with respect to labour, capital and raw materials are generally positive during the pre-and post-liberalisation periods, however, the size of elasticities are relatively larger in the post-liberalisation than pre-liberalisation period. It is worth mentioning here that during the post-liberalisation period, we observed that industries are adopting advanced technology or replacing old capital because the size of the coefficient of capital significantly increased from 0.03 in the pre-liberalisation period to 0.21 in

³⁰According to the World Bank's SAIES (2014), 74.5 percent of the firms ranked electricity outages as a major constraint to their productivity growth in Pakistan. Furthermore, about 9.2 percent sales losses faced by the Pakistani firms were due to power outages in 2013. Similarly, Kessides (2013) reported that power outages contributed to over US \$3.8 billion loss to industrial sector along with a loss of over 400,000 jobs and US \$1.3 billion in export earnings in 2009 [ADB (2010)]. The electricity induced power outages have reduced GDP growth by 2 percent annually for the past several years in Pakistan [World Bank (2014)].

the post-liberalisation period. This finding is in line with Liberman and Johnson (1999) who reported that investment in new equipments led to higher productivity. The other important finding is the output elasticity of energy that turned out from positive in the pre-liberalisation to negative in the post-liberalisation periods. This implies that outages of energy supply adversely impacted the performance of manufacturing industries in Pakistan during the post-liberalisation period. In addition, in the pre-and-post-liberalisation periods, raw materials appeared to be the major determinant of industrial productivity as compared to labour and capital in Pakistan. This indicates that availability of high quality raw materials in the domestic market produces positive and significant impact on the industrial productivity. This finding is consistent with the earlier finding of Mazumder, *et al.* (2009) and Mahmood (2012). Finally, the production function exhibits increasing returns to scale which confirms our earlier findings that efficiency of labour and capital has significantly improved in the post liberalisation period due to upgradation of existing technologies and workers skills or adoption of new technology.³¹

5.2. Estimation of Total Factors Productivity

The TFP for twenty seven 3-digit industries is estimated in two-stages following the Levinsohn and Petrin (2003). In the first stage, the coefficients of labour and energy are estimated separately for the pre-and post-liberalisation periods. Using the estimated coefficients of labour and energy, we computed unobservable demand shocks from the function $\phi_{it}(\cdot)$ as:

$$\phi_{it} = Y_{it} - 0.18L_{it} - 0.12EF_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (11)$$

Where Y_{it} is regressed on capital and raw materials to estimate the unobservable demand shocks- $\phi_{it}(RM_{it}, K_{it})$ (equation (2a)) using FGLS method. After the estimation of demand shocks, the estimates of capital and raw materials are obtained by employing TSLS method to control for the endogeneity problem. By conditioning the simultaneity problem, we computed the firm's TFP_{it} using the following equation.

$$TFP_{it} = Y_{it} - 0.18L_{it} - 0.12EF_{it} + 0.28K_{it} - 0.53RM_{it} \quad \dots \quad \dots \quad \dots \quad (12)$$

For the post-liberalisation period, $\phi_{it}(\cdot)$ is computed using the coefficients of energy and labour, that is:

$$\phi_{it} = Y_{it} - 0.22L_{it} + 0.13EF_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (14)$$

Now Y_{it} is regressed on capital and labour to estimate the demand shocks- $\phi_{it}(RM_{it}, K_{it})$. The firm's TFP_{it} for the post-liberalisation period is computed

³¹The sum of the production elasticities is equal to 1.22 in the post-liberalisation period as compared to 0.99 in the pre-liberalisation period.

using the coefficients of capital and raw materials, obtained using TSLS method. That is:

$$TFP_{it} = Y_{it} - 0.22L_{it} + 0.13EF_{it} + 1.028K_{it} - 1.73RM_{it} \quad \dots \quad \dots \quad \dots \quad (15)$$

After the computation of TFP_{it} , the impact of trade liberalisation is analysed for the pre-and post-liberalisation periods.

5.3. Impact of Trade Liberalisation on the Total Factors Productivity

The impact of trade liberalisation on firms TFP_{it} is reported in Table 4. Table 4 shows the impact of the ERP_{it} on TFP_{it} in the pre-and post-liberalisation periods using the POLS, FE and the RE models. However, the Hausman test confirms the usefulness of the RE model which provides more consistent estimates than the POLS and the FE models.

Table 4

Effect of Trade Liberalisation on Total Factor Productivity: Regression Results

Dependent Variable: TFP_{it}						
Variables	Pre-liberalisation (1981-1995)			Post-liberalisation (1996-2006)		
	POLS (1)	FE (2)	RE (3)	POLS (4)	FE (5)	RE (6)
Constant	5.88*	5.98*	5.97*	2.51*	2.80*	2.76*
	(150.94)	(235.90)	(18.96)	(51.35)	(56.29)	(6.18)
ERP_{it}	-0.006*	-0.01*	-0.008*	-0.0006	-0.02*	-0.02*
	(-4.50)	(-5.30)	(-2.64)	(-0.15)	(-8.10)	(-7.00)
ED_{it}	9.34E-06*	5.16E-06*	4.42E-06*	7.29E-06*	3.99E-06*	6.08E-06*
	(7.30)	(5.63)	(4.46)	(3.74)	(3.37)	(4.81)
RIO_{it}	-0.47**	-0.23	-0.36**	1.59*	1.14*	1.13*
	(-2.09)	(-1.64)	(-1.92)	(2.64)	(4.95)	(3.91)
R^2	0.24	0.94	0.07	0.13	0.96	0.12
\bar{R}^2	0.24	0.94	0.07	0.13	0.96	0.11
<i>F-stat</i>	42.96	204.66	9.64	15.14	245.30	13.26
Hausman	-	-	0.00	-	-	0.00
Test: $\chi^2(3)$			[1.000]			[1.000]

Note: See notes below Table 2.

The result reveals that reduction in ERP_{it} would increase TFP_{it} in the post-liberalisation period. The magnitude of the coefficient of ERP_{it} is -0.02 which suggests that a 1 percent reduction in ERP_{it} is associated with an increase in TFP_{it} by 0.02 percent in the post-liberalisation period. In other words, higher trade protection would lower TFP_{it} in the post-liberalisation period. This result is consistent with the

finding of Topalova and Khandelwal (2011); they found beneficial effects of trade liberalisation on industrial productivity in India. In contrast, a 1 percent reduction in ERP_{it} would increase TFP_{it} by 0.008 percent in the pre-liberalisation period. Moreover, excise duty on imports has a positive impact on the TFP_{it} in the pre- as well as post-liberalisation periods, though the impact of this variable is too small and negligible. Yu (2009) finds similar evidence for Japan. The ratio of investment to industrial output (RIO_{it}) bears a negative sign, suggesting that increase in RIO_{it} exerts negative impact on the TFP_{it} in the pre-liberalisation period. The results suggest that a rise in RIO_{it} by 1 percent lowers TFP_{it} by 0.36 percent in the pre-trade liberalisation period. One reason of this finding could be the lack of new investment in the manufacturing sector and inefficient use of existing capital resources, that produce negative impact on the industrial productivity. The other reason could be the high cost of investment which adversely affected the TFP_{it} . Ghosh (2013) found similar results for India. Contrary to the pre-liberalisation period, RIO_{it} exerts positive impact on the TFP_{it} in the post-liberalisation period. The result indicates that a 1 percent increase in RIO_{it} would increase TFP_{it} by 1.13 percent in the post-liberalisation period. One important implication of this finding could be that trade liberalisation reinforced with efficient use of capital resources that can lead to removal of inefficiencies in manufacturing industries in Pakistan. Sheikh and Ahmed (2011) find similar results for a panel of agro-based industries in Pakistan.

Overall, ERP_{it} exerts relatively large impact on the TFP_{it} in the post-liberalisation period than pre-liberalisation period. This implies that reduction in ERP_{it} significantly enhances the TFP_{it} in the post-liberalisation period in Pakistan. This finding further implies that reduction in ERP_{it} is a pre-requisite to enhancing TFP_{it} . The reduction in excise duty on imports produces positive but minimal impact on the TFP_{it} in the pre-liberalisation as well as post-liberalisation periods in Pakistan. Finally, we observed large positive impact of investment on the TFP_{it} in the post-liberalisation period. Accordingly, it may be inferred that the adoption of economic liberalisation policies since the 1990s and onward created favourable environment for the utilisation of domestic resources more efficiently than protected economic policy regime.³²

6. CONCLUSION AND POLICY IMPLICATION

Manufacturing industries in Pakistan have been facing tariff, non-tariff and other trade barriers for a long period of time. Lack of technological advancement and low quality products adversely influences industrial competitiveness in the international market. This study examines the impact of trade liberalisation on industrial productivity for a panel of twenty seven 3-digit manufacturing industries in Pakistan over the period 1981-2006. The sample is divided into two sub-periods, namely pre-liberalisation period (1981-1995) and post liberalisation period (1996-2006). A variant of the Cobb-Douglas

³² The major limitation of this study is the non-availability of data; CMI reported data only up to 2005-06.

production function is used to estimate the output elasticities with respect to inputs by employing the OLS, FE and GLS-based RE models. The results show that output elasticities with respect to inputs have positive and significant impact on the industrial productivity in the pre-and post-liberalisation periods except for output elasticity of energy. The output elasticity energy supply seemed to be negative in the post-liberalisation period.

In the second stage, TFP_{it} is estimated for all sampled industries and analysed the impact of trade liberalisation separately for the pre-and post-liberalisation periods. For the pre-liberalisation period, the results indicate that reduction in ERP_{it} exerts positive impact on the TFP_{it} , however, the magnitude is quite low (i.e. -0.008). With regards to post-liberalisation period, the findings suggest that a reduction in ERP_{it} significantly enhances TFP_{it} with reasonable magnitude (i.e. -0.02). These results, in general, imply that protection of industrial sector through tariff and other trade impediments are the major hurdles on the industrial development and economic growth in Pakistan. The import tariffs have positive effect on TFP_{it} ; however, the size of the coefficient is almost zero in the pre-and post-liberalisation periods. Investment relative to industrial productivity exerts negative impact on the TFP_{it} in the pre-liberalisation period; while it has positive impact on the TFP_{it} in the post-liberalisation period. Overall, the results appear to indicate that trade liberalisation have played a significant role in explaining TFP_{it} in the industrial sector in Pakistan.

On the basis of above discussion we can deduce some policy implications. Firstly, a reduction in ERP_{it} significantly increases TFP_{it} . Therefore, further reduction in the rates of protection, tariff and non-tariff barriers could enhance industrial productivity; improve quality of products and increase exports potential. Secondly, results in the post-liberalisation period reveal that energy input adversely affected industrial productivity; therefore, measures are needed to address the issues related to load-shedding and shortages of energy supply to the industrial sector on priority basis. Third, availability of raw materials appears to be the most significant determinant of industrial productivity in the pre-liberalisation as well as post-liberalisation periods. Therefore, there is need to provide cheap and quality raw materials to the industrial sector. To this end, there is need to develop trade related infrastructure, reduce import restriction on raw material and improve the quality of raw materials through research and development. Finally, the results show that the effect of physical capital on industrial output seems negative in the pre-liberalisation period, and turns to be positive and significant in the post-liberalisation period. Therefore, import of capital goods should be encouraged which is the main source of technological advances in the country.

APPENDIX A

Table 1A

List of 3-Digit Manufacturing Industries

S. No.	Name of Industry	S. No.	Name of Industry
1	Beverage	15	Other Chemical Products
2	Drug and Pharmaceutical Products	16	Paper Products
3	Electrical Machinery Apparatus and Appliance	17	Petroleum and Refining
4	Fabricated Metal Products	18	Plastic Products
5	Food	19	Printing and Publishing
6	Furniture and Fixture	20	Rubber Products
7	Footwear	21	Scientific Measuring and Optical Goods
8	Glass and Glass Products	22	Sports
9	Industrial Chemical	23	Transports Equipment
10	Iron and Steel	24	Tobacco
11	Leather and Leather Products	25	Textile
12	Machinery	26	Wearing Apparel
13	Non-Ferrous Metal	27	Wood and Wood Products
14	Non-Metallic Minerals	–	–

APPENDIX B

The model for the period 1981-2006 is given by:

$$y_{it} = a + bL_{it} + cK_{it} + dE_{it} + eM_{it} + fERP_{it} + gED_{it} + \varepsilon_{it} \quad \dots \quad \dots \quad \dots \quad (i)$$

We have estimated Equation (i) for two sub-periods, that is:

$$1981-1995: y_{it} = a_1 + b_1L_{it} + c_1K_{it} + d_1E_{it} + e_1M_{it} + f_1ERP_{it} + g_1ED_{it} + \varepsilon_{it} \quad \dots \quad (ii)$$

$$1996-2006: y_{it} = a_2 + b_2L_{it} + c_2K_{it} + d_2E_{it} + e_2M_{it} + f_2ERP_{it} + g_2ED_{it} + \varepsilon_{it} \quad \dots \quad (iii)$$

To examine the structural stability of the estimated industrial production function, we have tested following null and alternative hypotheses.

$$H_0 = a_1 = a_2, b_1 = b_2$$

$$H_a = a_1 \neq a_2, b_1 \neq b_2 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (iv)$$

We applied the Chow's structural break test as:

$$F = \frac{RSS_C - (RSS_1 + RSS_2) / k}{RSS_1 + RSS_2 / n - 2k}$$

RSS_c = is the residual sum of squares for aggregate data set.

