Trade Openness and Growth: An Analysis of Transmission Mechanism in Pakistan

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ABSTRACT

This paper investigates the linkages between trade policy openness and economic growth for Pakistan for the period 1973 to 2008. The paper tests the hypothesis that trade policy does not affect economic growth directly rather it affects through some growth determining economic variables, which then effect economic growth. For this purpose a simultaneous system of equations is estimated through the Three Stage Least Squares. The results suggest a positive impact of trade policy openness on Black Market Premium, Domestic Investment and Foreign Direct Investment (FDI) and negative impact on Macro Policy Index. However, Black Market Premium and FDI show negative and Domestic Investment shows positive impact on economic growth.

Key Words: Openness, Growth, Transmission Mechanism, Pakistan C30, F10

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1. Introduction

The empirical relationship between trade openness and economic growth is a topic of considerable interest among scholars of economics. Studies which employ cross section or panel data for various group of countries often support trade liberalization for economic growth (Harrison 1996, Edward 1998, Wacziarg 2001 and Santos-Paulino 2002).On the other hand studies which employ time series data for individual countries yield mixed results e.g. Ahmed and Anoruo (2000), and Ferreira and Rossi (2003) report positive impact of trade liberalization on growth whereas Siddiqui and Iqbal (2005) report the negative relationship of trade openness and growth. Very few studies have investigated channel relationship between trade openness and economic growth [Alesina et al (2003)], although role of Foreign Direct Investment as nexus between free trade and economic growth have been widely discussed (Kohpaiboon 2003, Pacheco 2005).

In this paper we analyze the role of channel variables through which trade openness affect economic growth for Pakistan. For this purpose a fully specified structural model is employed to evaluate the channels through which trade policy may affect growth. It starts with the specification of equations describing the incidence of trade policy on several growth determining variables. The channel variables mechanism for trade was first employed by Wacziarg (2001) for a penal of 57 developing countries. In this study we employ time series data covering the period

1973 to 2008. Thus this paper provides a methodological contributes to the literature in addition to focusing the channel relationship for individual country.

Following this introduction the remaining paper is organized as follows: Section-2 describes the history of trade liberalization policies in Pakistan, section-3 provides literature review of the various studies on trade liberalization, and section-4 describes the modal. Results are discussed in section 5 and section 6 concludes the paper.

2– Trade Liberalization History of Pakistan

In 1972 Pakistan emerged as new country, because its right wing – East Pakistan – was separated. This part of the country contributed over 60% of entire Pakistan exports (Zaidi, 2005). The new Pakistan faced the challenges of enhancement of exports by initiating some new policy measures.

After the fall of East Pakistan Zulfiqar Ali Bhutto became the new Prime Minister of Pakistan. He had taken some critical economic measures; one of the measures was nationalization of various industries, banks and development financial institutions (DFIs). Apart from these measures some trade related measures were also taken. Domestic currency, the Pak Rupee, was devalued by 131%. Export Bonus Voucher scheme were abolished and import list reduced to two categories one under which import was allowed without restriction and other allowed through aid or barter system. During this period (1972-1977) exports growth rate was 20% while import growth was 22%.

General Zia-Ul-Haq regime started in 1977. His government took various trade liberalization measures. Negative import list was reduced substantially and replaced by only one list, which is banned list and any item which was not banned was allowed to import. Tariff slabs reduced from 17 to 10. Several steps for export promotion e.g., rebate, export finance at concessional rate, income tax exemptions and import facility for export purpose were introduced. During this regime (1978-1988) export growth rate was 14% and import growth was 10%.

From 1988 to 1999, democratic governments had taken revolutionary steps through various Structural Adjustment Programs. By 1999 all Non-Tariff barriers were replaced with tariff. Import tariffs were reduced substantially. In 1988 the highest duty slab was 125% which by the end of 1999 was brought down to 30% with only six slabs of duty. Export rebate scheme was now for promotion of value added exports. Private sector was allowed to export cotton and rice. Local residents were allowed to open foreign currency bank accounts. During this regime export grew by 5.3%, while import grew by 4.3% only. According to Zaidi (2005), this low growth of export was result of Structural Adjustment Programs.

In 1999, democratic set up was rolled over and military regime headed by President Musharaf started and continued till 2008. In this era economy was liberalized more rapidly. In 2003 maximum tariff level reduced to 25% and import duty slabs reduced from 6 to 4 slabs only. Almost all important economic units, banks and DFIs were privatized. During this period trade deficit deteriorated drastically. Export grew by 10.6%, while import grew by 18.2%. On the

other hand balance of trade average growth rate was 46%, which is the highest ever in Pakistan's economic history.

3 – THE LITERATURE REVIEW:

There are various empirical studies on relationship between trade openness and output growth. The research focus on individual countries as well as panel of countries to estimate the trade-growth relationship. However, the results are mixed. Usually the effect of trade openness on output is found positive in case of panel of countries, while studies employing individual countries found mixed results.

