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TRADE LIBERALIZATION, ECONOMIC SIZE AND MACROECONOMIC VOLATILITY: EMPIRICAL EVIDENCE FROM PAKISTAN

The purpose of this paper is to investigate the link between trade liberalization, government size and the macroeconomic volatility in case of Pakistan. For this purpose, paper used time series data from 1967-2010 and employed co integration technique to find long run relationship. The results proposed that in long run trade liberalization and economic size create volatility in output. However consumption volatility is directly link with trade liberalization and government size. It is proposed that increase in trade liberalization and government size may reduce the investment volatility in long run. Furthermore error correction model suggested that in short run output volatility, trade liberalization, and economic size are negatively linked whereas government size directly linked with output, consumption and investment volatility in the short run.
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1. Introduction

Stability is more important for long run growth. Stability defined as an economy with constant growth. In Pakistan the association of trade liberalization and macroeconomic volatility haven't taken the attention. However, the link between trade liberalization and economic size has been investigated in detail, Bajwa & Siddqui (2011), Siddiqui & Iqbal (2005), Wacziarg & Welch (2003), Din & Siddique (2003), Hussian(2003). However the link between trade liberalization and volatility is less well understood. It is generally believed that trade liberalization is positively connected with economic growth. But does

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this appear at the cost of increase in growth volatility due to a greater vulnerability to total shock? After all, one may realistically expect a liberal economy to face a larger number of adverse shocks compare to less dependent countries on trade. Besides, the disciplining nature of global competition and the incidence of formal international contracts could potentially limit the risk of policy mistakes. Therefore it is uncertain whether the effect of trade liberalization on economic volatility should be positive or negative.

The purpose of this research is to discover the link between trade liberalization, economic size and the macroeconomic volatility in case of Pakistan. Globalization integrated trade liberalization with country size and government size, the pioneer of this finding is Cameron (1978) and since then it's one of the debatable topics. The link draw the attention because of several studies conducted globally in different regions and different result has found. Most of the studies exhibit the positive relationship with trade liberalization and government size also with economic volatility. Recent contribution of Jetter & Paramerter (2012), Haddad & Saborowski (2010), Pancaro(2010), Dawson (2010), Giovanni & Levchenko (2010), Epifani & Gancia (2008), Benarroch & Pandey(2008), Furceri & Karras (2008), Karras (2006), Loayza & Ventura (2007), Raddatz (2007), Down(2007) Fiaschi (2003), Easterly & Kraay (2000) Allen (1995) and Gali (1993), Molana & Violato (2004), Alesina & Wacziarg's (1998,2005), Rodrik (1998) discussed trade liberalization and its link with the country size and economic size. The reason reported, small countries has advantage of trade liberalization supplement as they spend more on the provision on public good and more international jolts related to trade liberalization, government spending and polices play vital role to stabilize the liberalization and to avoid volatility. Empirical evidence from different studies suggests small countries have benefit to open more.

However, risk and insecurities relates with the trade liberalization across the region, subsequently government polices and free trade can cop the sick industries. The paper discusses how the government spending and the trade liberalization and size of the country proposition on the economic activities. In Pakistan, there are far more to explore, numerous literature concerning the trade liberalization and economic growth exhibit recent are Bajwa & Siddqui (2011), Din & Siddique (2003), Berg & Krueger (2003), Hussian(2003), Jin(2000) and Frankel & Romer (1996) but no researches has conducted on the subject of trade liberalization and macroeconomic volatility. This paper helps to fill the gap; explains how much the macroeconomic volatility affected by trade liberalization and economic size also up to what extent? The main objective is to determine relationship among macroeconomic volatilities consisted on Income, Investment, Consumption and Exchange rate; with Trade Liberalization, Economic size and Government size. And to determine long run and short run relationship macroeconomic volatilities with Trade Liberalization, Economic size and Government size. This paper would be organized as flow: Section 2 would present the review of previous literature. Section 3 would discuss theoretical framework of research issues. Section 4 includes the Data and Sources, Section 5 contains the Economic Methodology and Section 6 would present Conclusion and policy implication.