$RSS_1 =$ is the residual sum of squares for before the break period data set.

$RSS_2 =$ is the residual sum of squares of after the break data set.

$$F = \frac{38.49 - (17.48 + 15.51)/7}{17.48 + 15.51/26 - 2(7)}$$

$$F = \frac{38.49 - (32.99)/7}{32.99/12}$$

$$F = \frac{38.49 - 4.71}{2.75} = \frac{33.78}{2.75} = 12.28$$

$$d.f = \frac{K}{n - 2k} = \frac{7}{12}$$

Critical value at 5 percent level of significance is 2.91.

Critical value at 1 percent level of significance is 4.64.

The calculated F-statistic is greater than that of critical value. Hence, we reject the null hypothesis of no structural break in the industrial production function.

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Fiscal Consolidation and Economic Growth: Insights from the Case of Pakistan

M. ALI KEMAL, OMER SIDDIQUE, and AHMED WAQAR QASIM

The primary objective of this paper is to find whether fiscal consolidation has positive impact on economic growth in Pakistan or not, using nonlinear specification. In addition to checking nonlinear relationship between fiscal deficit and economic growth, we also compute optimal level of fiscal deficit that enhances growth, using data from 1976 to 2015. The results show that at the current level, fiscal deficit is positively associated with economic growth but fiscal deficit at a very high level would be damaging for growth. The nonlinear association between fiscal deficit and economic growth suggests that Pakistan would need to keep fiscal deficit in check and keep on practicing fiscal prudence. The analysis of data reveals that although the fiscal deficit has come down over the years, capital, or development, expenditures have also come down. According to the calculations in this paper, the optimal level of fiscal deficit is 0.74 percent of GDP, implying that Pakistan's expenditure composition and tax structure needs to be revisited to achieve higher economic growth.

JEL Classifications: 2SLS

Keywords: Economic Growth, Fiscal Consolidation

1. INTRODUCTION

Ever since its inception in 1947, Pakistan has experienced chequered economic growth but the identification of the underlying causes has hitherto remained elusive. There are many factors that are cited for the haphazard growth experience and one of the reasons singled out is fiscal imprudence. It is argued that in order to achieve high and sustainable economic growth, Pakistan's economy must achieve fiscal soundness, among other things, and to this end fiscal consolidation is advocated. Consequently, fiscal consolidation through increasing revenues and decreasing deficit financing has been the focus of almost all the governments that have come into power, especially since 1990s¹ but the outcomes have not been impressive. Given the amount of debate, fiscal reforms and their impact on economic performance have generated, this paper seeks to explore the fiscal consolidation-economic growth nexus deeper.

A strand of literature on fiscal consolidation shows that the fiscal contraction may stimulate growth [see, for example, Dabrowski (1996); McDermott and Wescott (1996); Perotti (1998, 1999); Gupta, *et al.* (2005) and by Hagen and Strauch (2001), *inter alia*]. It is argued that prudent fiscal policy, which means low fiscal deficit and manageable public debt, is crucial for sustainable economic growth [Mauria, *et al.* (2013)]. The

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¹See *Economic Survey of Pakistan 2007-08*, Finance Division, Government of Pakistan.

argument is that if the growth in debt services exceeds growth in revenues, it can lead to economic turmoil [Oblath (1995)]. In such a scenario, fiscal consolidation is advocated, which focuses on elimination of debt and frugality [Gupta, *et al.* (2005)]. At the same time, the literature also emphasises that mere fiscal consolidation may not do the job. Consolidation that focuses on expenditure cuts, especially cuts in current expenditures, is more successful as compared to the consolidation that seeks to achieve increase in revenues or cut in investment [Hagen and Strauch (2001); Perotti (1998) and Alfonso, *et al.* (2006)]. Moreover, the expansionary impacts of fiscal consolidation also depend upon its adoption as a part of broader adjustment program [McDermott and Wescott (1996)].

The evidence, therefore, seems to suggest that growth does not always respond positively to fiscal consolidation [see, for example, Hjelm (2007 and 2002) and Hernandez de Cos and Moral-Benito (2011)]. The ambiguity in the literature about the expected effect of fiscal consolidation on economic growth is the motivation behind the current paper. Our primary objective in this paper is to find whether fiscal consolidation has positive impact on economic growth in the case of Pakistan or not. Specifically, the paper explores the nonlinear relationship between fiscal deficit and economic growth. Examination of the impact of expenditure composition as well as composition of taxes on the long-run economic performance is also part of our objectives. Finally, we also compute optimal level of fiscal deficit that enhances growth the maximum.

The rest of the paper proceeds as follow. The Section 2 reviews the literature on fiscal consolidation. Section 3 is devoted to the explanation of the model used in the paper, while Section 4 discusses the data. Descriptive statistics are presented in Section 5. The econometric technique used in the analysis is presented in Section 6 and the empirical results and findings are presented, and discussed, in Section 7. Section 8 concludes the discussion and also presents policy recommendations. It also highlights different dimensions that need to be explored further on the topic of fiscal consolidation.

2. LITERATURE REVIEW

Different theoretical perspectives are present in the literature regarding the impact of fiscal deficit on growth. The Keynesian view suggests that an increase in government spending would affect the output level in an economy positively. According to this view, during the time of economic recessions, government should engage in active fiscal policy and run a deficit to stimulate aggregate demand. The neoclassical perspective, on the other hand, considers fiscal deficits bad for the economy because increase in government spending leads to borrowing, which puts the pressure on interest rate. As a result of the hike in interest rate, the private investment is crowded out by public borrowing. Furthermore, the effectiveness of the fiscal policy is dependent on time. The lagged response makes it difficult for the fiscal policy to be effective.

The Ricardian Equivalence Hypothesis (REH) posits that individuals anticipate that the increase in government expenditures through borrowing in the current period would lead to higher taxes in the future. The individuals respond to this phenomenon by decreasing demand and therefore the net impact of fiscal expansion may be neutral. The rational expectation models also suggest similar responses to the fiscal policy.

The modern synthesis identifies the automatic stabilisers in the economy, which act counter-cyclically. According to the synthesis, fiscal deficit is a natural phenomenon during recessions whereas fiscal surplus may occur during the expansion phase of the economy. It implies that the economy moves toward full employment equilibrium automatically and the discretionary fiscal policy is impotent and difficult to implement. However, the government can use active fiscal policy to respond to major depressions. The supply side perspective argues that the deficit leads to higher taxes and taxes are always distortionary and change the incentives that affect the supply. The proponents of this perspective believe that the policies that are fully anticipated have no effect on the output level. However, unanticipated policies affect the output level through the supply side.

The theoretical literature on the topic at hand has also spawned substantial empirical literature. One of the earlier empirical studies that triggered the debate on fiscal consolidation and its impact on economic growth was by Giavazzi and Pagano (1990). They took the case of Sweden and Ireland and found that there is an expansionary effect of fiscal consolidation. This expansionary effect emerges due to increase in the private consumption expenditure. The study described four channels through which fiscal consolidation effects the consumption. These channels are tax channel, inflation channel, interest rate channel, and the substitution channel. An increase in the tax rate during fiscal consolidation is regarded as contractionary, while fall in inflation and real interest rate are regarded as expansionary. The fourth channel—the substitution channel—is based on how the consumers regard the provision of public goods, such as provision of schools and hospitals.

McDermott and Wescott (1996) explored the factors that determine the success or failure of fiscal consolidation. The magnitude and the composition of consolidation were identified as important factors in this regard. Hagen and Strauch (2001) also argued that the most of the successful consolidation episodes feature expenditure cuts, especially greater cuts in the current expenditure than in the investment expenditure. Similarly, Alesina (2012) also supported expenditure-reducing fiscal consolidation. Nonetheless, he argued that fiscal consolidation should be done in conjunction with pro-growth policies. Gupta, *et al.* (2005) examined fiscal consolidation for the less-developed countries and concluded that strong budgetary positions are associated with higher economic growth and the composition of expenditures also matters in this regard. Perotti (1999) and Afonso, *et al.* (2006) also found the expansionary effects of fiscal consolidation for central and eastern European countries.

Hjelm (2007) and Hjelm (2002) explored the role of monetary policy and exchange rate in the event of fiscal consolidation. The analysis suggested that fiscal consolidation preceded by real depreciation in the exchange rate was more successful. The author argued that the positive effects of the current account improvement and expenditure reallocation spread through the conventional Keynesian channel. Hernandez de Cos and Moral-Benito (2011) also supported the Keynesian view for the OECD countries.

The discussion on fiscal consolidation is further extended by Perotti (1998), who brought institutional setup in the picture, along with its macroeconomic effects and

implementation. In a similar vein, Angelopoulos and Philippopoulos (2007) introduced the quality of infrastructure into the debate on fiscal policy. The duration and determinants of fiscal consolidation were explored by Illera and Granados (2008) by taking the case of 15 European economies for the period, 1960-2004. Both the parametric and non-parametric analyses yielded that the longevity of fiscal consolidation depended on the level of debt, the quality of consolidation, where the quality of consolidation is measured by the share of primary expenditures in total deficit and the political fragmentation in the economy. The economic variables were found to be robust in determining the duration of fiscal consolidation but the non-economic variables were not robust to different specifications.

Hogan (2004) pointed out the econometric drawbacks of the studies on fiscal consolidation that used panel data. He concluded that the expansion in the private consumption was not enough to offset the contractionary impact of public consumption in an economy. Similarly, Cournède, *et al.* (2013) argued that fiscal consolidation may require increase in harmful taxes and cut down in valuable expenditures. Therefore, it can create difficulties for the government to achieve other policy goals. They stressed the need for structural reforms along with fiscal consolidation in order to achieve short term as well as long term goals.

Nauschnigg (2010) argued that if government reduces its fiscal deficit, or increases its fiscal surplus, then the private sector and/or external sectors need to reduce their surplus or increase their deficit. If this is not followed accordingly, then the economy will move into a recession, which may further accumulate the public debt since lessons from the Great Depression tell us to use expansionary fiscal and monetary policies in order to boost the economy. Pennings and Ruiz (2013) found that fast episodes of consolidation have higher multipliers, thus supporting consolidation at a steady pace. It suggested that consolidation at a steady pace would reduce the adverse effects of fiscal consolidation.

According to Huixing, Leeper, and Leith (2013), fiscal consolidation is effective in a very particular set of conditions. They argued that people form expectations for fiscal consolidation as debt level rises. Both consumers and producers anticipate higher taxes as fiscal consolidation starts due to rise in the debt level. However, consolidation done through spending cuts instead of increased taxes surprise the agents. This condition is dependent on the reputation of the government and when monetary policy is consistent with fiscal consolidation, i.e., when the central bank relaxes monetary policy.

Akram, *et al.* (2011) evaluated the fiscal position in Pakistan by analysing all the expenditure heads, along with their impact on economic growth and poverty. The Pakistani economy is found resilient against the economic recessions but is unable to tackle the deficit problem efficiently, mainly due to the revenue side problems. Fatima, *et al.* (2011) explored the link between the fiscal deficit and investment expenditure keeping in view the importance of investment in the economic growth of a country. The analysis of data, from 1980 to 2009, shows that the deficit problem is primarily due to gloomy situation of revenue efforts.

Apart from fiscal consolidation, optimal fiscal deficit level has also been explored in the literature. Fay and Porter (2006) suggested that the major relevant factors to decide optimal fiscal deficits include (i) intergenerational distributive effects of deficits,

which includes the change in debt burden; (ii) the composition of taxes and spending, especially the way it is spent on different items; (iii) macroeconomic indicators such as growth, savings, and inflation; (iv) national debt levels; and (v) the expected impact of certain political and procedural aspects of the budget process. However, they exclusively focused on the growth enhancing fiscal deficit, ignoring other aspects. Adam and Bevan (2005), using Bootstrap methodology, calculated growth enhancing threshold level of fiscal deficit for developing countries consistent with the productive spending and seignorage financing, which they found to be 1.5 percent of GDP. On the other hand, Onwioduokit (2012) found the optimal threshold level to be 5 percentage of GDP for Western African countries.

3. MODEL

Although the literature review in the preceding section shows that there is no consensus on the effects of fiscal consolidation on economic growth, it highlights one crucial factor which is that fiscal consolidation without regard to revenue-side or expenditure-side consolidation might prove to be counterproductive. Most of the empirical literature on the topic, indeed, shows that expenditure-side fiscal consolidation is more conducive to growth. There is a strong theoretical rationale for pursuing expenditure-based fiscal consolidation as against revenue-based consolidation. An increase in revenues leads the agents to reduce consumption, which could lead to slowdown in economic activity. This is especially important in the case of countries like Pakistan where increase in direct taxes has proved to be immensely difficult proposition for the economic managers. Also, as is well-known, an increase in indirect taxation almost always leads to losses in efficiency, in addition to negative welfare effects.

Similarly, wasteful expenditures could lead to crowding out of the private investment due to public borrowing. The Keynesian perspective opposes fiscal consolidation on the grounds that a reduction in development expenditures may lead to stagnation and unemployment. These theoretical arguments provide strong rationale to pursue the debate on fiscal consolidation for the case of Pakistan, especially consolidation through current expenditure reduction. As will be discussed below, in Pakistan the capital expenditures have come down considerably over the years thereby hampering economic growth. Another factor that is very important is that in the case of less-developed countries, as shown by Gupta, *et al.* (op cit.), there is a strong possibility of nonlinear relationship between fiscal consolidation and economic growth. We have also taken this factor into account in the empirical investigation.