Santos-Paulino (2002) examined the impact of trade liberalization on export growth for a sample of 22 developing economies between 1972 to 1998. He used a typical export growth function, which postulates that exports volume depends upon real exchange rate and world income. Trade openness is measured in two ways. First by the ratio of export duties to total export, as indicator of the degree of anti-export bias and second by a dummy variable of timing of the introduction of trade liberalization measures. The results of OLS estimation showed that export duty variable was significant with negative sign and the dummy variable was also significant with a positive sign. Therefore it was concluded that exports grow faster in open economies.

Edwards (1998) used comparative data for 93 countries to analyze the robustness of the relationship between openness and total factor productivity (TFP) growth. He used nine indices of trade policy to analyze the connection between trade policy and TFP growth for the period

1980 to 1990. Among these nine indices, three were related to openness, the higher value of which represented a lower degree of policy intervention in international trade. The other six were related to trade distortions, for which higher values represented a greater departure from free trade. The results of OLS estimation found trade openness indices significant with positive signs and trade distortion indices were significant with negative signs. This relationship suggests that more open countries will tend to experience faster productivity growth than more protectionist countries. The important point of the study was that the absolute value coefficients were very small while the value of R-square was also very low.

Harrison (1996) used a general production function to analyze the relationship between openness and GDP growth. He specified GDP as a function of capital stock, years of primary and secondary education, population, labour force, arable land and technological changes. He used seven openness measures to test the statistical relationship between openness and GDP growth. The cross-section estimation results show only black market rate was negatively significant. The country time series result indicated that three variables were found significant. Tariff and non tariff barriers had positive sign whereas black market rate and price distortion index resulted in negative sign. Estimation with annual data resulted in two significant variables namely tariff and non-tarrif barriers and black market rate both of which had negative relationship with GDP growth. He therefore concluded that the choice of period for analysis, of relationship between trade openness measures and GDP growth is critical.

Wacziarg (2001) investigated the links between trade policy and GDP growth in a panel of 57 countries for the period of 1970 to 1989. His study employs a fully specified structural model to

evaluate the six channels though which trade policy might affect growth. He measured openness through an index which consisted of three trade policy variables- tariff barriers, captured by share of import duties to total imports, non-tariff barriers, captured by un-weighted coverage ratio for the pre-Uruguay Round time period and a dummy variable (liberalization status). The fixed effect OLS results showed that three channel variables i.e., FDI inflows as share of GDP, domestic investment rate and macro economic policy, were significant. He therefore concluded that there is a positive relationship between trade openness and GDP growth.

Siddiqui and Iqbal (2005) analyzed the effect of trade liberalization on GDP growth for Pakistan. They used time series data for a period of 1972 to 2002. The co-integration analysis showed a negative relationship between trade openness and GDP growth.

The above literature showed that there very few empirical studies investigate channel variables which effect economic growth through trade openness. Wacziarg (2001) employed channel variables for panel of 57 developing countries. In this study we investigate the channel variables approach of Wacziarg (2001) in a structural simultaneous equation framework for Pakistan. Our study however employs time series data for the period of 1973 to 2008 unlike Wacziarg (2001) who employ a cross sectional data for 57 countries.

4 – THE MODEL AND EMPIRICAL METHODOLOGY

4.1 – The structural model:

Wacziarg (2001) stipulates that trade liberalization policy effects growth through some channel variables. He estimated simultaneous equation system with three-stage least square methodology. As our paper employs time series data for Pakistan some variables that do not vary over time e.g. land area and landlock dummy are obviously excluded.

The modal consist of eight different equations including an equation for for GDP growth and six equations for each of the channel variables. The channel variables are included in the growth regression, but the measure of trade policy openness appears only in the channel relationships. A separate equation determining trade openness is also included in the model. The equation explicitly deals with the endogeneity issue since we employ a system of simultaneous equation approach in describing growth, trade openness and channel variables which constitutes the structural model for our study.

We have added three lags of 'Investment Rate' variable in growth equation and one lag of 'GDP' in channel equation as well as in the 'Trade Policy' equation. These lags were primarily introduced to address identification issue. Moreover addition of these variables mitigates non-normality of residuals as confirmed through Jarque-Bera test of residual normality.

The growth (GR) equation is specified as

$$GR_t = \beta_{10} + \beta_{11}BMP_t + \beta_{12}GC_t + \beta_{13}MX_t + \beta_{14}IR_t + \beta_{15}FDI_t + \beta_{16}MPOL_t + \beta_{17}MALEHC_t + \beta_{18}FEMALEHC_t + \beta_{19}IR_{t-1} + \beta_{20}IR_{t-2} + \beta_{21}IR_{t-3} + U_{1t} \quad (1)$$

$$BMP_t = \beta_{20} + \beta_{21}TP_t + \beta_{22}GC_t + \beta_{23}LGDP_{t--1} + \beta_{24}TTS_t + \beta_{25}LPOP_t + U_{2t} \quad (2)$$

$$GC_t = \beta_{30} + \beta_{31}TP_t + \beta_{32}\ BMP_t + \beta_{33}LGDP_{t--1} + \beta_{34}TTS_t + \beta_{35}DUMMYDEMOCRACY_t + U_{3t} \quad (3)$$

