IMPACT OF TRADE OPENNESS ON MACROECONOMIC VARIABLES AND GDP GROWTH IN PAKISTAN AND INDIA

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ABSTRACT

This paper examines the effects of openness of trade on macroeconomic variables and GDP growth in Pakistan and India. For this purpose, Annual data ranging from 1972 to 2014 taken from World Development Indicators (WDI) including GDP, trade openness, employment rate, exchange rate, inflation and FDI. Johansen's co-integration test has been used to test the log run association among considered variables. Augmented Dicky Fuller (ADF) is also used to check the data stationarity. Empirical results show that there exist a long run association among the variables. By employing simple ordinary least square test, we come to know that trade openness has significant impact on GDP in both Pakistan and India. Exchange rate also have significant impact on GDP in both Pakistan and India. Inflation has negative impact on GDP in case of Pakistan. Whereas, FDI has negative impact on GDP in case of India. In conclusion, we can say that policy makers of both countries must be very keen observer on the policies of trade for the betterment of both countries.

Keywords: Inflation, Trade Openness, Exchange Rate, Employment Rate

1. INTRODUCTION

Since the origin of civilization, there is a need of goods and services to be produced and exchanged for the survival of humanity. In start before the paper money, society produced and exchanged goods under the barter system for the fulfillment of their requirements. After the evolution of Paper Money, it becomes very easy to buy goods and services by paying the money. Still there was something missing because every society is unable to produce all the goods they want, which leads to emerge the concept of trade among nations. In 1776, Adam Smith gave the concept of absolute advantage in International Trade; Ricardo (1817) gives the concept of comparative advantage and Heckscher-Ohlin (1920) gives the concept of factor endowment means that labor abundant country produce labor abundant products and capital abundant produce capital abundant goods and start trade. All these concepts are old version of trade indicating that countries trade only on the basis of product differentiation. Krugman (1979) gives new concept of trade with

the emerging requirements of world becoming a village known as global. He gives the concept of product differentiation and economies of scale in international trade. All these concepts throw light on the concept that not even a single country survive without international trade.

The whole world is divided into developed and developing countries both have different problems concerning international trade. Mostly developed nations have larger share of trade in international market as compared to the developing nations. With the emerging requirements of globalization, trade depends upon many factors like factors for production, technology, and cost of labor, economic activities and other macro-economic factors of individual countries. According to Yannikaya (2003), an important factor for any economy to prosper is openness of trade. But with the openness of trade, other factors like rate of exchange, inflation, rate of employment and FDI also effect the economic growth of any economy.

Objective of this study to evaluate the influence of inflation, rate of nominal exchange, rate of employment, FDI and openness of trade on GDP of Pakistan and India. The main research question to be investigated in this study is "What are the Influence of Openness of Trade on macroeconomic variables and GDP in Pakistan and India?" Present study is useful to evaluate the significant influence of macro-economic variables in both neighboring economies i.e., Pakistan and India. Augmneted Dicky-Fuller (ADF) test is used to check the data stationarity. We also apply Johansen's Co-integration test to check the long run association among the variables and then apply ordinary least square (OLS) to test the relation between the variables individually for both countries and then compare the results of both economies. Main Objective of this study is not only to test the long run association among openness of trade, inflation and GDP in both Pakistan and India. But we also find the impacts of openness of trade specifically in the region of Pakistan and India and also test the negative impact of inflation and openness of trade as pointed out by Romer's (1993) for both Pakistan and India either exist or not. This study is helpful for policy makers of both countries in identifying the problems and controlling them related with trade.

Main structure of the study is as follows: section 1 explains the brief introduction of this study, section 2 explains the review of literature in detail, section 3 discuss the data, its sources and model specification and section 4 discuss the estimation, results and conclusion of the study.

2. LITERATURE REVIEW

Bowdler and Malik (2005) used panel data of 96 countries to analyze the relationship between openness of trade and inflation. CPI proxy for inflation and openness of trade, imports plus exports divided by GDP and then taking the natural logarithm. System GMM is used here because inflation depends on its own lag. Found negative relation of inflation with openness of trade in most of the countries and also throw some interesting light on macro-economic variables and openness of trade. This leads to challenge the upcoming researcher to differentiate between variables w.r.t countries.

Tasci, Esener and Darici (2009) used panel data of developing countries ranging from1980 to 2006 to check the effects of openness of trade on inflation. Inflation as dependent variable on openness of trade with other variables included as explanatory variables i.e., FDI, GDP per capita and rate of nominal exchange rate. By applying panel data techniques i.e., fixed effect vs random effect found the positive relation of inflation with GDP per capita. Also other variables have significant positive impact in most of developing countries. Policy makers must opt such policies which help to reduce the unemployment rate in the market of developing nations.