We follow the model used by Gupta, *et al.* (ibid) and regress growth of per capita GDP on fiscal variables, along with a set of non-fiscal control variables. Our model is as follows:

$$\text{Economic Growth} = f(L, K, HK, TO, \text{Components of Budget Deficit})$$

where L , K , HK , and TO are labour force, physical capital, human capital and trade openness, respectively. These are the variables suggested by the economic growth theory to explain economic growth [see, for example, Mankiw, Romer, and Weil (1992); Barro (2003); among others].

The components of budget deficit include revenues and expenditures. We have also bifurcated revenues into tax revenues and non-tax revenues. Tax revenues are further subdivided into direct and indirect taxes. Expenditures are also subdivided into current and capital expenditures. These bifurcations are done to separate the impact of fiscal variables from the effect of traditional variables on economic growth. Gupta, *et al.* (op. cit.) have suggested that the ambiguous association of fiscal variables and economic growth could be due to non-linear association among the variables. To account for the non-linear association, we have also used squared terms of both the budget deficit and the composition of taxes and expenditures.

4. DATA

The time-period used in the paper for the analysis is from 1976 to 2016. Data on both the fiscal and the non-fiscal variables are taken from the Handbook of Statistics of Pakistan 2010 and various issues of the Pakistan Economic Survey. One of the major issues we faced regarding data is the non-availability of data on certain variables on a single base-year. To circumvent this problem, we converted the data to a single base year using the growth projections method.² Real GDP growth and real per capita growth are used as proxies for economic growth. Gross Fixed Capital Formation (GFCF) is taken in millions at constant prices, which is also used to construct capital stock series (K). To estimate the capital stock series, data on depreciation rate is obtained from the Penn World Tables (PWT 9.0).³ Trade openness is measured by adding exports and imports in million rupees and dividing by GNP in million rupees at current market prices. Employed labour force is measured in millions. Primary school and secondary school enrolment rates are used as a proxy for human capital (HK). Time series of primary school and secondary school enrolment rates are obtained by dividing the two rates by population in the relevant age groups, i.e. 5-9 and 10-14 age groups respectively. The enrolment rate data are obtained from the various issues of the Pakistan Economic Survey, whereas population in the age groups 5-9 and 10-14 is taken from UN statistics.

The fiscal variables, namely total revenues, total tax revenues, direct tax revenues, indirect tax revenues, total expenditures, current expenditures, capital expenditures, external and domestic financing of budget deficit, interest payments, and overall fiscal deficit are divided by GDP at market prices to transform each variable in percentage of GDP term. Primary deficit is calculated by subtracting overall fiscal deficit from the interest payments.

5. DESCRIPTIVE STATISTICS

There are numerous reasons cited for high budget deficit, among which, lower tax revenues take the top spot. It has been observed that reduction in revenue collection, in general, leads to reduction in expenditures, especially in the development expenditures. Another important reason for high deficit is the unforeseen circumstances such as floods, earthquakes etc., which leads to higher deficit despite cut in capital expenditures.

²Using growth rates of each variable in different years irrespective of their base years to obtain series on one base.

³The methodology is given in Appendix A.

In budget 2016-17, the maximum budget (35.5 percent of total budget)⁴ was allocated to debt servicing,⁵ which is among the major causes of high deficit budget.

Currently, fiscal policy in Pakistan is aimed at encompassing both expenditure- and revenue-based consolidation through prudent expenditure management and efficient resource mobilisation⁶. Government is taking austerity measures to manage fiscal profligacy as a result of which the fiscal deficit came down to 5.3 percent of GDP in 2015 from 7.3 percent in 2008. Similarly, due to expenditure-based consolidation, the government expenditures stood at 20.14 percent of GDP in 2015 as compared to 21.4 percent in 2008. The austerity measures and current expenditure curtailment has made it possible to bring the current expenditures down to 16 percent of GDP from 17.4 percent during the 2008-2015 period. On the other hand, the tax revenues increased from 9.9 percent of GDP in 2008 to 11 percent in 2015. This shows that the measures taken to consolidate the fiscal aspect of the economy have started showing results. But low real growth rate, which was 5 percent in 2008 and 4 percent in 2015, has left a question mark over the success of fiscal consolidation, at least in the short-run. It can be seen from the Figure 1 below that the budget deficit started declining only in 1997 and the process continued until 2004. However, after 2004 the budget deficit again started showing an increasing trend.

Fig. 1. Budget Balance as Percentage of GDP and GDP Growth

Table 1 shows that the average budget deficit since 1976 has been 6.40 percent of GDP. Among several episodes of high and low budget deficits, the maximum budget deficit was in 1976 (Figure B1, Appendix B7). On average, deficit was 4.88 percent during 1976-1980. In the first 25 years of the time-period used for analysis in this paper (1976-2000), the average budget deficit was more than 7 percent, while during the last one and a half decades it has remained close to 5 percent, despite it being as high as 8.2 percent of GDP in 2013. On the other hand, average primary deficit has been 2.2 percent since 1976. Few episodes of primary surplus are also apparent in Figure B2, especially during 1997-2004, which shows significant impact of the interest payments on the budget deficit.

Table 1

<i>Trends in Fiscal Variables and GDP Growth</i>						
<i>Year</i>	<i>Budget Balance</i>	<i>Primary Balance</i>	<i>Tax Revenues</i>	<i>Non-Tax Revenues</i>	<i>Direct Taxes</i>	<i>Indirect Taxes</i>
1976–2015	–6.40	–2.20	10.95	3.98	2.76	8.20
2001–2015	–5.13	–0.82	9.65	3.66	3.30	6.36
1976–1980	–4.88	–0.63	9.54	3.70	3.26	6.28

⁴The calculation is done by taking values from Federal Budget 2016-17: Annual Budget Statement.

⁵Revised estimates of 2015-16 show that share of debt servicing was 35.6 percent of total budget (see Federal Budget 2016-17: Annual Budget Statement).

⁶See Pakistan Economic Survey 2012-13, Finance Division, Government of Pakistan.

⁷The graphical representation of all the variables other than GDP growth and budget balance is relegated to appendix.

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1976–1990	–7.42	–4.71	12.06	4.28	2.00	10.06
1981–1990	–7.01	–3.66	11.98	4.94	2.08	9.90
1991–2000	–6.78	–0.49	11.24	4.00	3.09	8.15
2001–2010	–4.47	–0.23	9.42	3.82	3.18	6.24
2011–2015	–6.46	–2.01	10.11	3.33	3.52	6.58
Year	Current Spending	Capital Spending	Interest Payments	GDP Growth	Per Capita GDP Growth	Real GDP Growth
1976–2015	16.67	5.53	4.50	4.93	2.56	
2001–2015	15.36	3.57	4.55	4.32	2.16	
1976–1980	15.23	3.54	4.54	4.39	2.17	
1976–1990	16.49	8.09	3.19	5.87	3.08	
1981–1990	17.58	7.30	3.80	6.14	3.10	
1991–2000	18.92	4.63	6.39	4.41	2.38	
2001–2010	15.08	3.51	4.60	4.55	2.20	
2011–2015	15.92	3.68	4.45	3.87	2.05	

Note: Calculations are done by excluding FY2016 because FY2016 values are provisional.

Table 2 reports the correlation of the fiscal variables with GDP growth. Although correlation of GDP growth with budget deficit is low, it is positive (5.05 percent), which shows that higher budget deficit is positively associated with growth. Nevertheless, it is not statistically significant. On the other hand, it is negatively correlated (–34.7 percent) with the GDP per capita growth. More importantly, correlation between GDP growth and primary deficit is negative (–31 percent), while correlation between primary deficit and GDP per capita growth is also negative (–56 percent). Moreover, both the GDP and GDP per capita growth are negatively correlated with interest payments, i.e., –41 percent and –45 percent respectively. This implies that the fiscal consolidation along with reduction in interest payments may lead to higher economic growth.

Table 2

Correlation Matrix

	GDP Growth	GDP Per Capita Growth
Budget Deficit (% of GDP)	5.05	-34.76
Primary Deficit (% of GDP)	-30.85	-55.70*
Interest Payments (% of GDP)	-41.21**	-45.12**

Note: * and ** indicate significant at 1 and 5 percent level of significance.

Figure B3 also gives interesting insights from the data. We have estimated trend curves using polynomial equation of degree 6. This gives us non-linear movement of each variable. Cyclical movements in both the variables, namely GDP growth rate (GDPG) and per-capita GDP growth (PGDPG), show that as budget deficit declines GDP growth increases and vice versa. This result alludes to the importance of fiscal consolidation to boost growth. This does not, however, imply statistical significance.

A sudden decline is also observed in the tax revenues during the period 1996–2000, from the high of about 13 percent in 1980. Thereafter, tax revenues have remained relatively flat at around 9-10 percent (see Figure B4). Figure B5 shows that a major portion of the revenues comes from tax revenues. The share of non-tax revenues, in total revenues, was less than 20 percent in 1970s, which has now slightly increased to more than 20 percent. The decline in total tax revenues is associated with decline in indirect taxation, while direct taxes have remained almost flat (Figure B5, Appendix B). The share of direct taxes in total tax revenues has increased from 15 percent in 1990 to 35 percent in 1998 but no further increase is evident after 1998, which is clear from Figure 9. On the expenditure side, capital spending has been declining since 1976 from more than 10 percent of GDP to close to 2 percent in 2013 and 2014. On the other hand, although current spending has declined over the years, it is still close to 12 percent of GDP. Interestingly, the share of capital spending in total expenditures, which was more than 40 percent during the late 1970s, has been declining continuously and now it is less than 20 percent.

It may be concluded from the above discussion that continuous decline in the capital spending, as well as in the total tax revenues, along with increase in budget deficit could be one of the reasons for low GDP growth. Therefore, there is a possibility that increase in capital expenditures, coupled with decline in interest payments, may lead to higher economic growth.

6. ECONOMETRIC METHODOLOGY

Theoretically, labour, physical capital, and human capital affect economic growth through production of goods and services. Economic growth, in turn, affects demand for labour, capital and human capital. Similarly, there are several other variables in our model that may be influenced by various other variables not present in the model, potentially giving rise to the problems of endogeneity. To solve the problem of endogeneity, we need more than one instrument because potentially every explanatory variable in the model may be highly endogenous. To circumvent the problem of endogeneity, a linear combination of lagged variables is used as instruments for each explanatory variable. This process of using multiple instruments to get instrumental

variable estimator is known as two-stage least square (2SLS) estimator, which is the estimation technique used in this paper.

2SLS is relatively easier to apply in time series data than in cross section or panel data. In time series, in general, we do not need to find different instruments for each endogenous variable [Woolridge (2009)]. Instead, lags of the explanatory variables do the satisfactory job. The condition is that the number of instruments should be greater than the number of parameters estimated in the equation. The validity of instruments is determined by the J-statistics. The null hypothesis assumes that all the instruments are exogenous. If few instruments are exogenous and few are endogenous then the J-statistics will be large. If null hypothesis is rejected, then we need to look for other exogenous instruments until our null hypothesis is accepted. Furthermore, in order to check the presence of unit-root in the time series of the variables used in the analysis, we employ Augmented Dickey-Fuller (ADF) test.

7. RESULTS AND FINDINGS

As a first step, we checked for the presence of unit-root in all the variables. Table 3 reports the results of ADF test employed to check stationarity. All the variables are taken in the natural log form. The results show that budget deficit, direct taxes, and indirect taxes are trend-stationary but non-stationary if we do not include the trend term in the equation but stationary at first difference. Moreover, capital stock and total expenditures are non-stationary both at level and the first difference; they are integrated of order 2. Apart from these five variables, all other variables are integrated of the same order.

Table 3

Results of Augmented Dickey-Fuller (ADF) Test

Variable	Level	First Difference	Second Difference	I(d)
GDP	-2.25	-5.43*		I(1)
Labour	-1.82	-4.14*		I(1)
Capital	-2.88	-1.61	-3.81**	I(2)
Primary School Enrolment	-2.42	-4.05**		I(1)
Secondary School Enrolment	-2.37	-3.93**		I(1)
Trade Openness	-2.26	-4.52*		I(1)
Budget Deficit	-3.86** (-0.75)	-3.52**		I(0)
Tax Revenues	-3.62** (-1.04)	-3.58**		I(0)
Direct Taxes	-3.34** (-1.45)	-3.90**		I(0)
Indirect Taxes	-2.31	-4.63*		I(1)
Total Expenditures	-1.65	-3.13	-3.92**	I(2)
Capital Spending	-2.07	-3.53**		I(1)
Current Spending	-1.46	-3.59**		I(1)

Note: *, ** and *** indicate significance at 1, 5, and 10 percent level of significance, respectively.

The 2SLS estimation technique, as discussed in the previous section, is used to estimate the parameters of the equation to avoid the problem of endogeneity. Lagged values of the different variables used in the model are used as instruments. Up to 3 lagged values of each variable are used in each regression. The condition on the validity of instruments is that the number of instruments is at least as many as, or greater than, the parameters estimated in the equation. In our case, instruments are greater than the estimated parameters, i.e. $j \geq k$, where j is the number of instruments and k is the number of estimated parameters. Value of J-statistics (see Table 4) show that instruments used in all the four regressions are statistically within a given bound, i.e. in each case, we accept our null hypothesis that all the instruments are valid.