$$MX_t = \beta_{40} + \beta_{41}TP_t + \beta_{42}BMP_t + \beta_{43}LGDP_{t--1} + \beta_{34}LPOP_t + \beta_{35}SSENR_t + U_{4t} \quad (4)$$

$$IR_t = \beta_{50} + \beta_{51}TP_t + \beta_{52}BMP_t + \beta_{53}MPOL_t + \beta_{54}LGDP_{t--1} + \beta_{55}NLPOP_t + U_{5t} \quad (5)$$

$$FDI_t = \beta_{60} + \beta_{61}TP_t + \beta_{62}BMP_t + \beta_{63}GC_t + \beta_{64}LGDP_{t--1} + U_{6t} \quad (6)$$

$$MPOL_t = \beta_{70} + \beta_{71}TP_t + \beta_{72}BMP_t + \beta_{73}GC_t + \beta_{74}LGDP_{t-1} + \beta_{75}TTS_t + U_{7t} \quad (7)$$

$$TP_t = \beta_{80} + \beta_{81}GR_t + \beta_{82}LGDP_{t-1} + \beta_{83}TTS_t + \beta_{84}LPOP_t + U_{8t} \quad (8)$$

The variable definitions are as follows:

GR_t = GDP growth rate

BMP_t = Black Market premium which refers to Price distortion by measuring Premium on the official exchange rate

GC_t = Government Consumption measured as Government consumption as a share of GDP

MX_t = Manufactured Exports measured as manufactured export as a share of GDP. The World Bank has taken this variable as a proxy of technology transmission

IR_t = Investment Rate measured as Gross Fixed Investment as share of GDP

FDI_t = Foreign Direct Investment as share of GDP

$MPOL_t$ = Macro Policy Index This index is computed as equally weighted average of public debt, government deficit and M2 money variables

$MALEHC_t$ = Male Human Capital measured as literacy rate of male population

$FEMALEHC_t$ = Female Human Capital measured as literacy rate of female population

IR_{t-1} through IR_{t-3} represent the lags of Investment

TP_t = Trade Policy refers exports plus imports as share of GDP

$LGDP_{t-1}$ = the first lag of GDP

TTS_t = the terms of trade shocks

$LPOP_t$ = the log of total working Population

$SSENR_t$ =the Secondary School Enrolment as share of population

$NLPOP_t$ = the log of total non-working Population

TTS_t = the terms of trade shocks

U_{1t} through U_{8t} represent the error terms of equation (1) through (8).

Appendix 1 describes the description and data sources for these variables.

The simultaneous equation model can be presented in compact matrix notation as follows:

$$By_t + Cx_t = U_t, \qquad t=1,2,\ldots..n \qquad (9)$$

Where B is GxG matrix of coefficients of current endogenous variables, C is a GxK matrix of coefficients of predetermined variables.

We assume that the structural disturbances Ut ~ iid {N (0, $\sum$) where $\sum$ is a positive definite variance-covariance disturbance matrix.

Multiplying (9) by B^{-1} we obtain the system of reduced form equations, hence (9) become

$$Y_t = \Pi X_t + V_t \qquad (10)$$

Where $\Pi = B^{-1}C$, $V_t = B^{-1}U\ V_t$

4.2 Identification of the system:

Unlike cross countries regression estimated by Wacziarg (2001) our focus is on investigating the trade growth linkage through time series data of Pakistan. Generally, time series economic variables are non-stationary, so there may be a concern that conventional inference procedure using single equation OLS or system estimation method may not be statistically justified. However, as pointed out by Hsiao (1997) and Johnston and DiNardo (1997) the conventional Two Stage Least Square (2SLS) and system estimation methods are still valid. Non-stationarity and co-integration do not call for new estimation methods on inference procedure. Instead, following Cowlers Commission advice Johnston and DiNardo (1997) suggests paying attention

to the issue of identification and simultaneity bias. Therefore we investigate the identification of our system of simultaneous equations (1) to (8).

According to Johnston and DiNardo (1997) the necessary condition for identification of a given equation is as follows which is referred to as Order Condition:

$$K - k \geq g - 1 \qquad (11)$$

Where K is the number of exogenous variables in the system

k is the number of exogenous variables in the equation to be identified

g is the number of endogenous variables in the particular equation to be identified

Condition (11) explains that the number predetermined variables excluded from the equation should be at least as great as the number of endogenous variables included less one.

Table in Appendix 3 tests the order condition for our system of equation 1 to 8. It is evident that for the equation (1) the order condition is satisfied exactly while the remaining equations are over identified.