Ramzan, Asif and Mustafa (2013) study the direct relationship between openness of trade and macroeconomic variables i.e., Economic growth as dependent variable taking growth rate of nominal GDP as proxy. With the independent variable i.e., openness of trade other variables are Inflation, FDI (Foreign Direct Investment), Rate of Employment and Rate of Exchange. To check the unit root, ADF (Augmented Dicky Fuller) test is used and there is no evidence of unit root in the data. To check the long run association among the variables apply the Johansen co-integration test and found totally results significant indicating long run association among the variables leads to apply simple OLS (ordinary least square). Results indicate the positive relationship between GDP and rate of exchange as well as with FDI, while negative relationship with openness of trade.

Afzal, *et al.,* (2013) study the relationship between economic growth, openness of trade and inflation in Pakistan by means of ARDL approach. They specifically want to test the relationship between openness of trade and inflation in Pakistan as well as the findings of Romer (1993) i.e., either the negative relationship between inflation and openness of trade exists in Pakistan or not. They use real GDP as proxy for economic growth, GDP deflator as proxy for inflation and different proxies for openness of trade. By applying ARDL model, found significant negative relationship of inflation with openness of trade in both short run and in the

long run. Also found positive relationship of inflation with real GDP in lines of Okun's law and Phillips curve.

Kurihara (2013) used panel data in Asian and OECD countries to examine the relation between openness of trade and inflation. CPI as proxy for inflation, GDP as per capita GDP and openness as ratio of openness of trade. GMM and fixed method is used to analyze the relation here. Found statistically significant effect among variables for both 1990's and 2000's but effect is stronger in Asia as comparison with the OECD. Also conclude that we need some more specific policies to achieve the goal of economic growth via trade.

Mahyar (2014) use the data from 1965 to 2010 to test the association among openness of trade vs inflation in Iran. He used CPI growth rate as proxy for inflation and sum of total exports plus imports divided by GDP as proxy for openness of trade. Phillips Perron test is used to check the unit root and then Johansen co-integration test to check the long run association among the variables. Then apply VECM method and found uni-directional positive relation of inflation to openness of trade in Iran.

Afshan and Batul (2014) use the data ranging from 1971 to 2013 to investigate the empirical association concerning inflation with rate of exchange, rate of interest and trade, and cross comparison between Pakistan and India. ARDL test is used to check the long run relationship between the variables. Findings suggest negative relation of rate of interest with inflation for Pakistan and negative for India. Rate of interest is significant for Pakistan only, whereas, import and export is significant for both Pakistan and India with rate of exchange. Also this study approves the long run plus short run relation of macroeconomic variables for both countries. This study found bi-directional relation of rate of exchange and import in Pakistan but unidirectional relation in India i.e., increase in rate of exchange leads to increase the imports.

Komar, Kapoor and Poddar (2014) analyze the impact of openness of trade vs inflation in India using monthly data ranging from 2004-M4 to 2013-M12. Johanson co-integration technique is used to examine the long run connection of inflation with openness of trade with other explanatory variables i.e., money supply, rate of interest, rate of exchange and prices of crude oil. This study determine that inflation in terms of cost is more hazardous to economy coming from trade as compared to the gains from trade.so policy makers of India must take into account this negative impact of trade and inflation while considering the gains of trade and globalization.

Ijaz, zakria and Fida (2014) used annual data ranging from 1972 to 2012 for Pakistan to find the relation of inflation with terms of trade (TOT). Nominal rate of exchange, supply of money and output   growth impact is also used as the exogenous variables in the study. ADF test is used to measure the unit root in the data, ARCH to measure the uncertainty of TOT and then apply GMM methodology for further analysis. Inflation is reduced by TOT, supply of money and rate of nominal exchange both reduces the inflation in Pakistan. Another finding this study indicates that oil prices also have significant impact on local inflation showing high dependency on imports.

Ada *et al.,* (2014) by applying VECM approach to test the relation between inflation and openness of trade in Nigerian Economy by taking annual data from 1970 to 2010. For long run relationship between inflation and openness of trade, johansen   co-integration test is used and found negative significant effect between the variables at 1% and 5%. ECM co-efficient i.e., (-0.91) shows significant negative impact that system corrects itself to previous 91% annually. IRF (Impulse Response Function) shows positive shock for first two periods and then throughout the time significant negative impact indicating the negative overall relation between inflation and openness of trade in Nigerian Economy.

Joshi and Acharya (2015) use quarterly data ranging from1984-85 to 2004-05 to examine the relationship between inflation and openness of trade in India. Import of goods and services as proxy for openness of trade is used in this study and WPI as proxy for inflation. Johansen's multivariate co-integration test to check the association concerning these variables. Romer (1993) negative relationship between openness of trade and inflation is supported in this study and they conclude that openness of trade is helpful in creating favorable atmosphere to down the inflation rate in domestic economy excluding any other macroeconomic variable.