Table 4 reports the results of 2SLS and OLS regressions. In all the equations, the natural log of real GDP is the dependent variable. We have reported the results of OLS regression for the sake of comparison. The results show that the results from the two estimation techniques are similar and the difference is only in the magnitudes of the coefficients. The results show that labour force, capital stock, trade openness, and human capital are positively related with the GDP growth, which is as predicted in the theory. It is important to mention that we also used several dummies to capture the impact of primary deficit, taxation reforms, expenditure changes, regime changes etc. All the dummy variables came out to be insignificant and did not change the magnitude, signs and significance of other variables and for this reason, we have not included those dummy variables in our model.

The Equation 1 is the basic equation estimated in which budget deficit and its squared terms are used as independent variables, along with other control variables. Coefficient of budget deficit and budget deficit squared shows that association between GDP and budget deficit is non-linear. This implies that some budget deficit is good for growth but it starts to affect economic growth negatively once it crosses a certain level. It shows that some fiscal consolidation is needed to keep the deficit under control to boost growth.

Fiscal consolidation, as discussed above, in general, is more successful when it is done by cutting down expenditures. However, fiscal consolidation may also be achieved by raising revenues since raising the revenues leads to reduction in budget deficit. To see the impact of revenues and expenditures on economic growth separately, in Equation 2 (Table 4) we have used total revenues and total expenditures instead of budget deficit. The results are significant and in line with the results found in the literature; that is, very high expenditures are negatively associated with GDP growth.

In Equation 3 we have only included components of total expenditures, namely only current and capital expenditures, along with other control variables, omitting components of revenues. Capital spending and current spending in Equation 3 affect GDP growth positively, while the squared terms of both the variables have negative association with the GDP growth. Interestingly, current expenditures turn out to be significant and positive in affecting the GDP growth, whereas the coefficient of capital expenditures, though positive, is insignificant. The insignificant association of capital spending could be due to lower share of capital spending in total expenditures and the nature of capital spending. Development expenditures, especially on social sector, are

quite low in Pakistan and probably it is for this reason that capital expenditures are not a significant factor in explaining GDP growth.

In Equation 4, we have included the components of tax revenues; that is, direct taxes, indirect taxes, capital spending, and current spending, along with total expenditures and other control variables. Direct and indirect taxes show insignificant association with the GDP growth. This implies that an increase in revenues may not enhance growth. This gives another indication that our tax structure is not growth enhancing and we need structural changes in the tax regime. Although taxation distorts production and create inefficiencies in the economic system, taxation policies are a tool used to boost equity to give government space for expenditures where markets fail. In order to make the taxation system growth friendly, reforms are needed to increase the tax-base instead of increasing the existing tax rates, which increase the tax burden on existing tax payers. The coefficient of total expenditures in Equation 4 is both positive and significant. This result, coupled with the result that direct and indirect taxes are not significant in explaining growth, has important implications. It means that increase in revenues may not effect growth directly but through increase in expenditures, particularly through increase in capital expenditures.

Table 4

Results of Ordinary Least Squares and 2-Stage Least Squares Regression

Dependent Variable: Natural Log of Real GDP									
Variables	Equation 1		Equation 2		Equation 3		Equation 4		
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	
Constant	-3.36**	-2.87**	4.07	2.28	-2.28	-6.43***	2.17	4.47***	
Labour	0.91*	1.04*	0.34**	0.41**	0.14	0.06	0.40**	0.46*	
Capital	0.54*	0.50*	-0.04	-0.03***	0.49**	0.90*	0.17	-0.04	
Primary School Enrolment	-0.16**	-0.17	0.14***	0.13	0.10	0.06	0.13***	0.16	
Secondary School Enrolment	0.30*	0.43*	-0.01	0.07	-0.02	0.001	0.00	-0.01	
Trade Openness	-0.02	-0.06***	0.03	0.07	-0.04	0.01	0.03	0.03	
Budget Deficit	0.96*	0.94**							
(Budget Deficit) ²	-0.04*	-0.04**							
Total Revenues			-0.66	-1.88**	-0.68	-1.19**			
(Total Revenues) ²			0.03	0.08**	0.03	0.05***			
Direct Taxes							0.12	0.15	
(Direct Taxes) ²							-0.01	-0.01	
Indirect Taxes							-0.58	-0.88	
(Indirect Taxes) ²							0.03	0.04	
Total Expenditures			1.67*	2.87*			1.35**	1.64**	
(Total Expenditures) ²			-0.06*	-0.11*			-0.05**	-0.06**	
Capital Spending					0.52	0.40			
(Capital Spending) ²					-0.020	-0.01			
Current Spending					1.11*	1.69*			
(Current Spending) ²					-0.04*	-0.07*			
R ²	0.9978	0.9968	0.999	0.9980	0.9992	0.9988	0.9989	0.9986	
	0.9973	0.9960	0.9987	0.9973	0.9989	0.9982	0.9985	0.9980	
F-statistic	2033	1286	3296	1419	107.2	1770	102	1603	
J-Statistic		18.01		12.09		10.18		16.57	
Prob.		0.39		0.74		0.75		0.41	

Note: *, **, *** indicate significant at 1, 5 and 10 percent level of significance, respectively.

One of the contributions of the present paper is the calculation of optimal level of budget deficit that enhances growth. Onwioduokit (2012) used lowest residual sum of squares and Fay and Porter (2006) used bootstrapping methodology to calculate threshold level of fiscal deficit. We have calculated growth maximising optimal level of budget deficit using the first order conditions. Using the estimates of Equation 1 (Table 4) the optimal level of fiscal deficit comes out to be 0.74 percent of GDP. This optimal level of budget deficit that would enhance the growth to its potential level is surprising and indeed impracticable. For the West African Monetary Zone, Onwioduokit (2012) estimated the optimal level of fiscal deficit at 5 percentage of GDP, while Fay and Porter (2006) got 1.5 percent level for developing countries. Pakistan has never achieved such low level of fiscal deficit as a percentage of GDP.

It must be borne in mind, however, that the calculation is ex-post and not ex-ante. It is argued above that in Pakistan revenues, especially those collected through indirect taxation, are very low, current expenditures are high and capital/development expenditures are low as well. Therefore, given these factors and trend of these variables in the data, it should not come as a surprise that the optimal level of fiscal deficit, as a percentage of GDP, is so low. What it essentially means is that in order to grow, Pakistan needs to rev up revenue collection and increase capital expenditures.

8. CONCLUSIONS AND POLICY RECOMMENDATIONS

This paper has made an attempt to explore the association between fiscal variables and economic growth in Pakistan, following the discussion and functional form used in Gupta, *et al.* (op. cit). Our results suggest that there exists nonlinear association between fiscal deficit and growth and reduction in fiscal deficit beyond a certain level may be growth-enhancing. However, given the current levels and structure of revenues, taxation, expenditures, and fiscal deficit, our results do not show that fiscal consolidation would enhance growth.

One of the important conclusions drawn from the analysis is the negative correlation between growth and interest payments. Negative correlation is also found between primary deficit and growth, which strengthens the result that we need to reduce our primary deficit to boost growth. Primary deficit combined with higher interest payment will be a double blow to the economy and therefore it is extremely important to curtail both the interest payments and the primary deficit. An important implication of the present paper is that our tax structure is not beneficial for the growth process. The positive association of both direct and indirect taxes with growth is insignificant from which we may conclude that increase in tax revenues will not enhance growth. It is very much possible that growth effects tax revenues and not the other way round. At the same time, we cannot preclude the fact that tax revenues increase fiscal space which may affect growth indirectly through increase in capital expenditures.

Following Abdon, *et al.* (2014), it may be argued that spending on the social sector may enhance long-term growth but to spend on the social sector government needs fiscal space. To increase the fiscal space, we need more revenues, which has not happened for the last many decades despite several ineffective tax efforts. Another way is the reduction in expenditures by cutting down our interest payments, curtailment of the inefficient use of expenditures and reduction in leakages, which eat into resources

and are highly unproductive. Very high levels of expenditures, especially current expenditures, have negative impact on growth, while capital expenditures have positive impact on the long run growth. Development expenditures have externality effects and also have higher multiplier effect but they should not come at the cost of crowding out of private investment. The share of capital expenditure has been declining despite persistent budget deficit, which may be one of the reasons why capital spending is insignificantly associated with growth. It shows that capital expenditures incurred in the past have not been very productive.

Finally, one surprising result of our analysis is the very low threshold level of fiscal deficit to GDP ratio. It practically implies balanced budget, which is not possible, at least in the case of Pakistan because it is operating well below its capacity utilisation potential. What it suggests is that Pakistan needs to enhance tax revenues, reduce current or wasteful expenditures, and raise capital expenditures. Furthermore, such a low level of fiscal deficit is not possible when interest payments are too high. As far as optimal level of growth enhancing fiscal deficit is concerned, Amador (1999) concludes that in the case of proportional intervention costs, the optimal ceiling depends positively on the cost parameter and on the variance of the budget deficit, while the optimal ceiling depends negatively on the average budget deficit. We have not included intervention costs, variance of fiscal deficit and average budget deficit in the paper. Moreover, fiscal deficit creates problem with increase in debt, thus in future research it is one of the areas that should be explored.

There are a few important lessons that can be drawn from the results and analysis in this paper. At the current level, capital spending is not contributing to growth in a significant way. There is a need to boost capital spending in those areas that are highly productive and efficient. What has been hurting Pakistan is high share of interest payment, in the government's financial commitments. Even though it is extremely difficult to curtail interest payments, government can reduce future interest payment obligations through prudent borrowing. The required increase in tax revenues to meet government's financial commitments will take time and monumental efforts but in the short-term policy-makers can focus on withdrawing exemptions given through infamous statutory regulatory orders (SROs) and withdrawing subsidies where they are not needed to increase tax revenues.

APPENDIX A

CAPITAL STOCK⁸

The capital stock series is estimated using data on Gross Fixed Capital Formation (GFCF) in constant prices and capital stock depreciation rate.⁹ The data on depreciation rate is obtained from Penn World Tables (PWT 9.0). One of the most widely used methods to estimate capital stock is Perpetual Inventory Method (PIM). The idea behind PIM is that capital stock is an inventory, which increases with investment. The investment stays in the economy once it has entered the system, though it depreciates over time at some rate, but

⁸The discussion in this sub-section is based on Berlemann and Weselhöft (2014).

⁹Some authors assume constant depreciation rate but we have used, following Berlemann and Weselhöft (ibid.), time-varying depreciation rate.

never reaches zero [Berlemann and Weselhöft (2014), p. 4]. The name Perpetual Inventory Method is derived from this so-called “perpetuality” of investment.

The net capital stock at the beginning of period can be written as a function of net capital stock at the beginning of period, K_{t-1} , investment in the previous period, I_{t-1} , and consumption of fixed capital stock, CF_{t-1} . Hence, we have:

$$K_t = (1 - \delta) K_{t-1} + I_{t-1} - CF_{t-1} \quad (1)$$

Assuming capital stock depreciates at the rate δ , we can write capital stock as:

$$K_t = (1 - \delta)^t K_0 + \sum_{i=0}^{t-1} (1 - \delta)^{t-i-1} (I_i - CF_i) \quad (2)$$

Iteration of this equation backward up to the initial period leads to the following equation:

$$K_t = (1 - \delta)^t K_0 + \sum_{i=0}^{t-1} (1 - \delta)^{t-i-1} (I_i - CF_i) \quad (3)$$

The PIM requires an estimate of initial capital stock in order to arrive at a series of capital stock for subsequent years. One way is to guess the initial value and then estimate capital stock for later years, using data on GFCF but it is highly arbitrary. Another method reported in the literature to obtain the initial capital stock is to use the following equation:

$$K_t = (1 - \delta)^t K_0 + \sum_{i=0}^{t-1} (1 - \delta)^{t-i-1} (I_i - CF_i) \quad (4)$$

where K_0 is initial capital stock, in period t , I_t is GFCF in period t , δ is growth rate of GFCF for the entire period for which the capital stock period is to be estimated, and δ is capital stock depreciation rate. The rationale behind using the above equation to estimate initial capital stock is that capital stock and investment grow at roughly the same rate and growth rate of investment can be used to approximate initial capital stock. Following Berlemann and Weselhöft (ibid.), we regress GFCF on time to derive initial investment for the period t , using data from t_0 to t . Specifically, the following equation is used to estimate initial investment, using the OLS method:

$$I_t = a + b t \quad (5)$$

Next, using the estimated parameters, a and b from Equation 5, we calculate fitted value of investment for period t :

$$I_t = a + b t \quad (6)$$

This gives us a series of investment, ranging from I_{t_0} to I_t , using exponential function. We use the first value of fitted investment for t_0 to calculate initial capital stock, using Equation 4. Instead of calculating growth rate of investment, δ , calculated from the data, we use b as a measure of trend investment growth. Capital stock for subsequent years is then calculated using Equation 1 above.

APPENDIX B

Fig. B1. Budget Balance

Fig. B2. Budget Deficit and Primary Deficit

Fig. B3. Share of Tax and Non-Tax Revenues**Fig. B4. Share of Current and Capital Spending****Fig. B5. Share of Direct and Indirect Taxes****REFERENCES**

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Strategic Change in Operating Trends of Public Listed Companies and Its Impact on Stock Market Growth

ABDUL WAHID, NADEEM TALIB, and SYED ASGHAR ABBAS NAQVI

The primary concern of the present study is to examine the impact of cross-listing on the stock market growth. The theoretical framework for the research was developed by taking the members of the World Federation of Exchanges (WFE) as statistical frame. For analysis and statistical calculations in the study a Structural Equation Modelling (SEM) technique is used. The results suggest a significant and positive impact of cross-listing on stock market growth indicators except on the value of share trading. The study concludes that cross-listing is fruitful for stock market growth of host stock exchanges. It recommends that host countries should create conducive environment for offshore listing.