4.***3 Estimation of the simultaneous model:***

The *ith* equation of the reduced form model (10) can be written as

$$y_i = x_i\pi_i + v_i \qquad i = a, \ldots\ldots, G \qquad \ldots\ldots\ldots\ldots\ldots \qquad (12)$$

where y_i is the vector of time series observation of dependent variables in the *ith* equation, x_i is a matrix of exogenous variables, π_i is the coefficient vector and v_i is vector of disturbance of ith reduced form equation. The 'stacked' system can be written as

$$\begin{pmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_G \end{pmatrix} = \begin{pmatrix} X_1 & 0 & \ldots & 0 \\ 0 & X_2 & \ldots & 0 \\ \vdots & \vdots & \ldots & \vdots \\ 0 & 0 & \ldots & X_G \end{pmatrix} \begin{pmatrix} \pi_1 \\ \pi_2 \\ \vdots \\ \pi_G \end{pmatrix} + \begin{pmatrix} V_1 \\ V_2 \\ \vdots \\ V_G \end{pmatrix} \qquad (13)$$

or more simply

$$Y = X\,\Pi + V \qquad (14)$$

We assume that there is no autocorrelation in residuals

i.e. $E[v_{it}v_{js}] = 0 \quad \forall\ t \neq s$

where i and j represent equation numbers and t and s indicate the observation numbers. Contemporaneous correlation is allowed across equation so that

$$E[v_{it}v_{jt}] = \sigma_{ij}$$

Thus the covariance matrix of all disturbance is $E(VV^{/}) = \Omega = \sum \otimes I_T$

Where $\sum = [\sigma_{ij}]$ is the contemporaneous disturbance covariance matrix. $\otimes$ indicates the Kronecker product, I_T is an identity matrix of dimension T and T is the number of time series observations in each equation.

If only exogenous variables are presented in the system, consistent parameter estimates can be obtained by OLS or SUR (Seemingly Unrelated Regressions). However, in our system there are some lagged endogenous variables which may be correlated with the disturbances i.e. $E(Vi^{/}Xi) \neq 0$ which may give biased and inconsistent OLS or SUR estimates.

We overcome this difficulty by using Three Stage Least Square (3SLS) with instrumental variables which are obtained as the fitted values of the regression.

$$\hat{X}_i = Z_i(Z_iZ'_i)^{-1}Z'_iX_i \qquad (15)$$

Where Z_i are the instrumental variables which are assumed same for all equations

Employing these fitted regressions the 3SLS estimator can be obtained as

$$\hat{\pi} = (\hat{X}'\hat{\Omega}^{-1}\hat{X})^{-1}\hat{X}'\hat{\Omega}^{-1}Y \qquad (16)$$

where $\hat{X} = \begin{bmatrix} \hat{X}_1 & 0 & \dots & 0 \\ 0 & \hat{X}_2 & \dots & 0 \\ \vdots & \vdots & \dots & \vdots \\ 0 & 0 & \dots & \hat{X}_G \end{bmatrix}$

An estimate of covariance matrix can be obtained as follows

$$Cov(\hat{\pi}) = (X'\Omega^{-1}X)^{-1} \quad \dots\dots\dots\dots\dots \qquad (17)$$

Where $\Omega = \sum \otimes I_T$

Where $\sum$ is the estimated residual covariance matrix of the disturbance terms.

The above discussion and notation is based on Henningsen and Hanann (2007) who present description of several system estimators and the software for their estimation.

4.4 Measurement of Variables:

As discussed above there are six channel variables which are affected by Trade Policy openness and these six channel variables then affect economic growth. These six channel variables can be

stated as Government size, Macro Economic Policy Index, Black Market Premium, Domestic Rate of Investment, Manufactured Exports and Foreign Direct Investments.

The system has two type of variables; Endogenous variables and Exogenous variables. Endogenous variables are GDP Growth, the six channel variables and Trade openness. Growth is measured as GDP growth rate in percentage. Government size is measured by government consumption as share of GDP. Macro Economic Policy Index is the index that gives equal weight to each of three decile rankings of (1) level of public debt as percentage of GDP, (2) level government deficit – the budget deficit – as a share of GDP and (3) growth of M2 net of total real output growth. The Black Market Premium is percentage premium on the official exchange rate. Domestic Rate of Investment is captured by Gross Fixed Investment as share of GDP, Manufactured Exports and Foreign Direct Investment as percentage of GDP. Trade Policy measured as export plus import as share of GDP.

Among the 11 exogenous variables include one lag of GDP growth rate, three lags of Domestic rate of investment, Male Human capital, measured as Male literacy rate, Female Human Capital, measured as Female literacy rate, Secondary school enrollment in percentage, Dummy democracy, measured as 1 for the time period 1973 to 1978 and 1989-2000 and zero for the rest of the period, Terms of Trade shocks measured as Growth rate of manufactured export prices minus growth rate of manufactured import price, Working population measured as log of number of labour and non-working population as log of number of population not involved in labour.

Details on variables used in structural model, their computation and source are given in Appendix 1.

5. EMPIRICAL RESULTS

Appendix 2 presents the complete result of estimation of the model, however results of all eight simultaneous equations are presented below.