2. Review of previous studies

An important determinant of a extensive variety of economic effect is measured macroeconomic volatility. The impact of trade liberalization on volatility differs with great deal depending on country distinctiveness. However, it's generally assumed that small countries are more volatile for the reason of high level of dependency on trade liberalization. Haddad & Saborowski (2010), Pancaro(2010), Dawson (2010), Giovanni and Levchenko (2010), Epifani & Gancia (2008), Benarroch and Pandey(2008), Furceri and Karras (2008), Karras (2006), Loayza & Ventura (2007), Raddatz (2007), Down(2007) Fiaschi (2003), Easterly & Kraay (2000) Allen (1995) and Gali (1993). Economic theory proposes that volatility is a role of the size and depth of markets consequently trade is an engine of growth. In present period, there are wide range of literature proposes positive relationship of trade and economic size like Bajwa & Siddqui (2011), Siddiqui & Iqbal (2005), Wacziarg & Welch (2003), Din & Siddique (2003), Berg & Krueger (2003), Hussian(2003), Jin(2000) and Frankel & Romer (1996). In Pakistan the link of trade liberalization and macroeconomic volatility is under observed.While the relationship between openness and growth has been investigated thoroughly, the link between trade liberalization and volatility is less well understood. Various studies have argued that trade liberalization increases macroeconomic volatility Loayza & Ventura (2007), Fiaschi (2003), Rodrik (1997) and Gali (1993), yet there is no clear consensus in the literature to date specifically in case of Pakistan.

2.1. Trade liberalization and Economic size: review of evidence

The literature on trade liberalization and economic size is vast which is beyond the scope of this paper. This paper simply sums up some of the salient results from recent studies in this literature. Some recent contributions are done by Bajwa & Siddqui (2011) investigated SAARC relationship between trade liberalization and economic growth. During 1972-85 found short run unidirectional causality of economic growth and trade liberalization but long run negative relationship exist plus for the period of 1986-2007 bi directional causality discovered and has positive long run relationship. Siddiqui & Iqbal (2005) analyzed the causality impact of trade liberalization policy of Pakistan on GDP growth for the span of 1972- 2002 by applying co integration technique and described the negative relationship between trade and GDP growth. Din & Siddique (2003) found the positive link between trade liberalization and growth, Berg & Krueger (2003) discussed the effect of trade liberalization on growth, poverty and the distribution of growth rate and found the positive impact, trade policy and trade liberalization played a vital role in the growth. Hussain (2003) investigated the trade liberalization effect on growth and poverty reduction in Pakistan and found the positive relationship also he defines because of poor polices Pakistan loosing the potential benefit which it can achieves. Poverty can be reduced by cutting non development expenditure and which can significantly affect on growth. Wacziarg & Welch (2003) exercised cross section of 118 countries data and discussed the relationship between economic integration and growth and with the help of Sach & warner(1995) method found trade policy under the regime of 1990's not significantly part of growth. Also, introduced latest facts of physical capital investment, trade liberalization

and time lane of economic growth and found trade liberalization has direct effect on growth and investment rates. Jin(2000) investigated the relationship of trade liberalization on growth in East Asian countries and result not carry the concept of long run growth is effected by trade liberalization he added the fiscal and international shocks has greater impact on growth. Frankel & Romer (1996) discussed the effect of trade in geographical components of countries on income and found the significant effect of trade liberalization on income.

2.2. Trade liberalization and Macroeconomic volatility

The link between trade liberalization and macroeconomic volatility has been completely neglected in case of Pakistan specifically. On the theoretical front, there are few exceptions; Haddad & Saborowki (2010) exhibited product diversification played important to protect economy from volatility while opening economy for trade. They further explained policies made in such a manner to improve the product diversification, product diversification could improve by developing infrastructure of trade related items, removal of crimson tide which affected trade also service sector played important role to manage the export diversification. Giovanni and Levchenko (2010) discussed that the country size, trade liberalization affect the volatility, also trade liberalization required large no. of firms in countries which create macroeconomic volatility. They elaborate the positive relationship between trade liberalization and economic volatility, free trade reduces the economic volatility in some countries. Dawson (2010) proposes the relationship of business cycle and economic freedom and found negative link between volatility and economic freedom; economic freedom includes index of government size, legal structure of property rights, free trade, business regulations and money access; government size has positive relationship with volatility. Benarroch and Pandey(2008) outcome was the trade volatility decreased by increase the size of government. Furceri and Karras (2008) found the relationship of business cycle, country size and volatility of 25 countries on quarterly based data and the country size and business cycle volatility negatively related. Also documented large countries are less volatile and include 167 countries to remove the missing link on Rose (2006) studies and found country that size is important part of business cycle fluctuations which favored Karras (2006) as the small countries are more volatile than large countries.