Keywords: Cross-listing, Domestic Listing, Market Capitalisation, Equity Shares and Stock Index

1. INTRODUCTION

Introduction of the Alternative Trading System (ATS) is a paradigm shift towards network economy and globalisation which has changed the patterns and trends of capital markets over the last few decades [Alhaj-Yaseen (2013)]. Capital mobility has lowered the barriers that keep national markets separate or independent from one another [Changa and Corbitt (2012)]. As a result of globalisation, firms have become more integrated with each other than before, wrecking the boundaries of operations [Peng and Su (2014)]. Furthermore, advancements in technology have also changed the way stock is traded. Globalisation eventually has resulted in an expansion and diversification of operational areas of the stock exchanges. Competition among stock exchanges is substantially increasing because of factors like expansion of stock markets [Alhaj-Yaseen (2013)], strategic change in governing structure of the stock exchanges (demutualisation) and interaction and information sharing among global investors [Ahmeda, *et al.* (2006)].

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The obstacles to international capital flow are legal restrictions on capital mobility and foreign ownership, the costs associated with trading and acquiring information on companies listed abroad and concerns over investor protection in certain foreign jurisdictions that still exist [Abdallah, Abdallah, and Saad (2011)]. The segmentation of markets that re-emerges with these barriers is creating incentives for corporate managers to adopt financial policies such as international cross-listing whereby a company lists its shares for trading on at least two stock exchanges located in different countries. However, investors can now access foreign capital markets easily as geographical boundaries have been rendered meaningless [Alaganar and Bhar (2004)]. At the same time, listed companies can enlist their securities for trading around the world without any hassle to attract investors effectively and by controlling their operations in head offices located in different corners of the world [Dodd and Gilbert (2016)].

Despite globalised, integrated capital markets, companies still opt for cross-listing or offshore listing for numerous reasons, benefiting both the company and the investors. The basic idea behind cross-listing is to help and facilitate the listed companies to access foreign capital from domestic markets because general public will be enabled to take part in the initial public offerings across borders and most importantly the brokering community may be able to operate directly in regional stock markets by use of technology such as remote trading terminals etc. Changa and Corbitt (2012) defines the secondary listing as *“listing of stocks on foreign exchange, local exchange subjects itself to foreign exchange, and, by doing so, reduces the discretion corporate insiders have to divert corporate resources for their own private benefit ”*.

There is a significant body of literature that deals with cross border or offshore listing and its effects on the governance structure [Charest, Cosset, Marhfor, and M’Zali (2014); Charitou, Louca, and Panayides (2007)] as well as offshore listing and its private benefits to one firm regarding the control on another firm [Chira (2014)]. Similarly, studies have investigated offshore listing and its impact on company worth and the competition in the host stock market [Ghosh and He (2015)], as well as market return and risk to cross listed companies in domestic host stock market [Koh, Lee, and Basu (2015)]. Effects and reaction of cross-listing on host stock market [Alaganar and Bhar (2004)] are also important areas of discussion.

Besides, the cross-listing and its legal aspect as a consequence of the Sarbanes-Oxley Act as well as its benefits to new markets [Bahlous (2013)] are also the focus of discussion in various circles. However, little research has been carried out on the role of cross-listing in host stock market. This evident gap in the existing literature needs to be bridged to develop linkage between cross-listing and host stock market growth, which would be a new concept in the relevant research field. Consequently, this study adds to the existing literature about stock market by exhibiting how secondary listing significantly uplifts indicators of host stock market, bringing novelty to the field. The present research advances theoretical and conceptual contribution in this domain by finding answers to two research questions i.e., how does cross border listing enhances capital market growth of host

stock exchanges, which experienced the cross border listing program; and what is the mean score of cross-listing in different exchanges?

2. LITERATURE REVIEW

If access to the market, and capital flows are very restricted and the risk mitigation avenues through diversified pool of investments are limited, cross-listing would be a source to counter these restrictions and limitations [Alhaj-Yaseen (2013)]. Prior literature has documented numerous fruitful economic outcomes of cross-listing. For instance, it reduces cost of capital [Bris, Cantale, Hrnjic, and Nishiotis (2012)], extends stockholder base [Karolyi (2012)], provides more liquidity as well as diversified pool of investment [Peng and Su (2014)], and enhances firms' visibility and exposure to participation of local and international investors [Charitou, Louca, and Panayides (2007)]. Cross-listing has numerous benefits, particularly, when firms can avail opportunities in terms of new investors, have their stock traded in the international market and gain access to international pool of investment. It also reduces the discretion where corporate insiders divert corporate resources for their own private benefit [Koh, Lee, Basu, and Roehl (2013)].

Cross-listing removes the investment barriers that exist between two locations as the investors can trade overseas the same way they trade at local markets. It also helps in the growth of the capital market of a country in which the companies go to list [Kryzanowski and Lazrak (2011)]. However, most of the recent literature regarding offshore listing has emphasised on its governance benefits due to diversified pool of investments. In addition, the Sarbanes-Oxley Act in 2002 encourages the company's concentration towards the foreign market for risk mitigation and for vigorous corporate governance structure in the company. When a company is listed in a foreign market for trading, its capital comprises of domestic and foreign funds. This benefit is an opportunity for shareholders of the cross-listed companies to avail better investor protection when their shares are traded in international market. Cross-listing can assist stock exchanges to enhance stock market performance by updating its technology and improving corporate governance structure due to diversified investors, which are more responsive and flexible to market growth. This ensures appropriate decision making due to corporate investors and increases the value of its customers, such as foreign and domestic companies [Lin, Hutchinson and Percy (2013)].

Litvak (2008) provided a theoretical model and supporting empirical evidence that integration of emerging stock markets is beneficial for the development of a domestic stock market. Integration increases domestic prices by enhancing the ability of the domestic stock market to provide the diversification and liquidity roles of the market. Liu (2007) found that firms can raise more equity capital after cross-listing in the U.S. and those firms which are cross-listed possess more worth than those which have not [Luo, Fangb, and Esquedac (2012)].

Cross-listing of stocks in multiple stock markets may offer an opportunity to diversify their investments, by investing in different markets, and increasing financial and economic ties [McEnroe and Sullivan (2006)]. Ng, Yong, and Faff (2012) concluded that the integration of emerging stock markets increases domestic prices by enhancing the ability of the domestic stocks to provide diversification and liquidity, and

transfer a segmented local equity market to an integrated market with high liquidity and market capitalisation.

Pan and Brooker (2014) argued that growth opportunities are more highly valued for firms that choose to cross-list in the U.S., particularly those from countries with weaker investor rights. They also concluded that firm characteristics explain almost none of the variations in governance ratings in less-developed countries and that access to global capital markets sharpens firms' incentives for better governance. All the evidence is consistent with the theory that there is a distinct governance benefit for firms that are listed on the US exchanges [Baileya, Karolyi and Salva (2006)]. This benefit is not shared by firms that list outside the US exchanges or in London. There is no evidence in our data that this benefit has weakened over time [Peng and Su (2014)].

Petrasek (2012) argued that global equity increases the list of the company's investor base with beneficial effects on the cost of capital. Cross-listing can assist stock exchanges to enhance the stock market performance by updating its technology, improving corporate governance structure due to diversified investors [You, Lucey, and Shu (2013)] which is more responsive and flexible to market growth, ensuring appropriate decision-making due to corporate investors [Silva, Chavez, and Wiggins (2015)] and increasing the value of its customers such as foreign and domestic companies.

Cross-listing also covers advantages regarding liquidity, return, new opportunities and reduction of the risk due to diversified investment in the capital of the company [You, Lucey and Shu (2013)]. It also indicates the benefits of foreign stock listings, including enhancing the name recognition in the minds of investors and consumers in a foreign country, building relations and access to a foreign financial community as well as economic soundness in the local market.

2.1. Hypothesis

It is evident in the existing body of literature regarding stock markets that integration of regional stock markets with international forums through cross-listing is not only beneficial for the cross-listed company but it also upgrades the intensity of the host stock market. Chira (2014) argued that firms can gain more equity capital and worth after cross-listing than those which are not cross-listed, by availing international market access, gaining diversified investment, and enhancing their financial and economic resources [Alhaj-Yaseen (2013)]. Similarly, when an international or multi-national company lists its securities on a regional stock market forum e.g. Bombay Stock Exchange, Pakistan Stock Exchange and Tehran Stock Exchange, it plays a vital role in developing and enhancing the magnitude of share trading value on host market [Baileya, Karolyi and Salva (2006)].

H1: Cross-Listing leads to a better share trading magnitude in the host stock exchange.

Cross-listing not only removes barriers in the trading of companies, which exist among different nations like India and Pakistan, but also brings investors from different

regions together. It also helps to grow the capital market of the country in which the company is going to be enlisted [Zhou and Owusu-Ansah (2012)]. As a result, the magnitude of market capitalisation of host stock market expands due to listing of new foreign company shares.

H2: Cross-Listing enhances market capitalisation in host stock exchanges.

It has been observed that ups and downs in stock indexes are the result of stock market investors' behaviour, daily activities, trends, political stability and the economic condition of the relevant country. It can be enhanced through upgrading technology, providing concessions in trading and attracting investors by building confidence among investors. It has been observed during the last decade that cross-listing is also an emerging reason which could influence the stock index of a host market [Baileya, Karolyi, and Salva (2006)].

H3: Offshore listing strengthens stock index in host stock exchanges.

The most important issue regarding the listing on the stock exchange is the lack of confidence of the company in its regulatory system, operating system and working condition. It is considered as 'club of brokers' [Karolyi (2012)]. Because of this listing, the trends of stock exchange forums are slow and weak. The effects of globalisation are realised in every domain of life but are especially evident in the stock market because of the concept of demutualisation and cross-listing [Bahlous (2013)]. It shifted investors, especially public unlisted companies' focus from local investors towards stock market forum. As a result, public unlisted companies' trends are diverting towards stock markets due to foreign investors.

H4: Secondary listing attracts the unlisted domestic companies towards capital market to list their securities on their platform.

Cross-listing removes the investment barriers that exist between two locations, as the investors can trade overseas shares in the same way as they trade at the local markets. It also helps to grow the capital market activities in the host country in which the company is going to list [Yu-Shan (2008)]. This causes increased trading activities in the host market [Ayyagari (2004)].

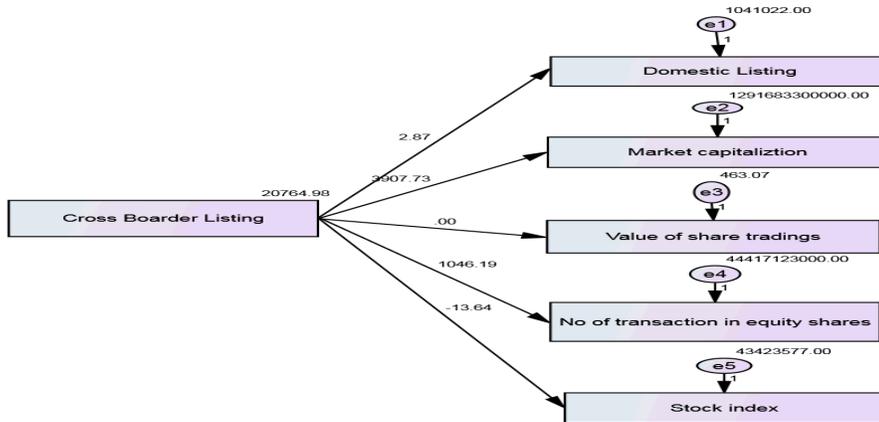
H5: Cross-border listing increases trading activities in host market through attracting investors towards foreign investment.

3. FRAMEWORK DETAIL

The idea of cross-listing is to list a domestic public listed company's securities on the international secondary stock exchanges to get benefits of excessive optimal capital and to increase investment opportunities [Chipeta and Mbululu (2013); Ayyagari (2004)]. The basic idea behind the cross-listing phenomenon is to facilitate listed companies to access foreign capital from domestic markets and to enable the general public to take part in initial public offerings across the border where the most important

brokering community may be able to operate directly in regional stock markets through use of technology such as remote trading terminals etc.

Fig. 1. Result of SEM
Cross listing and its impact on stock market performance



The main indicators of the stock market growth are as follows:

1.No. of Listed Companies	The number of the listed companies is a figure which shows how many companies are listed on the platform of the stock exchanges and share their activities in the concerning stock exchanges.
2. No. of the Transactions	Number of the transactions in the equity market shows how many transactions in the equity capital and debt capital are carried out on daily basis. “The number of trades represents the actual number of transactions which have occurred during the period on the relevant exchange.” [World Federation of Exchanges (2012)]
3. Value of Share Trading	The value of share trading is the total number of shares traded multiplied by their respective matching prices. It shows the total worth of domestic companies’ shares trading in specific period. Companies admitted to listing and trading are included in the data.
4. Market Capitalisation	Market capitalisation is a term which shows the strength and magnitude of the stock market. Market capitalisation shows how strong and large the stock exchange is. The market capitalisation is calculated by the total number of issued shares of the domestic companies, including their several classes, multiplied by their respective prices at a given time.
5. Stock Index	Indexes are, in general, market capitalisation-weighted including a large sample of listed domestic companies, as all-share or composite indexes. They are generally re-calculated to adjust capital operations and modifications in the company composition of the index. The index can be market capitalisation-weighted or free float based. When the index is a price index, it measures the pure change of share prices without taking into consideration returns from dividend pay-outs.