Table 5.1: 3SLS estimation of Growth Equation

Dependent Variable: Gr (GDP growth rate)

Variables	**Coefficient**	**T-Stats**	**P. Value**
Constant	-58.68962	-2.945036	0.0036
Black Market Premium (BMP)	-1.070738	-3.374630	0.0009
Govt. Consumption (GC)	0.184697	0.419323	0.6754
Manufactured Exports (MX)	0.352323	1.518196	0.1305
Investment Rate (IR)	3.726119	2.624317	0.0093
Foreign Direct Investment (FDI)	-7.109820	-2.149350	0.0327
Macro Policy Index (MPOL)	-0.003416	-0.050626	0.9597
Male Human Capital (MALEHC)	-1.413179	-1.338083	0.1823
Female Human Capital (FMALEHC)	1.635189	1.377287	0.1699
First Lag of Investment Rate [IR(-1)]	-1.521024	-1.959954	0.0513
Second Lag of Investment Rate [IR(-2)]	2.454559	2.276263	0.0238
Third Lag of Investment Rate [IR(-3)]	-0.134481	-0.215065	0.8299

System Normality Test Statistics		
	Test Statistic	P-value
Skewness Test	3.267525	0.0707
Kurtosis Test	0.006935	0.9336
Joint Jarque-Bera (Joint Normality Test)	3.274460	0.1945

Table 5.1 shows the GDP growth is significantly effected by “Black Market Premium”, “Domestic Investment Rate” and “Foreign Direct Investment”. However, Government Consumption, Manufactured Exports, Macro Policy Index do not appear to affect GDP growth. The p-value of Manufactured Exports coefficient is 0.13 which is closer to our significant criteria of p-value of 0.1 or 10% level of significance. Both first and second lag of Domestic Investment Rate are found to be statistically significant.

It is observed that only Domestic Rate of Investment shows positive coefficient, while other two significant variables, BMP and FDI, have negative coefficient. This implies that during the period 1973-2008 GDP growth has positive relationship with domestic investment and has negative relation with over/under value of Exchange rate and Foreign Direct Investment.

Table 5.2: 3SLS estimation of Price Distortion Equation

Dependent Variable: BMP (Black Market Premium)

Variables	**Coefficient**	**T-Stats**	**P. Value**
Constant	-73.28108	-2.104771	0.0365
Trade Policy (TP)	0.569000	1.953007	0.0521
Govt. Consumption (GC)	0.666139	1.937611	0.0540
GDP lag [LGDP(-1)]	-6.762425	-1.444706	0.1500
TTS	-0.030415	-1.055486	0.2924
Population (LPOP)	30.68839	1.457050	0.1466
System Normality Test			
		Test Statistic	P-value
Skewness		0.358542	0.5493
Kurtosis		0.627792	0.4282
Joint Jarque-Bera (Joint Normality Test)		0.986334	0.6107

Table 5.2 shows that Trade Policy and Government Consumption significantly affect Black Market Premium with positive sign. It implies that a greater trade volume and Government Consumption lead to a higher BMP value.

Table 5.3: 3SLS estimation of Government Consumption Equation

Dependent Variable: GC (Govt. Consumption)

Variables	**Coefficient**	**T-Stats**	**P. Value**
Constant	15.88214	3.259111	0.0013
Trade Policy (TP)	-0.048311	-0.244379	0.8072
Black Market Premium (BMP1)	0.679185	3.895715	0.0001
GDP lag [LGDP(-1)]	-0.366836	-0.895278	0.3717
TTS	0.036563	1.882418	0.0611
DUMMY DEMOCRACY	0.448117	0.764300	0.4455
System Normality Test			
	Test Statistic	P-value	
Skewness	0.002088	0.9636	
Kurtosis	0.884235	0.3470	
Joint Jerque Berra	0.886324	0.6420	

Table 5.3 shows that Trade Policy does not affect Government Consumption, however, BPM significantly affect Government Consumption. However, our study aims to analyze the Channel Variables between GDP growth and Trade Policy, and this equation shows that Trade policy is ineffective to influence Government Consumption.

Table 5.4: 3SLS estimation of Manufactured Export Equation

Dependent Variable: MX (Manufactured Exports)

Variables	**Coefficient**	**T-Stats**	**P. Value**
Constant	29.71392	0.550148	0.5828
Trade Policy (TP)	-0.693502	-1.235533	0.2180
Black Market Premium (BMP1)	0.469464	0.876756	0.3816
GDP lag [LGDP(-1)]	20.77551	2.786416	0.0058
Population (LPOP)	-49.86840	-1.578043	0.1160
SSENR	-1.050779	-0.188543	0.8506
System Normality Test			
		Test Statistic	P-value
Skewness		2.830575	0.0925
Kurtosis		0.816368	0.3662
Joint Jerque Berra		3.646942	0.1615

Table 5.4 shows no independent variable significantly affecting Manufactured Exports, only first lag of GDP, which is an instrumental variable affecting Manufactured Exports. It is therefore concluded that Trade Policy has no influence over Manufactured Exports.