Down(2007) has documented the relationship of trade liberalization and economic volatility. He used cross sectional data on developed countries and explains the size and depth of market depends on the economic volatility. The small countries are more volatile because of greater market integration and liberation. He analyzed the relationship of trade openness, country size and economic volatility. Down (2007) suggested large share of trade liberalization creates great internal volatility. Therefore smaller countries are more open (Rodrik 1996, Alesina, spolare and wacziarg 1998) and likely to be more economically volatized, and more insecure . Loayza & Ventura (2007) suggested that macroeconomic volatility is fundamental problem of developing countries indication of underdevelopment. These countries attain instability for the reason of external shocks, unstable macroeconomic policies, inflexible microeconomics and frail institutions, exhibited that growth and development ultimately affected by economic volatility but directly to the income of risk-

averse individual and found that over last four decade not only small countries are volatile but also large countries; among them some are urbanized economies.

Raddatz (2007) showed external shocks which transmitted on the volatility of real activity in less developed economies, applied a VAR methodology and found prices, foreign growth, and real interest rates has significant impact. Karras (2006) Macroeconomic volatility is measured by cyclical output, consumption investment and the exchange rate. Ilhan (2006) found the mix result of exchange rate instability respect to the sample size, model specification and countries taken. Also ambiguous result found on growths in volatility reduces volume of trade.

At the total level, Easterly & Kraay (2000) found for small economies term of trade is significant driver for increase in volatility. Moreover they argued that small economies typically experienced the high income volatility is due mainly to their trade liberalization and small role of the export concentration. Ramey (1995) has taken ninety two countries to find the impact of macroeconomic volatility on growth and documented greater the volatility lower the growth. However, government spending is inversely related with growth. Allen (1995) explained economic volatility varies with the country size, large countries more expands their output from different sectors, consequently can stay away from the average volatility and because of less share of international risk; less open than small countries. Also, compute large in size of trading countries the bigger the shock transfer to the partner country, small countries are more volatile because of high dependency on the trading partners. Gali (1993) found the association of economic volatility with government size; suggested government size act like a automatic stabilizers support the real business cycle model proposed by Keynesian. And co movement of sectors has significant effect on volatility.

3. Research Issue

3.1. Trade liberalization, Economic size and Macroeconomic Volatility

In this part, this paper sketch theoretical model to illustrate how trade liberalization can affect the macroeconomic volatility through the conduct of monetary policy. The process is more resemble with Karas(2006) which is based on model of monetary policy reliability; initiated by Kydland and Prescott(1977) and then expanded to open economy by Rogoff(1985) and Obstfeld and Rogoff(1996)

This paper are classifying the macroeconomic volatility by taking measures of GDP, Investment, consumption and exchange rate, therefore, with little extension the function to examine the impact of trade liberalization and economic size on macroeconomic volatility is:

$\sigma_{¥} = f$ *(Trade liberalization, Economic size, Government size)*

$\sigma_{In} = f$ *(Trade liberalization, Economic size, Government size)*

$\sigma_{con} = f$ *(Trade liberalization, Economic size, Government size)*

From the above theoretical framework research specific models are:

$\sigma_{¥} = \gamma_0 + \gamma_1 \log TL + \gamma_2 \log ES + \gamma_3 \log GS + \ddot{E}_1$ ..... (a)

$\sigma_{ln} = \Pi_0 + \Pi_1 \log TL + \Pi_2 \log ES + \Pi_3 \log GS + \ddot{E}_2$ ..... (b)

$\sigma_{con} = \varphi_0 + \varphi_1 \log TL + \varphi_2 \log ES + \varphi_3 \log GS + \ddot{E}_3$..... (c)

Above equations capture the economic macroeconomic volatility, explanation discuss in empirical section.

4. Data and Variable definition

The paper covers annual time series data from 1967 to 2010. The paper use GDP and also examine two of its major components one is aggregate consumption and another is gross fixed capital formation the most volatile variables. The data for the variables of consumption, investment, Gross domestic product, import and export are collected from Hand book of statistic; published by state bank of Pakistan. Government size is measured as the government consumption in percentage of GDP and it's taken from World Bank. Trade liberalization is the sum of import plus import divided by GDP and economic size is the ratio of Pakistan GDP to US GDP. The expected sign for trade liberalization and economic size is negative with different forms of macroeconomic volatilities. And government consumption is anticipated positive with macroeconomic volatilities.