4. METHODOLOGY

This study consists of 104 stock exchanges which are members of the World Federation of the Exchanges. The sample of the study was selected by using stratified

proportionate sampling technique. Total population is divided into three homogeneous subgroups (strata) such as *Asian*, *European* and *American* stock exchanges. These strata are mutually exclusive in terms of ownership, control, region, rules and regulations, and the working environments. Systematic sampling was then used within each stratum for selection of the sample. The sample comprised of only 16 (15.38 percent of population) stock exchanges, which have experienced cross-listing and foreign companies are listed on their platform. Sample of the study comprised of 5 stock exchanges from the American region (31.25 percent of sample), 4 stock exchanges from the Asian region (25 percent of sample) and 7 stock exchanges from the European region (43.75 percent of the sample). List of this sample of stock exchanges is shown in Table (1).

Table 1
*Summary of Sample and Mean and Median of Cross Listing in
Sample Stock Exchanges from 2000 to 2012*

Sr. No.	Stock Exchange	Region	Mean	Median
1	American SE	Americas	81	95
2	Bermuda SE	Americas	33	33
3	Lima SE	Americas	38	32
4	NASDAQ OMX	Americas	340	321
5	TMX Group	Americas	61	52
6	Australian SE	Asia Pacific	80	78
7	Japan Exchange Group – Tokyo	Asia Pacific	24	25
8	New Zealand Exchange	Asia Pacific	34	31
9	Singapore Exchange	Asia Pacific	198	247
10	Deutsche Börse	Europe - Africa - Middle East	136	105
11	Johannesburg SE	Europe - Africa - Middle East	31	30
12	London SE	Europe - Africa - Middle East	505	501
13	Luxembourg SE	Europe - Africa - Middle East	225	224
14	NYSE Euronext (Europe)	Europe - Africa - Middle East	246	334
15	Oslo Børs	Europe - Africa - Middle East	34	34
16	SIX Swiss Exchange	Europe - Africa - Middle East	96	92

Concerned data for chosen stock exchanges was provided by the World Federation of Exchanges (WFE) along with authorisation for its use for the present study. The data in squashed form was also published on their website which voided reliability issues since reliability of secondary data is assessed through its source from

which the data is collected [Sekaran (2003)]. This data covers the time period from 2000 to 2012 regarding foreign listed companies and stock market indicators of host stock exchanges.

Quantitative analysis coupled with a qualitative background was employed to test research hypotheses. The study used the Structural Equation Modelling (SEM) for the model fitness and to check whether the cross-listing significantly influences stock market indicators such as domestic listing, market capitalisation, stock index, number of transactions in equity market and value of share trading.

5. FINDINGS AND DISCUSSION

5.1. Descriptive Statistics

Data range, mean, standard deviation and normality distribution is provided in Table (2). Descriptive statistics indicate a normal distribution in data, which affirms the assumption for running all statistical tests. Similarly, the result of descriptive statistics shows the cross-listing of foreign companies listing in the stock exchanges as shown in Table (1, 2) and Figure (3, 4). American region average cross-listing on exchanges was as American SE, Bermuda SE, Lima SE, Nasdaq Omx and Tmx Group 81, 33, 38, 340 and 61 foreign companies respectively as shown in Table (2) and Figure (3). Nasdaq has the highest score in foreign listings as an average of 340 foreign companies per year were listed on its platform from 2000 to 2012. Similarly, average cross-listing in Asia Pacific's stock exchanges such as Australian SE, Japan Exchange Group Tokyo, New Zealand Exchange and Singapore Exchange is 80, 24, 34 and 198 foreign companies respectively as shown in Table (2) and Figure (3). The Singapore Exchange enjoys the highest score in foreign listing as an average of 198 foreign companies per year were listed on its platform from 2000 to 2012.

Table 2

Summary of Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Cross Boarder Listing	9.00	719.00	135.7212	144.44824	1.689	.169	2.656	.336
Domestic Listing	13.00	4239.00	1019.8846	1103.50771	1.149	.169	.170	.336
Market Capitalisation	1232.34	4614068.83	1059113.2674	1271434.12757	1.161	.169	.196	.336
Value of Share Trading	103.00	276.00	245.5986	21.57111	-4.957	.169	28.201	.336
No of Transaction in Equity Shares	5.45	1515900.70	183834.1214	259747.79185	2.212	.169	6.189	.336
Stock Index	-464.80	39250.34	5217.3480	6893.22691	2.391	.169	6.088	.336

Fig. 2. Summary of Mean of Cross Listing in Stock Exchanges

Fig. 3. Summary of Median of Cross Listing in Stock Exchanges

In the European stock exchanges the result is that in Deutsche, Johannesburg SE, London SE, Luxembourg SE, Nyse Euro next (Europe), Oslo børs and SIX Swiss Exchange, 136, 31, 505, 225, 246, 34 and 96 foreign companies were listed respectively as shown in Table (1) and Figure (3). In the European sample, London SE is at the top in foreign companies with listing 505 companies. Result of the study shows that 340 average foreign companies in a year are listed on the NASDAQ stock exchange which is at the top of the list in American region and 198 companies are listed on the Singapore stock exchanges in the Asian region. Similarly, the London stock exchange is at the top of list in European region with average 505 foreign companies per year listed on its platform. The London stock exchange is more attractive than the Nasdaq and Singapore stock exchanges for foreign companies listing. [Changa and Corbitt (2012)] argued that London stock exchange is more attractive than other stock exchanges not because of changes in firm characteristics but due to changes in the benefits of cross-listing.

5.2. Model Fitness

The sample size of the study is 208 observations covering 16 stock exchanges over the period from 2000 to 2012. Six model fit indexes (χ^2/df , GFI, AGFI, NFI, CFI and RMSEA) are employed to test the fitness of the model. These indexes of the model fitness, on the basis of the structural model analysis, are summarised in Table (3). In practice, Chi-square/degrees of freedom should be less than 3, GFI, NFI, CFI should be greater than or equal to 0.9, AGFI should be more than 0.8, and RMSEA should be less than or equal to 0.08 are considered as indicators of a good fit [Teo and Khine (2009); Jackson, *et al.* (2005)]. As shown in Table (3), all goodness-of-fit indices are in the acceptable range. Chi square is 21.970, Degree of freedom is 10, Chi-square/degrees of freedom 2.19 and $P < 0.0000$ RMSEA 0.069** which is less than 0.08 GFI 0.97, NFI 0.93, CFI 0.91 and AGFI 0.82 which are greater than 0.9, 0.8 respectively. So, it is concluded that the obtained model has suitable fitness.

Table 3

Summary Indexes about the Model Fitness

Indexes	Standard Value	Observed Value	Recommended By
χ^2/df	≤ 3.00	2.19	Wheaton, <i>et al.</i> (1977) and Carmines and McIver (1981)
GFI	≥ 0.90	0.97	Jöreskog and Sörbom (1984) and Jöreskog and Sörbom (1984)
AGFI	≥ 0.80	0.82	Jöreskog and Sörbom (1984) and Jöreskog and Sörbom (1984)
NFI	≥ 0.90	0.93	Bentler and Bonett (1980) and Bollen (1989b)
CFI	≥ 0.90	0.91	Bentler (1990)
RMSEA	≤ 0.080	0.069	Browne and Cudeck (1993)

GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; NFI = Normed fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation.

CFI

5.3. Major Findings and Discussion

The result of the SEM and Pearson correlation shows that cross-listing of companies significantly and positively influences the domestic listing, market capitalisation and number of transactions in equity shares having regression weight 3907.734, 2.868 and 1046.187 respectively at 99 percent confidence level as shown in Tables 4 and 5. It shows that cross-listing enhances the domestic companies listing; market capitalisation and number of transactions in equity shares of host stock exchanges. Impact of the cross-listing on the stock index is -13.642 and significant at 99 percent confidence level as shown in Tables 4 and 5. Similarly, there is no impact of the off-shore listing on the value of share trading. Findings of the SEM and Pearson correlation accept the null hypotheses and reject all alternative hypotheses except H5.

Table 4
Summary of Correlation

	1	2	3	4	5
1. Cross-Listing	1				
2. Domestic Listing	.375**	1			
3. Market Capitalisation	.444**	.697**	1		
4. Value of Share Trading	.500**	.020	.095	1	
5. No of Transaction in Equity Shares	.582**	.650**	.645**	.054	1
6. Stock Index	.286**	.147*	.183**	.114	.121

Table 5
Summary of Regression Weights

Dependent Variables	IV	Estimate	S.E.	C.R.	P
Domestic Listing	<--- Cross Listing	2.868	0.492	5.829	***
Stock index	<--- Cross Listing	-13.642	3.178	-4.292	***
Domestic Market Capitalisation	<--- Cross Listing	3907.734	548.185	7.128	***
No of Transaction in Equity Shares	<--- Cross Listing	1046.187	101.654	10.292	***
Value of Share Trading	<--- Cross Listing	0.001	0.01	0.067	0.947

The last two decades have observed a growing trend and interest of researchers about cross-listing. Most of them emphasised the impact of the cross-listing on stock returns in terms of share price up-gradation [Bahlous (2013)], short term and long term liquidity [Eaton, Nofsinger, and Weaver (2007)], cost of capital [Eaton, Nofsinger, and Weaver (2007)], and risk associated with cross-listing abroad [Baileya, Karolyi and Salva (2006); Zhou and Owusu-Ansah (2012)]. When we talk about the benefits of the cross-listing with respect to capital market of host stock exchange, it is not only fruitful for companies to provide new avenues for fund raising and share price strengthening through availability of access to international market but it also increases the magnitude of the capital market of host country.

When the companies list their securities on foreign capital market for trading, it increases the magnitude of market capitalisation of that market by increasing number of shares on that platform. Another advantage of cross-listing is that when a company is listed in foreign market for trading, its capital comprises of domestic and foreign funds.

Cross-listing can assist stock exchanges to enhance stock market performance by updating its technology and improve corporate governance structure due to diversified investors [Teng and Liu (2013)]. The findings of the study suggest that after the cross-listing, diversified ownership creates a constant pressure on board of directors of cross-listed firms to behave in the best interest of shareholders due to rigorous policies about investor protection in international markets. Overall, our results, consistent with the prior literature on the financial and economics fruitfulness of cross-listings on international stock exchanges, suggest an increased importance of cross-listing on American stock exchanges.

Similarly, cross-listing enhances the overall performance of stock market indicators such as domestic companies listing, market capitalisation and number of transactions in equity shares of host stock exchanges which indicate offshore listing leads to better stock market performance. Chipeta and Mbululu (2013) provided evidence in support of our study showing that companies increase the number of equity issues after listing in a secondary market due to equity issuance in their home market as well as in host market. As a consequence of equity issuance in host market, number of transactions in equity market of the host stock exchanges increases which definitely increases market capitalisation. Increase in market capitalisation shows the soundness of Indexes and is the best indicator of market growth. Cross-listing has only one negative impact and that is on stocks index, which might not be real because stock index data is highly volatile as it indicates negative association.

5.4. Theoretical and Practical Implications of the Study

This study makes important theoretical contributions to the economic and financial literature as well as implications for academics scholars about secondary listing, diversified pool of investment, avenues of growth, and yielding significance. The basic and important conceptual insight to emerge from this study is that dual listing gives firms financial power to tackle various financial risks and also enhances the magnitude of trading volume and increases the competition in stock market. Critically, the degree to which companies list on exchanges determines whether or not the secondary listing will increase trading activities in market and volume. It is not only beneficial for the market but also provides diversified sources of investments to listed companies and investors. It also indicates that the benefits of enhancement in market volume and improvement of cross-listed firm's financial position depend on host market's policies. These results suggest that the secondary listing affects the host stock market in a positive manner by enhancing market volume and creating positive sentiments in the market regarding confidence building for local companies to list their securities on the host market.

In addition, this study provides three important practical implications for cross-listed firms and host stock market. Firstly, cross-listing provides international avenues and forums with a good starting point to cross-listed firms, to unfold their growth opportunities and scope for both products and locations. It does not only diversify firm's capital resources financially but also unfolds avenues for strategic growth. In this regard, the board of directors of a cross-listed firm should follow the

stringent international market requirements to really gain the benefits from cross-listing. Secondly, the board of directors of a cross-listed firm should be aware of the fact that after cross-listing, the securities, shareholding of the firm, and the scope will be changed. Firms may be advised to focus on long term growth and return for their survival in the international market. This study also suggests that firms should keep the level of both the local and international shareholding the same because it still has to respond to ups and downs of the international market. However, when a cross-listed firm gradually gains benefits, it can then raise further capital through different sources such as debentures, bonds etc. In this way, a cross-listed firm can enhance its efficiency by expanding its leverages through both technological synergy and financial synergy. Lastly, managers should also be aware that the competition in the market increases after cross-listing. Managers, thus, need to equip themselves with both the knowledge and the psychological preparation to deal with the complexities and frustrations associated with cross-border listing.

The findings of this study may be of interest to regulatory bodies and policy makers. The policy makers and regulatory bodies should be concerned about how they can both improve their countries' stock market volume and strengthen enforcement strategies so that cross-listed firms would be valued fairly.