Table 4.5: 3SLS estimation of Domestic Investment Equation

Dependent Variable: IR (Investment Rate)

Variables	**Coefficient**	**T-Stats**	**P. Value**
Constant	23.73958	2.025024	0.0441
Trade Policy (TP)	0.711675	5.299913	0.0000
Black Market Premium (BMP1)	-0.196389	-1.466504	0.1440
Macro Policy (MPOL)	0.006222	0.387845	0.6985
GDP lag [LGDP(-1)]	-0.812483	-3.444656	0.0007
Population (NLPOP)	-0.231731	-1.318073	0.1889
System Normality Test			
		Test Statistic	P-value
Skewness		0.527834	0.4675
Kurtosis		0.129773	0.7187
Joint Jerque Berra		0.657607	0.7198

Table 5.5 shows that Trade Policy is significantly affecting Investment Rate with positive sing. P.Value is close to zero which shows a very strong relationship between Investment Rate and Trade Policy. This implies that Trade Volume has positive impact on Domestic Investment.

Table 5.6: 3SLS estimation of Foreign Direct Investment Equation

Dependent Variable: FDI (Foreign Direct Investment)

Variables	**Coefficient**	**T-Stats**	**P. Value**
Constant	-7.810198	-5.188795	0.0000
Trade Policy (TP)	0.245795	4.177747	0.0000
Black Market Premium (BMP1)	-0.101619	-1.652000	0.1000
Government Consumption (GC)	-0.032486	-0.669538	0.5039
GDP lag [LGDP(-1)]	0.152152	1.347879	0.1791
System Normality Test			
		Test Statistic	P-value
Skewness		5.295034	0.0214
Kurtosis		0.987317	0.3204
Joint Jerque Berra		6.282351	0.0432

Table 5.6 shows that Trade Policy and BMP are significantly affecting Foreign Direct Investment. It is therefore implies that Trade Policy affecting FDI positively, whereas BMP affecting it negatively. It implies that greater trade volume leads greater level of Foreign Direct Investment and broader gap between official and open market exchange rate would lower FDI in the country.

Table 4.7: 3SLS estimation of Macro Policy Index Equation

Dependent Variable: MPol (Macro Policy Index)

Variables	**Coefficient**	**T-Stats**	**P. Value**
Constant	38.42245	1.098653	0.2732
Trade Policy (TP)	-2.769155	-2.121115	0.0351
Black Market Premium (BMP1)	1.527821	1.061513	0.2897
Government Consumption (GC)	3.632855	2.695629	0.0076
GDP lag [LGDP(-1)]	7.090509	2.718898	0.0071
TTS	0.276911	2.453361	0.0150
System Normality Test			
	Test Statistic	P-value	
Skewness	0.592511	0.4414	
Kurtosis	0.875138	0.3495	
Joint Jerque Berra	1.467650	0.4801	

Table 5.7 shows that Trade Policy and Government Consumption has significant relationship with Macro Policy Index. However, negative sign show an inverse relationship between trade volume and Macro policy index. Therefore, higher trade volume induced poorer macro policy index. This index as already explained is the index of three variables; level of public debt, budget deficit and growth of M2 net. This may because of higher trade volume leads to higher trade deficit which require higher level of public debt and consequently higher level of budget deficit (Siddiqui 2009). However this Index has shown no significant effect on GDP growth.

Table 5.8: 3SLS estimation of Trade Policy (Trade Volume) Equation

Dependent Variable: TP (Trade Policy)

Variables	**Coefficient**	**T-Stats**	**P. Value**
Constant	-11.36405	-0.421135	0.6741
GDP Growth (GR)	0.028413	0.081928	0.9348
GDP lag [LGDP(-1)]	-1.819881	-0.590459	0.5555
TTS	-0.037901	-1.553474	0.1218
Population (LPOP)	13.81455	0.959454	0.3384
System Normality Test			
		Test Statistic	P-value
Skewness		0.694444	0.4047
Kurtosis		0.164671	0.6849
Joint Jerque Berra		0.859116	0.6508

The Table 5.8 shows no significant relationship between Trade Volume and GDP growth. Even instrument variables, lag of GDP, terms of trade shock, and labour force do not have significant relationship trade volume.

As the t-tests are valid only under normality of disturbance term, we also provide the JB test of residual normality for each of the residuals of equation (1) through (8) in Table 5.1 through Table 5.8. The normality tests consist of test of skewness and kurtosis as well as joint skewness-kurtosis tests. The tests indicate that except for the case of skewness of FDI equation, residual normality test is not rejected at the at the 5% level of significance. This provides a confidence in

validity of the statistical tests. In case of FDI the source of high skewness might be some large FDI values in the years 2006, 2007 and 2008. However in this case also the overall normality as judged by joint skewness-kurtosis tests is not rejected.

Table 10 present the joint multivariate normality of the residual of system of equation (1)-(8).

Table 10: Joint Normality test

	Chi-Square	Prob.
Skewness	13.56855	0.0937
Kurtosis	4.492230	0.8102
Jarque-Bera	18.06078 (Jarque-Bera)	0.3203

The joint test confirms that at the conventional level of significance the overall system normality cannot be rejected implying that the statistical significance tests are justified.