The macroeconomic volatility can be estimated with standard Arch-Garch method. The generalized heteroscedasticity (garch) which is suggested by Bollserslev(1986) and Engle (1982) proposed generalized ARCH method . Augmented Dickey fuller approach used for unit root test. All variable involved series are transformed into natural log form; to reduce the problem of hetero skedasticity Gujrati (2003). This paper is testing 3 equations which identify the macroeconomic volatility effected from trade liberalization (TL) and economics size(Size) and government size (GC).

5. Economic Methodology

This paper use unit root test ADF, Johenson co integration technique and Error correction mechanism.

5.1. Unit root test

Unit root test were used critically by Augmented Dickey Fuller coefficient; Dickey Fuller (1979) and Fuller's (Enders, 2004). For the lags selection in ADF unit root test was selected according to Akaike and Schwarz criteria (Verbeek, 2004). The model in unit root tested with constant, with constant and trend and without constant and trend respectively. The test for stationary of series is based on following equation:

$$\Delta z_t = \zeta_0 + \zeta_1 z_{t-1} + \zeta_2 t + \zeta_3 \Delta z_{t-1} + \ldots\ldots + \zeta_{p-1} \Delta z_{t-p+1} + I_t \ldots\ldots\ldots\ldots \quad (5.1)$$

The model with constant and trend null hypothesis H_0:(ζ_0, ζ_1,ζ_2)=(0,0,0), for the model with constant only null hypothesis was H_0:(ζ_0,ζ_1)=(0,0) and the model without constant and trend null hypothesis was H_0:(ζ_1)=(0). Moreover stationary possibility check consist on I (0) or I (1) for co integration.

5.2. Johansen Co integration and VEC technique

Dickey-Fuller test used for unit root test and for long run relationship Juselius Johansen co integration technique; actually represents nothing more than a multivariate (Enders, W., 2004). Instead of z on behalf of a single variable, there is y and ϵ representing (n*1) vectors, A denotes (n*n) matrix and O is (n*n) identity matrix.

$$V_t = \lambda + \sum_{t=1}^{p} \psi V_{t-1} + E_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5.2)$$

Where V_t is the vector of both X_t and Y_t dependent variables respect to the equation examining and X_t represents explanatory variables, trend variable is t, ψ_t is a matrix of lag I, VEC parameter. Also this paper generated a vector error correction model as follow:

$$V_t = \lambda + \sum_{t=1}^{p} F \Delta y_{t-1} + \sum_{t=0}^{p} F \Delta X_{t-1} + E_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5.3)$$

Where Δ is first difference operator, t is the time trend and X is a vector of explanatory variables namely, log of trade liberalization and GDP for initial four equation and log of pop, log of GDP, log Trade liberalization and some vector variables for the last equation, λ_2 is speed of adjustment. This paper tests *for ECM (short run relationship)* and equations for vector error correction are as follows:

In case of output volatility:

$$\Delta\sigma_{¥} = \chi_0 [\gamma_1 TL_{t-1} - \gamma_2 ES_{t-1} - \gamma_3 GS_{t-1} - \gamma_4 \sigma_{¥ t-1} - \gamma_5] + e_1 \ldots\ldots\ldots\ldots\ldots \quad (i)$$

$$\Delta TL = \chi_1 [\gamma_6 TL_{t-1} - \gamma_7 ES_{t-1} - \gamma_8 GS_{t-1} - \gamma_9 \sigma_{¥ t-1} - \gamma_{10}] + e_2 \ldots\ldots\ldots\ldots\ldots \quad (ii)$$

$$\Delta ES = \chi 2 [\gamma_{11} TL_{t-1} - \gamma_{12} ES_{t-1} - \gamma_{13} GS_{t-1} - \gamma_{14} \sigma_{¥ t-1} - \gamma_{15}] + e_3 \ldots\ldots\ldots \quad (iii)$$

$$\Delta GC = \chi_3 [\gamma_{16} TL_{t-1} - \gamma_{17} ES_{t-1} - \gamma_{18} GS_{t-1} - \gamma_{19} \sigma_{¥ t-1} - \gamma_{20}] + e_4 \ldots\ldots\ldots \quad (iv)$$