6. CONCLUSION

The present study examined the impact of cross-listings on stock market indicators. The study revealed that London Stock Exchange is at the top in comparison with others in cross-listing or foreign companies listing on its platform. The fact is that a number of foreign listed companies have seen decline in other stock exchanges like NASDAQ etc. The U.S. security Exchange Commission increased enforcement of corporate laws; development of litigation environment, enhancement of true and fair disclosure of conflict of interest according to the U.S. generally accepted accounting principles. These regulations may reduce the information asymmetry between the management and shareholders. Consequently, a cross-listing on U.S. stock exchanges enforces firms to value the minority shareholder rights. This argument is known in the literature as the bonding hypothesis, as a result of which, screening mechanism in the U.S. market has been increased and may be a hurdle in the way of attracting firms that are not likely to comply with the more demanding environment. This broader concept and situation makes it difficult for NASDAQ to attract foreign investors, hence becoming less competitive in terms of flexible atmosphere about foreign companies, perhaps because of regulatory changes.

In the light of market segmentation theory, if two stock markets are integrated with each other, then the assets having the same risk should gain the same risk premium; however, if these markets are segmented, the same assets will have a different risk premium in each market. In the context of offshore listing on American exchanges, due to the existence of investment barriers between two markets, international investors with diversified pool of securities on their portfolios are likely to demand a positive risk premium, represented in higher expected returns, to compensate for the higher risk that arises from market segmentation. As a result, most of the firms are not likely to invest

their securities in American exchanges comparative to London stock exchange. Similarly, the result of SEM shows that cross-listing of the stock exchanges is not only fruitful for those companies which go for cross-listing but is also beneficial for stock market growth of the host stock exchanges where these companies are listed. The result of the present study is also validated by [You, Lucey, and Shu (2013)] affirming the conclusion that companies increase the number of equity issues after the listing in host stock exchanges platform. As a consequence of equity issues in host markets, the number of transactions in the equity market of the host stock exchanges increases which definitely increases market capitalisation. The increase in market capitalisation shows the soundness of indexes and is the best indicator towards market growth. All of the gathered evidence supports the concept that cross-listing is not only beneficial for the firms which get listed on exchanges but it also supports growth of the stock market of host stock exchanges.

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Book Reviews

Sung-Hee Jwa. *A General Theory of Economic Development—Towards a Capitalist Manifesto*. Cheltenham, UK: Edward Elgar Publishing. 2017. x+215 pages. Price UK £ 67.50 (Hardback).

1. INTRODUCTION

A General Theory of Economic Development is yet another attempt to demystify the underlining causes of underdevelopment and economic stagnation, and to offer a theory of economic development, which has proved to be an elusive quest for most of the world economies. Apart from a handful of developed economies, most of the other world economies are merely also-rans in the quest for economic development. In fact, even those economies that have been growing at respectable rates over the last decade or two, such as China, cannot yet claim to be developed countries. It is in this backdrop that Sung-Hee Jwa has written this book that offers a theory of economic development. It is a daring attempt as it departs from the standard growth models and development theories and challenges the conventional wisdom. The theory put forth in the book, according to the author, is not only applicable to the developing, or underdeveloped, countries, but is equally applicable to the developed countries, hence meriting the word ‘general’ in the title.

The ideas presented in the book are the culmination of the author’s work on the South Korean economy in which he has traced the development experience of South Korea, which started in the earnest in 1960s. In fact, his other book, *The Rise and Fall of Korea’s Economic Development: Lessons for Developing and Developed Economies* (2017), may be treated as a companion volume to this piece of work. In that book, the author has applied his general theory to the case of South Korea to trace the success of the South Korean economy under President Park, and its recent stagnation. In short, the theory presented in the book is a result of the author’s keen observations and painstaking review of the South Korean economy in particular and some of the other economies of the world in general.

2. A GENERAL THEORY OF ECONOMIC DEVELOPMENT

The book is composed of nine chapters, each serving as a building block for the author’s general theory of economic development. The book begins with the claim that economic development is a relatively recent phenomenon as the developed countries began to progress around the 1850s even though the history of mankind dates back to at least 2.5 million years. Immediately thereafter, the author criticises the economics profession for its detachment from reality and irrelevance for policy-making: “Theory

and policy are now detached more than ever, mostly because, on the one hand, theories have lacked reality from the standpoint of policy-makers of developing economies; and on the other hand, there has been an absence of consensus regarding the theory for actual policy-making and implementation” (p. 2). He also questions the usefulness of the Marxist approach because the policies based on the Marxist ideas call for ‘balanced growth’, which, according to him, have proved to be futile. The author also cites several myths (such as ‘economic development is achievable by all nations’, ‘economic development requires balanced growth’, ‘democracy is a precondition of development’, ‘industrial policy is unfair practice’, etc.) that have wrongly been presented as facts of development in the mainstream growth literature. These alleged myths are dispelled one by one in the following chapters, which serves as foundation to the development of his general theory.

Chapter 2 discusses the nature of development. Simply put, the author envisages economic development as a complex phenomenon. He argues that it goes beyond the question of efficient allocation of resources with which the neoclassical economics has long been preoccupied. He contends that economic development is essentially a complex phenomenon, which, through non-linear interactions among agents, results in qualitative change: “While the issue of linear quantitative growth is still important in understanding development, its fundamental nature consists of increasing complexity created in the evolutionary transformation process from the coach, to railway, to automobile, to aeroplane, to spaceship economy” (p. 17). Rejecting the myth that ‘markets are the elixir of economic development’ (p. 7), the chapter is concluded by asserting that markets alone cannot lead to economic development because of numerous imperfections, including externalities and transaction costs.

In order to present a new theory, it is essential that one points out the flaws and lacunae in the existing theories, a task accomplished by the author in the third chapter. He critiques mainly the neoclassical approach to economic growth and development. The author’s criticism centres on the claim that neoclassical theory is not a realistic depiction because it does not take into account non-linearities, increasing returns, and transaction costs. According to him, the mainstream approach has failed to provide a plausible theory of the firm, which is central to his general theory of economic development. The author also criticises the mainstream approach’s rejection of an active role of the government and the role of industrial policy in economic development. The author contends that the New Institutional Economics (NIE), which is gradually moving away from the mainstream theory, can solve many of the development puzzles. He says, “New Institutional Economics has the capacity to encompass the complexity as well as evolutionary approaches appropriate for dealing with the development of a complex economy” (p. 56). However, the author is of the view that NIE misses the point by focusing too much on the property rights institutions and economic freedom. He claims that the institutions touted as enabling institutions (for economic development) can only do their part if they are aided with the principle of ‘economic discrimination’. Economic discrimination is a term coined in the book by the author, which means ‘treating the differences differently’.

The subject of the next two chapters, i.e. Chapters 4 and 5, is the development experiences of the West and the Northeast Asian countries, mainly Japan, South Korea,

and China. The author terms the development in the West 'extended' because it took a long time for the Western economies to develop. On the other hand, he terms the development in the Northeast Asia 'condensed' because it was achieved in a relatively short period of time (p. 63). It is generally believed that the development process in the West was markedly different from that in the Northeast Asia. In the former region, the economic development is thought to be driven by markets whereas in the latter region, the economic development was a result of active government intervention and directed industrial policy. However, according to the author, in both the regions, it was the synergy among three players, namely the market, the government, and the corporation, which lead to their economic development. As discussed below, these three players are the cornerstone of the author's general theory of economic development.

In Chapter 6, the author appraises the role of the corporation in economic development. He argues that markets have always existed, even in the agrarian economies, but what distinguishes the agrarian economy from the modern economy is the corporation. He criticises the Coasian theory of firm, which, according to Coase, replaces the market. The author, on the other hand, argues that the corporation extends the role of the market, rather than to replace it and, thereby, contributes to economic development.

Having set the stage in previous chapters, the author presents his general theory in Chapter 7. The main purpose of his theory is to overcome the shortcomings of the existing theories that explain the process of economic development. The main idea of the general theory of economic development is 'economic discrimination'. By economic discrimination, the author means providing selective incentives to superior performers in the market. In his words, economic discrimination is "[...] an action of treating economic differences differently, or treating the better economic performers favourably" (p.117). The theory builds upon the idea of the so-called 'holy trinity' of development. The holy trinity comprises the market, the government, and the corporation. The market, in the author's view, discriminates among actors in the sense that it picks winners and favours those who are better performers. This conception of the market contrasts with the conventional view of market, which sees the market as an institution that efficiently allocates resources. According to the author, if market merely played the role of efficient resource allocation, it would not lead to economic development. The author, however, stresses that markets alone cannot lead to economic development and the government should actively aid the market in performing its 'discrimination function', i.e. government should create and reinforce market's discrimination function because market leaders are hampered by the problem of free-riding. In his theory, an active industrial policy is also advocated. The author argues that since the market, if left on its own, picks winners only with insufficient rewards, the government should select better performing industries, or regions, based on their performance in the market. At the same time, he warns that the industrial policy should also keep an eye on the handpicked industries to monitor their performance. The synergies created by the interaction of the holy trinity of economic development lead to non-linear transformation of the economy.

In addition to providing a general theory of economic development, the author also provides a theory of political economy in Chapter 8. He calls his political economy theory a positive theory, which "[...] aims at establishing the analytical framework of the political economy through the lens of economic discrimination" (p. 151). Unsurprisingly,

the author's theory of political economy is also based on the principle of economic discrimination. He argues that political order and ideology should be such that they reinforce the economic discrimination function of the market. He also asserts that political leadership is very important in promoting economic development, of course by aiding and abetting the economic discrimination function, and it should not be "[...] slave of ideology, history and culture" (p.155). Giving the example of South Korea under President Park, the author claims that the policy regime in South Korea was such that it helped those who 'helped themselves', which "[...] helped to transform Koreans into 'self-help people, removing the previous ideology, tradition and culture from them'" (p. 156). The last chapter is a recap of the main points presented in the preceding eight chapters. The author reiterates that smooth functioning of the holy trinity of the market, i.e. the government, and the corporation, aided by the principle of economic discrimination, is must for economic development.

3. CRITICAL EVALUATION

In a way, the general theory presented in this book may be seen as extending the works of various economists who have contributed significantly to our understanding of the economic development process. The author advocates the economic discrimination function to promote unbalanced growth, an idea also put forth by Albert Hirschman, who argued that by creating unbalanced growth, the vicious circle of poverty can be broken down. Similarly, the use of selective industrial policy, to promote best performers, has been advocated by structural macroeconomists and development economists. Ha-Joon Chang (2004, 2002), in his historical analyses of the economic development of Western economies, has also shown that many developed economies used active industrial policy to spur development.

3.1. Main Contributions

The general theory of economic development is an ambitious attempt to provide a new perspective on the process and intricacies of economic development. One of the contributions of his general theory is to recognise the process of development as necessarily complex. He brings into the focus the ideas from the theories of complexity economics, evolutionary economics, behavioural economics, and the NIE to chalk out a holistic view of economic development. The author's general theory breaks away from the traditional view of the economy in which atomistic agents compete against each other, with the belief that self-interest maximising individuals would lead to the overall welfare of the society. The author points out that such a conception of the economy is linear. In this way, economic development is conceptualised as an emergent phenomenon in which agents combine in synergistic interactions to produce economic development. Therefore, synergies among the market, the government, and the corporation make $2+2 > 4$ possible, which is non-linear transformation as opposed to the linear transformation implied by the traditional theory.

Another notable contribution of the author's general theory is expanding the reach of the NIE. The NIE seems to be fixated on the idea that it is the property rights institutions that matter most for economic progress. However, the author, while recognising the role of NIE in enhancing our understanding of the process of economic

development, shows that the institutional framework required for development is much broader than the property rights institutions alone. He argues that those institutions, along with the property rights institution, are important that ensure smooth functioning of economic activities, mitigate transaction costs, and justly reward the better performers through the economic discrimination function of the market. By incorporating the contributions of NIE in his theory, he extends the scope and reach of his general theory. He correctly asserts that when the role of institutions is brought into the picture, something which is absent from the neoclassical theory, economic development becomes a context-specific, or economy-specific, phenomenon. Therefore, one-size-fits-all neoclassical theory cannot be applied to all the economies without distinction. The theory, taking cue from the NIE, also explicitly considers the role of political leadership, as well as the role of ideology and self-help ethos, in economic development.

A strength of the general theory of economic development is the recognition of the active role of the government in economic development. Neoclassical theory, in contrast, allows government intervention only in the event of market failures. The general theory, on the other hand, sees government as an institution that extends the scope of the market by promoting the principle of economic discrimination. The general theory also puts the corporation at the forefront of the economic development process. It acknowledges that the role of the firm as an institution is not merely to organise factors of production and maximise profits, which is an example of linear transformation, but the general theory gives it due credit as an institution that actively engages in innovation, which is the hallmark of a dynamic economy. In fact, it is the firm that makes non-linear transformation possible and helps transform an economy from a coach economy to a space economy.

3.2. Limitations

The theory presented in the book is innovative, compelling, and holds promise as a framework for economic development, both for undeveloped and stagnant developed economies. Nevertheless, the theory outlined by the author displays a few inconsistencies and is problematic in certain respects. Generally, economic development is considered a broader concept than economic growth as economic development does not only mean increasing incomes, but it also means improvement in the standard of living, such as the improvement in education, health, and economic opportunities. Although, the author's general theory alludes to improvement in social conditions, one cannot help but note that he is mainly concerned with the increase in incomes. For example, author attributes "economic polarisation and growth stagnation" to egalitarian educational policies (p. 171). He even argues for the application of the discrimination function to social empowerment policies (p.188). Amartya Sen, in numerous places [see, for example, Sen (2002)] has argued that real development is enhancing individuals' capabilities; and education, along with other means of empowerment, is one of the ways to increase an individual's capabilities.