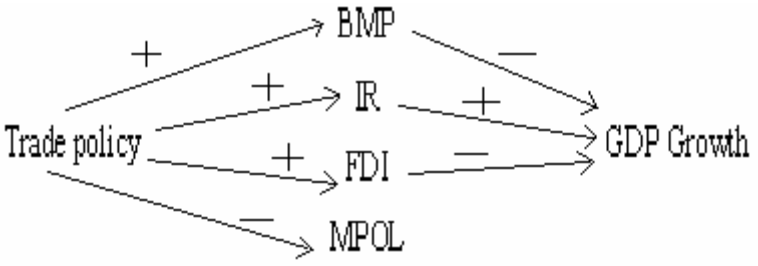
6. CONCLUSION

The 3SLS estimates indicate that for Pakistan GDP growth was effected by Black Market Premium, Domestic Investment and Foreign Direct Investment. The negative coefficients of Black Market Premium and Foreign Direct Investment show that these variables have negative effect on GDP growth whereas Domestic Investment Rate positively affects GDP positively.

On the other hand channel variables, Black Market Premium, Investment Rate, Foreign Direct Investment and Macro Policy Index have shown significant relationship with Trade Policy. The following a table and diagram summarizes the relationship between Trade Policy and GDP growth through channel variables:

Table – 9: Relationship between Trade policy and GDP growth through Channel variables.

	Sign	Channel variables	Sign	
Trade Policy	+	BMP	-	GDP Growth
	+	IR	+	
	+	FDI	-	
	-	MPOL	insignificant	



These tables and diagram show channel variables which affect Growth through trade policy. Table 9 explains that Trade policy has positive impact on Price Distortion (BMP), Domestic Investment Rate (IR) and Foreign Direct Investment (FDI), and negative impact on Macro Policy Index (MPOL). These Channel variables then affect GDP Growth. BMP and FDI have negative

impact on growth, while IR has positive impact on growth. At the other hand Trade policy does affect MPOL but this channel has no impact on GDP growth.

The results suggest that an increase in trade volume would increase Domestic Investment which further increases GDP, while trade volume increase the gap between official and open market exchange rate and foreign direct investment but these economic variables induce downward pressure on GDP. It is therefore concluded that Trade openness have positive effect on GDP through one economic variable which is domestic investment, while FDI would have negatively effect GDP and other economic variables, e.g. Macro Policy Index, Manufactured Exports and Government Consumption, as these channel indicate insignificant relation.

Furthermore, higher trade volume, which is widely used as proxy for trade openness, increases both domestic as well as foreign direct investment. These investments then further stimulate economic activity and thus increased Gross Domestic Production. However, FDI has shown a negative impact on GDP, therefore Domestic Investment has been proved as growth stimulant phenomenon for GDP growth of Pakistan over the years from over the sample period considered in this study.

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Appendix 1: Data Sources and Description

Variable Name: GDP Growth (GR)

Source: Pakistan Economic Survey, various issues

Unit: % points

Description: Growth rate of Gross Domestic Product

Variable Name: Manufactured Exports Share (MX)

Source: Pakistan Economic Survey, various issues

Unit: % points

Description: Share of manufactured goods in merchandise exports

Variable Name: Foreign Direct Investment (FDI)

Source: Pakistan Economic Survey, various issues

Unit: % points

Description: Ratio of gross Foreign Direct Investment inflows to GDP.

Variable Name: Macroeconomic Policy Quality (MPOL)

Source: Economic Survey of Pakistan, State Bank of Pakistan Annual report, various issues

Unit: index

Description: Index of macroeconomic policy quality. An index that gives equal weight to each of three deciles rankings of (1) level of public debt as percentage of GDP, (2) level

government deficit – the budget deficit – as a share of GDP and (3) growth of M2 net of total real output growth.

Variable Name: Black Market Premium (BMP)

Source: State Bank of Pakistan annual reports, IMF, various issues

Unit: (Black market rate-official rate)/official rate. %

Description: Black market premium on the official exchange rate.

Variable Name: Government Consumption (GC)

Source: Economic Survey of Pakistan, various issues

Unit: %

Description: Share of general government consumption of goods and services in GDP.

Variable Name: Dummy Democracy (DUMMYDEMOCRACY)

Unit: Takes values 0 (from 1978-1988 and 2000-2008 non-democratic government) and 1 (1989-1999 democratic government)

Description: Different policies adopted during democratically elected governments non-democratic governments

Variable Name: Male Human Capital (MALEHC)

Source: Pakistan Economic Survey, various issues

Unit: %

Description: literacy rate of male population age between 12 and 65

Variable Name: Female Human Capital (MALEHC)

Source: Pakistan Economic Survey, various issues

Unit: %

Description: literacy rate of female population age between 12 and 65

Variable Name: Secondary School Enrollment Rate (SSENR)

Source: Economic Survey of Pakistan, various issues, demographic surveys, various issues

Unit: %

Description: Percentage of "secondary school enrollment" in the total population.

Variable Name: Working Population (LPOP)

Source: Demographic Survey of Pakistan, Pakistan Economic Survey, various issues

Unit: numbers in log form

Description: Share of population aged over 10 and below 65 in the total population

Variable Name: Non Working Population over (NLPOP)

Source: Demographic Survey of Pakistan, Pakistan Economic Survey, various issues

Unit: numbers in log form

Description: Share of population aged over 65 and below 10 in the total population

Variable Name: Terms of Trade Shocks (TTS)

Source: State Bank of Pakistan

Unit: %.