In case of Consumption volatility:

$$\Delta\sigma_{con} = \theta_0 [\rho_1 TL_{t-1} - \rho_2 ES_{t-1} - \rho\gamma_3 GS_{t-1} - \rho_4 \sigma_{con\, t-1} - \rho_5] + e_5 \ldots\ldots\ldots\ldots\ldots \quad (v)$$

$$\Delta TL = \theta_1 [\rho_6 TL_{t-1} - \rho_7 ES_{t-1} - \rho_8 GS_{t-1} - \rho_9 \sigma_{con\, t-1} - \rho_{10}] + e_6 \ldots\ldots\ldots\ldots\ldots \quad (vi)$$

$$\Delta ES = \theta 2 [\rho_{11} TL_{t-1} - \rho_{12} ES_{t-1} - \rho_{13} GS_{t-1} - \rho_{14} \sigma_{con\, t-1} - \rho_{15}] + e_7 \ldots\ldots\ldots \quad (vii)$$

$$\Delta GC = \theta_3 [\rho_{16} TL_{t-1} - \rho\gamma_{17} ES_{t-1} - \rho_{18} GS_{t-1} - \rho_{19} \sigma_{con\, t-1} - \rho_{20}] + e_8 \ldots \quad (viii)$$

In case of Investment volatility:

$$\Delta\sigma_{in} = \omega_0 [\alpha\rho_1 TL_{t-1} - \alpha\rho_2 ES_{t-1} - \alpha_3 GS_{t-1} - \alpha_4 \sigma_{in\, t-1} - \alpha_5] + e_9 \ldots\ldots\ldots\ldots \quad (xi)$$

$$\Delta TL = \omega_1 [\alpha_6 TL_{t-1} - \alpha_7 ES_{t-1} - \alpha_8 GS_{t-1} - \alpha\sigma_{int-1} - \alpha_{10}] + e_{10} \quad \text{..... (x)}$$

$$\Delta ES = \omega 2 [\alpha_{11} TL_{t-1} - \alpha_{12} ES_{t-1} - \alpha_{13} GS_{t-1} - \alpha_{14}\sigma_{int-1} - \alpha_{15}] + e_{11} \text{.. (xii)}$$

$$\Delta GC = \omega_3 [\alpha_{16} TL_{t-1} - \alpha_{17} ES_{t-1} - \alpha\rho_{18} GS_{t-1} - \alpha\rho_{19}\sigma_{int-1} - \alpha_{20}] + e_4 \text{.. (xii)}$$

6. Results

The paper identify the order of integration because most of the time series are found no stationary which leads to misleading results even with simple OLS. The paper use Augmented Dickey Fuller test for unit root analysis results are reported in table 1. Both at level and first difference test carried out on assumption of intercept also intercept with trend. The results suggested that unit root hypothesis can't be rejected in levels only volatilities unit root accepted on 10 percent of level of significance however unit root hypothesis rejected at level of 1 percent in first difference indicating all variables integrated at I(1). The second part of empirical finding of this paper is to analyze the long run relationship of variables with help of JJ co integration test results of output, consumption and investment volatilities are reported in table 2, 3 and 4 respectively.

Table 1

Unit root test ADF

	Intercept		Intercept & trend	
	Level	First Difference	Level	First Difference
$\sigma_{¥}$	-2.52	-4.142*	-2.39	-4.11*
σ_{con}	-2.06	-4.23*	-2.65	-4.17**
σ_{in}	-2.55	-4.49*	-2.54	-4.46*
TL	-2.49	-4.73*	-1.13	-5.15*
ES	-1.55	-5.43	-1.28	-5.55*
GC	-1.92	-8.61*	-2.12	-8.69*

Note: critical values are: -3.59, -2.93, -2.60 significant level is 1%, 5% , 10% respectively when first difference is constant and when 4.18 ,-3.51, -3.18 (significant level is 1%, 5% , 10% respectively when level & first difference is constant & trend) where *,**and *** represents the level of significance at 1%, 5% and 10% respectively.

Table 2

Johenson co integration for output volatility

Hypothesis	Null Hypothesis	Trace	Critical Value	Hypothesis	Null Hypothesis	Max-Eigen	Critical Value
H0	H1	Statistic	Trace Stats	H0	H1	Statistic	Max- Eigen
r=0	r≥1	124.9239	54.07904	r=0	r =1	64.08008	28.58808
r≤1	r≥2	60.84384	35.19275	r≤1	r =2	30.70466	22.29962
r≤2	r≥3	30.13918	20.26184	r≤2	r =3	18.14411	15.89210
r≤3	r≥4	11.99507	9.164546	r≤3	r =4	11.99507	9.164546

Variables	TL	ES	GC	C
Coefficients	0.029740	-0.317763	0.181094	-0.326301
S.E	0.029740	-0.317763	0.181094	-0.326301
t-stats				