One of the main conclusions of the general theory of economic development is that economic inequality is a natural outcome of economic development. The author argues that economic inequality spurs competition in the economy and motivates individuals to get ahead of the others because discrimination engenders the self-help

ethos. The empirical evidence, however, shows otherwise. Shin (2012) has shown that income inequality, especially in the early stage of economic development, hampers economic growth. While relatively lower levels of economic inequality could be beneficial for economic growth as it creates healthy competition, extreme inequality retards economic growth because it reduces opportunities of the already disadvantaged sections of the society. Cingano (2014) has also observed that there is a negative association between inequality and economic growth. And we must not forget Hirschman's 'tunnel effect' [Hirschman and Rothschild (1973)], which explains that due to uneven growth, people might initially tolerate increased inequality, and even take pleasure in other's improved economic status, in the hope of catching up; when they fail to catch up, their delight turns into envy and despair [Flehtner (2013)]. Economic inequality can only be acceptable if level playing field is provided to all the agents in the society; only then any resulting inequality may be deemed natural.

Although, the general theory of economic development has broadened the scope of the NIE, the constitution of the complex economy (p. 58) presented in the book, which builds upon the NIE, appears to be linear and unidirectional. The author argues that political leadership is an exogenous institution that determines all other institutions (p. 58). However, economy- and society-wide social interactions are highly complex and endogenous systems, in which it is hard to determine the direction of causality. For example, political leadership in caste-based societies would most likely be different from the political leadership in caste-free societies. Therefore, informal institutions, such as the caste system, can influence the type of political leadership. However, this does not imply that political leadership cannot affect informal institutions. And this leads to the role of political leadership in economic development, which is ascribed a very important role in the author's general theory of economic development. He argues that the right kind of political leadership that can harness popular support and promotes the economic discrimination principle, along with the ideology prevailing in the society and self-help ethos, is a crucial factor for economic development. However, he is silent on how such leadership, ideology, and ethos can be cultivated. Without outlining how this can be achieved, the author's theory is incomplete.

Finally, the author seems to have attributed every problem that has hampered economic development to egalitarian policies, including the financial crisis of 2008 (p. 139). The author's attribution of economic stagnation to egalitarian policies is also noted in another review of the book [Lee (2017)]. Lee (2017) argues that developed economies began to stagnate after the 1970s due to the oil price shock, and not due to egalitarian policies. Furthermore, he also points out that many economies adopted egalitarian policies after the World War II but still developed at respectable rates (pp. 652-653). As far as the financial crisis of 2008 is concerned, many economists have attributed it to excessive financial deregulation and not to the egalitarian policies, as alleged by the author. In fact, when financial giants were about to collapse, it was the government that bailed them out of the crisis. It is an application of the economic discrimination principle, based on size and power rather than market performance.

4. CONCLUDING REMARKS

Any theory cannot be a complete picture of reality but despite a few limitations and lacunae, the general theory of economic development is a step in the right direction.

The author rightly points out that the current policies based on the conventional thinking have borne no fruit and what is needed is an innovative approach to development, which this theory in its essence is. There are many policy prescriptions based on the theory that can be useful for the developing countries, such as Pakistan. For example, the industrial policy in Pakistan should be such that it handpicks better performers and stop supporting those industries that have not been able to perform admirably despite being supported and protected by the government for a long time. Pakistan's exports have stagnated, and the industrial policy based on the economic discrimination principle of the general theory of economic development can help boost exports of the developing countries, Pakistan included.

The author correctly points out that often the political leadership, especially in the developing countries, bow to the pressure of masses and adopt those policies that are 'development unfriendly'. They are myopic in the sense that wanting to be elected, or re-elected, they adopt those policies that appeal to the masses and are not conducive to development. This is where the role of building up of development friendly ethos figures, but the problem is that there is no easy way to build such mindset. Ideologies, self-help ethos, and other such informal institutions are built up over a long period of time and cannot easily change in a short span of time.

Lastly, some of the leading economists of the world, such as Stiglitz and Sen, have called for rethinking development by going beyond merely focusing on the material wealth. Although the material wealth in the world has increased at an unprecedented rate over the last two centuries, but so has deprivation. In such a state of affairs, we cannot wait for the trickle-down effect to take place, as warned by late Mahbub ul Haq. Indeed, for the sake of fairness and help bring the deprived segments of the society out of the vicious circle, egalitarian policies cannot be completely discarded. Combined with the discriminatory industrial policy, egalitarian social policies are needed to be adopted to help people 'help themselves'. At the same time, to safeguard the interests of the corporations, which undertake the innovation and make non-linear transformation of the economy possible, the economic and political institutions need to be strengthened so that they aid the process of economic growth and development. To this end, the author's general theory of economic development, enriched with the lessons from the complexity, behavioural, and evolutionary theories, and the NIE, can take the discourse on economic development forward.

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Karl August Wittfogel. *Oriental Despotism: A Comparative Study of Total Power.* New Haven, USA: Yale University Press. 1957 (Reprinted 1981). 550 pages. USD 119 (Paperback).

Karl A. Wittfogel, famously known for his hydraulic thesis, was a German historian and sinologist. In his book, *Oriental Despotism: A Comparative Study of Total Power*, he has given a comprehensible account of social, political, and economic history of Asian societies. The book offers a study of the development of totalitarian rule in hydraulic societies. He refers to the Asian societies as hydraulic societies, as they control the population by maintaining control over supply of water and irrigation system. The book focuses on different factors that invited totalitarian rule in these societies. Influenced by the classical economists, Wittfogel argues that large irrigation systems tend to win large lands and an expansion and acquirement of large areas is the development of managerial form of administration.

Wittfogel argues that the natural setting is a major determinant of the economies of oriental societies. In Asian societies, highly developed irrigation systems provided basis for the hydraulic agriculture and it eventually preserved the patterns of despotic government. In the first chapter, he shows how natural resources have played a remarkable role in highly developed irrigation systems. In the second chapter, he describes the process of division of labour and how it is, along with cooperation, the key to modern industries. Wittfogel claims that highly developed irrigation systems of Asian societies were the basis of the political economy of these economies. While establishing this as the basic argument of the book, in the next four chapters, he describes the rise of strong state, strong despotic power, total terror, and total submission of society to highly concentrated power. In chapter seven he provides institutional analysis not only in the context of agro-managerial apparatus but also its proprietary development. He examines the pattern of private property, which emerged under the agro-managerial despotism. In chapter eight, he analyses societal orders, viewing the position of state as the one practicing maximum control. After presenting an historical context, in chapter nine, he describes the Asiatic mode of production from a socialist's, an economist's, and an historian's points of view. In chapter ten, he elaborates some key aspects of a society, such as the development of the society, its specific and non-specific elements, and perspectives of hydraulic society in transition.

Oriental Despotism, to some extent, is a successful effort by the author. Wittfogel has discussed how sources and supply of water for irrigation were the basis of Asiatic mode of production, which eventually led to despotic empires and bureaucracy. Referring to the Oriental society as a hydraulic society, he has tried to introduce his theory of hydraulic monopoly. The author accentuates that in Asian societies, the highly developed irrigation system as a mode of production had determined the character of political control. In the same context, he endeavours to explain agro-managerial and agro-bureaucratic characteristics of the Asian societies. He propounds that agriculture as a mode of production determined the character of political control. He derives his inspiration from Montesquieu and Karl Marx. On the same lines, he tries to show that climatic conditions and landscape also influence the customs, laws, and intellectual

facets of a society. In the very context, he provides individual examples in order to explain specific hydraulic order of life.

Wittfogel has compared the Eastern hydraulic societies with the Western capitalist societies based on totalitarian and democratic rules. The crux of his argument is that the hydraulic civilisations are static in nature, hence they are destined to be ruled by despotic authorities and can only be exposed to democratic rule through imperialist intervention. According to him, only exposure to democratic rule cannot provide the surety of establishment of electoral government. He asserts that the structure of Oriental societies is rigid to an extent that democracy requires further evolution to take hold in these societies. Describing the democracy in Oriental societies as beggar's democracy, he diverges from his basic point, which is that the Asian societies are unable to develop the true spirit of democracy. On the other hand, patronising Russia as a semi-hydraulic society, the book describes how anti-totalitarian forces brought anti-Asiatic society revolution in Russia in 1917, a prediction made for India by Karl Marx. Spotlighting the importance of the Western concepts of private property and democracy, Wittfogel has shown how it influences non-colonised countries, as it is clear from the Russian culture. According to him, revolutions in hydraulic societies are not really revolutions because they originate from controlled hydraulic economy and only imperialist interventions can expand the horizon of societies for liberal democracy. Giving his comparative analysis of power in western and eastern societies, he claims that the Western democratic system is in fear of being contaminated by the system of totalitarianism of the Asian societies.

According to Wittfogel, the vicious seeds of total power were sown in hydraulic civilisation. This is the reason despotic empires have proved to be a poor form of rule in the Oriental societies. There is intra-bureaucratic competition in hydraulic bureaucracies and despotic rulers are not benevolent in these states. As the people are totally subdued by this totalitarian power, different attempts by virtuous colonialists to modernise their possessive societies were not persuasive in the past. Hence, after decolonisation hydraulic societies again regressed to their traditional structure, though some societies maintained pseudo-democracy. These absolutist regimes were free to alter law. History is full of examples of how one-sided constitution regulation has played a role to subdue the people. Colonial rule gave rise to government that was a mixture of Oriental and Occidental despotism. Few hydraulic societies developed the democratic system when reforms were introduced by the colonial masters, for example, in India and Indonesia while the same did not occur in Mexico and Peru.

Even though Wittfogel is quite objective in describing the setup of hydraulic societies, he is silent on many issues. After describing the nature of hydraulic societies, the author has stuck with his theory that imperialist intervention is the only way to change the static nature of hydraulic societies. The book turns out to be a description of struggle between good Occidental and bad Oriental. According to him, if the colonial power fails to bring change in colonised societies, it is a loss for the Oriental societies that they failed to apply democratic model in its true spirit. He totally deviates from objectivity in an effort to describe the concept of total power. Describing the Russian communist regime as the manager of total power, he ventures to assert that this kind of regime must be blown away by

democracy. When the question of hydraulic societies arises, he is hostage to his thesis in which he ascertains that these societies need democracy more severely than any other society, by colonial or imperialist intervention.

One may pause at the absurdity of claim that concept of totalitarian power is solely attached to the Asian societies. Wittfogel was a communist and was detained stay in a concentration camp by the Nazi Germany. It is striking to notice that in his comparison of total power, only the Asian societies are guilty of absolute power even though plantation slavery in America was one of the worst forms of human labour under the supervision of so-called enlightened masters. Also, one of the worst forms of totalitarian power was observed in the Nazi Germany. Despite the existence of such examples in history, totalitarian power holds a permanent value only in the Oriental societies according to the author. He hedges the concept of total power in compliance with the Eastern societies, describing culture, social norms and economics in the same context. The most conspicuous thing in this perspective is the universalisation of his theory.

While Wittfogel's book might be dated but his thesis is still relevant in the present age of post-colonialism. For example, in Pakistan, since its inception, the leadership, while claiming to be the custodian of people's power and interests, has meddled with the constitution and democratic framework. There has been a continuous struggle between political leadership and other institutions for arbitrary power. For the major part of the political history of Pakistan, the power has rested with non-political actors, who derive their ethos from the values of absolute power. The major source of income is traditional Asiatic mode of production, and form of governance has been despotic throughout Pakistan's history. In short, the arguments of Wittfogel resonates across the length and breadth of country when we observe the passive tussle that is still going on among various institutions of the country. Despite its obvious shortcomings, *Oriental Despotism: A Comparative Study of Total Power* is alluring for geographers, historians, and economists alike as the author has tried his best to give a global point view of the societies, cultures, and economies. Though he has failed to offer implications of the concept presented in the book, still a discussion of several themes, such as the origin and evolution of society, economy, and politics, in a philosophical way can help to analyse history through Marxist lens to evaluate his theory.

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Shorter Notice

Tariq Riaz. *An Enquiry into the Nature and Causes of the Poverty of Nations: With Special Reference to Pakistan*. England: Research Publication. 2017. 392 pages. U.K. £ 7.70 (Paperback).

Looking into the institutional functioning and economic management of the country, the book investigates the causes of Pakistan's poverty and also suggests ways to achieve sustainable prosperity. Following the prologue, the book is organised in five parts. The first part traces the human evolution and the quest for economic and social progress, and the relation between individuals, state, and economic development through history. Part two talks about some basic concepts linked to economic development and human welfare. These include: gross national product and productive capabilities; stages of transformation of an economy; and what history tells us about how the poor became rich. Part three presents the author's views on the Washington Consensus policies and how it led to the domination of the neoliberal economics, and its role in creating a poverty trap. A comparison of four Asian countries and their pathways to economic development, or lack of it, is presented in part four of the book. Looking at the economic development history of South Korea, China and India, Riaz explains how and why Pakistan lags behind all these countries. The last part of the book focuses on normative economics, and recommends policies, which if implemented, can help build Pakistan's economy and transform it into an efficient and vibrant welfare state. This book can be of interest specifically to policy-makers and academicians, but it can be a good read for anyone interested in understanding persistent poverty in Pakistan and measures needed to get out of it. [*Durre Nayab*].