Description: Growth rate of manufactured export prices minus growth rate of manufactured import price

Appendix 2: Table 11: Detailed estimation results

	Growth	Trade Openness	Black Market Premium	Government Consumption	Manufactured Exports	Investment	FDI	Macro Policy index
Intercept	-58.6896 [-2.945] (0.0036)	-11.3640 [-0.42113] (0.6741)	-73.281 [-2.1047] (0.0365)	15.8821 [3.2591] (0.0013)	29.7139 [0.5501] (0.5828)	23.7396 [2.0250] (0.0441)	-7.81019 [-5.1887] (0.0000)	38.4224 [1.0986] (0.2732)
Endogenous variables								
Trade openness			0.569 [1.953] (0.0521)	-0.0483 [-0.2444] (0.8072)	-0.6935 [-1.2355] (0.218)	0.71167 [5.2999] (0.0000)	0.2458 [4.1777] (0.0000)	-2.76915 [-2.1211] (0.0351)
GDP Growth		0.02841 [0.08193] (0.9348)						
Black market Premium	-1.0707 [-3.374] (0.0009)			0.6792 [3.8957] (0.0001)	0.4694 [0.8767] (0.3816)	-0.19638 [-1.4665] (0.1440)	-0.10162 [-1.6500] (0.1000)	1.5278 [1.06151] (0.2897)
Government	0.1847		0.6661				-0.03248	3.63285

consumption	[0.419]		[1.9379]				[-0.6695]	[2.69562]
	(0.6754)		(0.054)				(0.5039)	(0.0076)
Manufactured exports	0.3523							
	[1.5182]							
	(0.1305)							
Investment rate	3.7261							
	[2.6243]							
	(0.0093)							
FDI	-7.1098							
	[-2.1493]							
	(0.0327)							
Macro policy Index	-0.0034					0.00622		
	[-0.0506]					[0.3878]		
	(0.9597)					(0.6985)		
Exogenous variables (instruments)								
GDP Lag		-1.81988	-6.7624	-0.3668	20.7755	-0.81248	0.15215	7.09051
		[-0.59045]	[-1.4447]	[-0.8952]	[2.7864]	[-3.4446]	[1.34787]	[2.7189]
		(0.5555)	(0.15)	(0.3717)	(0.0058)	(0.0007)	(0.1791)	(0.0071)
First lag of Investment rate	-1.52102							
	[-1.9599]							

	(0.0513)						
Second lag of Investment rate	2.4546						
	[2.2763]						
	(0.0238)						
Third lag of Investment rate	-0.1345						
	[-0.2151]						
	(0.8299)						
Male human capital	-1.4132						
	[-1.3381]						
	(0.1823)						
Female human capital	1.6352						
	[1.3773]						
	(0.1699)						
Secondary school enrollment					-1.0507		
					[-0.1885]		
					(0.8506)		
Dummy-democracy				0.44811			
				[0.7643]			
				(0.4455)			
Terms of trade		-0.0379	-0.0304	0.0366			0.27691

shocks		[-1.55347]	[-1.055]	[1.8824]				[2.45336]
		(0.1218)	(0.2924)	(0.0611)				(0.0150)
Log working population		13.8145	30.6883		-49.8684			
		[0.9594]	[1.4570]		[-1.57804]			
		(0.3384)	(0.1466)		(0.116)			
Log of non-working population						-0.2317		
						[-1.3180]		
						(0.1889)		
R^2	*0.3474089*	*0.392953*	*0.142216*	*0.249931*	*0.87047*	*0.031968*	*0.430163*	*0.33041*

Note: t-statistics are reported in parenthesis and corresponding p-values in square bracket

Appendix 3: Table 12: Test of Order Condition

	Endogenous Variables								Exogenous Variables											Order Condition for Identification $K-k \geq g-1$ where K = 11
	GR	TP	BMP	GC	MX	IR	FDI	MPol	GDP(-1)	IR(-1)	IR(-2)	IR(-3)	MALEHC	FEMALEHC	SSENR	Dummy Democracy	TTS	LPOP	NLPOP	
GR			*	*	*	*	*	*		*	*	*	*	*						11-5 ≥ 7-1
TP	*		*						*								*	*		11-3 ≥ 3-1
BMP		*		*					*								*	*		11-3 ≥ 3-1
GC		*	*						*							*	*			11-3 ≥ 3-1
MX		*	*						*						*			*		11-3 ≥ 3-1
IR		*	*					*	*										*	11-2 ≥ 4-1
FDI		*	*	*					*											11-1 ≥ 4-1
MPol		*	*	*					*								*			11-2 ≥ 4-1

Order Condition "K-k ≥ g-1" hold for each equation of the System

Where K is the number of exogenous variables in the system

k is the number of exogenous variables in the equation

g is the number of endogenous variables in the particular equation to be identified