Trace & Max Eigen test indicates 4 cointegrating eqn(s) at the 0.05 level

Table3

Johenson co integration for Investment volatility

Hypothesis	Null Hypothesis	Trace	Critical Value	Hypothesis	Null Hypothesis	Max-Eigen	Critical Value
H0	H1	Statistic	Trace Stats	H0	H1	Statistic	Max- Eigen
r=0	r≥1	73.56234	47.85613	r=0	r =1	37.04746	27.58434
r≤1	r≥2	36.51487	29.79707	r≤1	r =2	27.84911	21.13162
r≤2	r≥3	8.665762	15.49471	r≤2	r =3	8.509653	14.26460
r≤3	r≥4	0.156109	3.841466	r≤3	r =4	0.156109	3.841466

Variables	TL	ES	GC
Coefficients	6.58E-05	-0.000622	0.000263
S.E	(1.3E-05)	(9.7E-05)	(4.7E-05)
t-stats			

Trace & Max Eigen test indicates 2 cointegrating eqn(s) at the 0.05 level

Table 4

Johenson co integration for Consumption volatility

Hypothesis	Null Hypothesis	Trace	Critical Value	Hypothesis	Null Hypothesis	Max-Eigen	Critical Value
H0	H1	Statistic	Trace Stats	H0	H1	Statistic	Max- Eigen
r=0	r≥1	125.7887	63.87610	r=0	r =1	54.69113	32.11832
r≤1	r≥2	71.09759	42.91525	r≤1	r =2	42.34175	25.82321
r≤2	r≥3	28.75584	25.87211	r≤2	r =3	20.15407	19.38704
r≤3	r≥4	8.601771	12.51798	r≤3	r =4	8.601771	12.51798

Variables	TL	ES	GC
Coefficients	0.119267	1.450405	-0.572222
S.E	(0.24396)	(0.27274)	(0.15785)
t-stats			

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

Table 4

Vector Error correction for output volatility:

Error Correction:	D(VOLG)	D(TL)	D(ES)	D(GC)
CointEq1	-0.255111	0.238916	-1.008119	0.542476
	(0.08586)	(0.44298)	(0.45498)	(0.97244)
	[-2.97129]	[0.53934]	[-2.21575]	[0.55785]
D(VOLG(-1))	-0.161392	1.019723	-0.830606	-0.747660
	(0.14473)	(0.74673)	(0.76695)	(1.63924)
	[-1.11512]	[1.36559]	[-1.08300]	[-0.45610]
D(VOLG(-2))	0.070569	0.548713	0.289298	-0.296704
	(0.14331)	(0.73940)	(0.75942)	(1.62315)
	[0.49242]	[0.74211]	[0.38094]	[-0.18280]
D(TL(-1))	0.060761	0.359844	-0.208895	-0.630208
	(0.03475)	(0.17931)	(0.18417)	(0.39364)
	[1.74827]	[2.00678]	[-1.13425]	[-1.60100]
D(TL(-2))	-0.081099	-0.347203	-0.026870	0.718385
	(0.03842)	(0.19823)	(0.20360)	(0.43516)
	[-2.11082]	[-1.75153]	[-0.13198]	[1.65086]
D(ES(-1))	0.019050	-0.078320	0.376242	0.402646
	(0.04082)	(0.21060)	(0.21630)	(0.46231)
	[0.46670]	[-0.37190]	[1.73945]	[0.87095]
D(ES(-2))	-0.011479	0.132571	0.029196	0.047102
	(0.03961)	(0.20437)	(0.20991)	(0.44864)
	[-0.28980]	[0.64868]	[0.13909]	[0.10499]
D(GC(-1))	-0.047586	0.065301	-0.252415	-0.312974

	(0.02182)	(0.11256)	(0.11561)	(0.24709)
	[-2.18123]	[0.58015]	[-2.18337]	[-1.26662]
D(GC(-2))	-0.039065	0.052301	-0.253741	0.271898
	(0.02291)	(0.11821)	(0.12141)	(0.25949)
	[-1.70509]	[0.44245]	[-2.08997]	[1.04781]
C	0.000425	0.034060	0.009144	-0.008172
	(0.00177)	(0.00912)	(0.00937)	(0.02003)
	[0.24054]	[3.73282]	[0.97566]	[-0.40797]
R-squared	0.520157	0.263891	0.278145	0.315607
Adj. R-squared	0.371241	0.035444	0.054121	0.103210

Table 5

Wald test for granger causality:

	Dependent Variables (p values)			
Independent variables	Volg	TL	ES	GC
Volg	0.4191	0.3465	0.4688	0.8965
TL	0.0418	0.0501	0.4941	0.1079
ES	0.8318	0.7123	0.2158	0.6829
GC	0.0844	0.8408	0.0601	0.0273

Table 6

Vector Error correction for Investment Volatility:

Error Correction:	D(VOLIN)	D(TL)	D(ES)	D(GC)
CointEq1	-0.242169	141.2118	-622.4861	489.0972
	(0.10242)	(278.305)	(278.809)	(595.185)
	[-2.36440]	[0.50740]	[-2.23266]	[0.82176]
D(VOLIN(-1))	-0.431396	343.7727	-66.50319	36.05951
	(0.14751)	(400.822)	(401.548)	(857.201)
	[-2.92447]	[0.85767]	[-0.16562]	[0.04207]
D(VOLIN(-2))	-0.096979	150.0795	306.3193	372.9255
	(0.14430)	(392.100)	(392.810)	(838.547)
	[-0.67205]	[0.38276]	[0.77982]	[0.44473]
D(TL(-1))	0.000165	0.386237	-0.221335	-0.658732
	(6.7E-05)	(0.18168)	(0.18201)	(0.38854)
	[2.47135]	[2.12595]	[-1.21608]	[-1.69542]
D(TL(-2))	-0.000167	-0.359590	-0.010409	0.607819
	(7.8E-05)	(0.21303)	(0.21342)	(0.45559)
	[-2.13184]	[-1.68795]	[-0.04877]	[1.33412]
D(ES(-1))	5.94E-05	-0.059938	0.354864	0.312514
	(7.9E-05)	(0.21417)	(0.21456)	(0.45803)
	[0.75389]	[-0.27986]	[1.65390]	[0.68229]
D(ES(-2))	-4.15E-05	0.124024	0.069204	-0.024341
	(7.6E-05)	(0.20756)	(0.20794)	(0.44389)
	[-0.54291]	[0.59753]	[0.33281]	[-0.05483]
D(GC(-1))	-8.25E-05	0.058676	-0.228790	-0.272510
	(4.1E-05)	(0.11107)	(0.11127)	(0.23754)
	[-2.01853]	[0.52827]	[-2.05610]	[-1.14721]
D(GC(-2))	-6.55E-05	0.052797	-0.238252	0.341577
	(4.5E-05)	(0.12353)	(0.12375)	(0.26417)
	[-1.44147]	[0.42741]	[-1.92527]	[1.29299]
C	-6.00E-07	0.033186	0.009252	-0.002599
	(3.5E-06)	(0.00955)	(0.00957)	(0.02042)
	[-0.17063]	[3.47529]	[0.96718]	[-0.12727]
R-squared	0.590871	0.230964	0.282514	0.321405
Adj. R-squared	0.463900	-0.007702	0.059846	0.110807

Table 7

Wald test for granger causality:

	Dependent Variables p values			
Independent variables	Volin	TL	ES	GC
Volin	0.0103	0.6921	0.6176	0.8903
TL	0.0109	0.0435	0.4596	0.1380
ES	0.5647	0.7576	0.2537	0.7708
GC	0.1266	0.8627	0.0856	0.0199

Table 8

Vector Error correction for Consumption Volatility

Error Correction:	D(VOLC)	D(TL)	D(ES)	D(GC)
CointEq1	-1.102797	2.491826	1.186511	-2.671095
	(0.19386)	(2.25998)	(2.44087)	(4.77787)
	[-5.68865]	[1.10259]	[0.48610]	[-0.55906]
D(VOLC(-1))	0.896594	-0.191297	-0.167640	-0.175455
	(0.07391)	(0.86161)	(0.93058)	(1.82156)
	[12.1311]	[-0.22202]	[-0.18015]	[-0.09632]
D(VOLC(-2))	0.133309	-1.356464	-1.763458	3.310007
	(0.18331)	(2.13697)	(2.30802)	(4.51781)
	[0.72724]	[-0.63476]	[-0.76406]	[0.73266]
D(TL(-1))	0.046626	0.239413	-0.247199	-0.559706
	(0.01710)	(0.19938)	(0.21533)	(0.42150)
	[2.72632]	[1.20082]	[-1.14798]	[-1.32788]
D(TL(-2))	0.025833	-0.312454	-0.223486	0.829915
	(0.02072)	(0.24158)	(0.26092)	(0.51074)
	[1.24657]	[-1.29335]	[-0.85653]	[1.62493]
D(ES(-1))	0.025855	-0.060584	0.007399	0.605875
	(0.01709)	(0.19927)	(0.21523)	(0.42129)
	[1.51254]	[-0.30402]	[0.03438]	[1.43814]
D(ES(-2))	0.032347	0.168265	-0.034843	0.063048
	(0.01573)	(0.18334)	(0.19802)	(0.38761)
	[2.05677]	[0.91776]	[-0.17596]	[0.16266]
D(GC(-1))	-0.006498	-0.004070	-0.081879	-0.382076
	(0.00788)	(0.09190)	(0.09926)	(0.19430)
	[-0.82422]	[-0.04429]	[-0.82489]	[-1.96645]
D(GC(-2))	-0.020013	0.012074	-0.101853	0.185070
	(0.00862)	(0.10050)	(0.10854)	(0.21246)
	[-2.32161]	[0.12015]	[-0.93839]	[0.87108]
C	-0.002347	0.034609	0.017419	-0.012347
	(0.00098)	(0.01146)	(0.01237)	(0.02422)
	[-2.38806]	[3.02128]	[1.40795]	[-0.50985]
R-squared	0.890880	0.242202	0.120678	0.287831
Adj. R-squared	0.858144	0.014863	-0.143119	0.074180

Table 9

Wald test for granger causality

Dependent Variables (p values)				
Independent variables	Volcon	TL	ES	GC
Volcon	0.0000	0.8135	0.7465	0.7420
TL	0.0153	0.1753	0.3937	0.0856
ES	0.0495	0.6089	0.9834	0.3553
GC	0.0659	0.9870	0.5799	0.0221

For the output volatility JJ co integration suggested that there are only two co integrated at level of 0.05 critical levels and the normalized equation depicted that trade liberalization and economic size are negative also significant effect on output volatilities as expected. But the government consumption directly related with output volatilities and insignificant in long run. Table 3 suggests that in case of consumption volatility 3 variables are co integrated, normalized equation explains that trade liberalization, and government spending has positive and significant effect. And the economic size has negative effect on consumption volatility. Table 4 represents that there are only twp con integrated variables in case of investment volatility and normalized equation depicted that trade liberalization and government size has negative and significant effect on investment volatility whereas the economic size has positive but insignificant effect on investment volatility.

The third part of empirical finding is to check the short run relationships among variables through ECM table 5, 6 and 7 representing the ECM for output, consumption and investment volatilities respectively. Table 5 shows that speed of adjustment of output volatility, trade liberalization, economic size and government spending are -0.12, -0.67, -0.63 and 0.52 respectively, all are significant except government spending in short run. The adjustment coefficient for output volatility, trade liberalization, and economic size are showing negative, as it should be, all adjusting coefficient are showing significant. Similarly adjustment coefficient for government spending is showing positive, as it should be.Table 6 illustrate that speed of adjustment of consumption volatility, trade liberalization, economic size and government spending are -0.22, 1249, -1526 and 4420 respectively, all are insignificant except government spending . The adjustment coefficient for government spending is showing positive in case of consumption volatility.Table 7 demonstrate that speed of adjustment of investment volatility, trade liberalization, economic size and government spending are -0.033,-185, 462 and -979 respectively, only economic size and government size are significant effect . The adjustment coefficient for government spending is showing negative whereas economic size has positive impact.

Conclusion

It generally believes that greater trade liberalization cause greater volatility in small countries but there are some other factors which can also be the reason of higher macroeconomic fluctuations. However, few evidence describe, international jolts affect more to smaller countries than large countries which can cause large aggregate fluctuations so that their consumption, investment might be less correlated to their own output level. On the other hand free trade transmitted weak consumption shock because major portion of income effected from foreign trade in the course of movement in terms of trade. Therefore macroeconomic volatility not only depends on trade liberalization but also on government activities. The ongoing debate regarding the effects of trade liberalization and government consumption on macroeconomic volatility has been opened by Cameron (1978). Results suggested that in long run trade liberalization and economic size create volatility in output which can be cope through product diversification and increase in the size of government however consumption volatility is directly link with trade liberalization and government size. It has proposed increase in trade liberalization and government size may reduces the

investment volatility. The policy proposition of the study is simple but still much linger to be done. However there is unpretentious difficulty for the policy makers to change polices for economy's relative size in short run, but some instruments are still there, by which volatility can reduces. Pakistan has been facing domestic and international threats which can be avoided through, improved trade liberalization, improved national and international polices and stable government spending. Trade liberalization is not only the reason which generates macroeconomic volatility but also government policies and economic structure play significant role to avoid volatility. There is still far more to explore in order to find the reason of aggregate volatility.

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