3. DATA AND METHODOLOGY

3.1 Data Description and Sources

In this study, we use annual data ranging from 1972 to 2014 from World Development Indicators (WDI) for the comparison of Pakistan and India. The variables going to be used in this study are defined as:

GDP = Gross Domestic Product (GDP growth (annual %))

TO = Trade Openness (Trade (% of GDP) defined as Import plus Export divided by GDP)

EMP = Employment Rate (Employment to population ratio, 15+, total (%) (Modeled ILO estimate))

Ex R = Exchange Rate (Official exchange rate (LCU per US$, period average))

Inf = Inflation Rate (Inflation, consumer prices (annual %) defined as Lag of CPI)

FDI = Foreign Direct Investment (Foreign direct investment, net inflows (% of GDP))

3.2 Descriptive Statistics

The descriptive   statistics of data show some indications about the variables of both Pakistan and India, which exhibits the features of skewness and kurtosis. Table-1 given below show the descriptive statistics:

Table-1: Descriptive Statistics

Variables	Obs.	Mean	Max.	Min.	S-D	Skewness	Kurtosis	J-B
GDP-P	43	4.809404	10.21570	0.813406	2.168221	0.208937	2.547295	0.680046
TO-P	43	30.85405	38.74397	25.00443	3.318834	0.291317	2.647452	0.830891
EMP-P	43	48.23488	51.70000	46.70000	1.514672	1.366631	3.205016	13.46036
Ex R-P	43	38.36434	101.6289	8.681383	28.91571	0.726751	2.300620	4.661556
Inf-P	43	9.473870	26.66303	2.914135	5.258987	1.468083	5.184102	23.99287
FDI-P	43	0.786669	3.668323	-0.06324	0.829428	2.081179	7.063997	60.63232
GDP-I	43	5.632399	10.25996	-5.23818	3.035913	-1.150115	5.284341	18.82910
TO-I	43	18.99165	42.93755	6.423816	10.67739	1.058530	2.883807	8.054334
EMP-I	43	57.13721	58.60000	52.20000	1.885663	-1.770476	4.701889	27.65395
Ex R-I	43	28.34041	61.02951	7.594468	17.62759	0.142374	1.473547	4.319958
Inf-I	43	8.233075	28.60169	-7.63438	5.151549	0.858060	8.590885	61.28049
FDI-I	43	0.648324	3.545983	-0.02917	0.847512	1.499026	4.846748	22.21451

Mean of the variables show the central values, min. and max. values are also given in the above table. S-D shows that how much the values are scattered from their mean. The more the less value of std. dev. shows that its values are very close to their mean. Skewness is the absence of symmetry in a dist. round specific central value and has positive value than it is known as positive skewness. If its values is negative value than known as negative skewness. Kurtosis is the degree of peakedness of a dist. usually taken relative to a normal dist. The Jarque-Bera (JB) statistic is basically a goodness-of-fit test based on the sample of both. Test is used to check the normality of a dist. under the null hypothesis that series are normally distributed via non- normally dist. If JB critical value is greater than 5.99, it means statistically significant at 5% significance level.

3.2.1 Johansen's Co-integration Model

To check the long-run dynamic relation among the selected variables for both countries i.e., Pakistan and India, we apply the Johansen's co-integration model in this study. Before applying this test, we check the unit root in the series. We use ADF (Augmented Dickey Fuller) test to check the data stationarity. Table-2 given below shows the ADF results and var.'s are stationary at the level of 2nd difference.

Table-2 Augmented Dickey Fuller Test (Unit Root Test)

Pakistan			India		
Variables	2nd Differences		Variables	2nd Differences	
	t-stats	Prob.		t-stats	Prob.
GDP-P	-7.247419	0.0000	GDP-I	-6.057016	0.0000
TO-P	-8.428536	0.0000	TO-I	-6.402624	0.0000
EMP-P	-9.831018	0.0000	EMP-I	-8.610471	0.0000
Ex R-P	-6.046483	0.0000	Ex R-I	-8.698897	0.0000
Inf-P	-9.474950	0.0000	Inf-I	-10.22011	0.0000
FDI-P	-6.845993	0.0000	FDI-I	-5.959479	0.0000

After applying ADF, we are able to apply the Johansen's Co-integration model. Table's 3, 4, 5 and 6 given below show the results of both Pakistan and India.

Table-3 Unrestricted Co-integration Rank Test (Trace-Pakistan)

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	0.01 Critical Value
None**	0.752612	152.0765	94.15	103.18
At most 1**	0.670237	94.80780	68.52	76.07
At most 2*	0.476712	49.32320	47.21	54.46
At most 3*	0.267701	22.77068	29.68	35.65
At most 4*	0.212816	9.996451	15.41	20.04
At most 5*	0.004512	0.185402	3.76	6.65

Trace test indicates 3 co-integrating equation(s) at the 5% level
Trace test indicates 2 co-integrating equation(s) at the 1% level
*(**) denotes rejection of the hypothesis at the 5% (1%) level

Table-4 Unrestricted Co-integration Rank Test (Maximum Eigen-Value-Pakistan)

Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	0.01 Critical Value
None**	0.752612	57.26870	39.37	45.10
At most 1**	0.670237	45.48459	33.46	38.77
At most 2*	0.476712	26.55252	27.07	32.24
At most 3*	0.267701	12.77423	20.97	25.52
At most 4*	0.212816	9.811049	14.07	18.63
At most 5*	0.004512	0.185402	3.76	6.65

Max-eigenvalue test indicates 2 co-integrating equation(s) at both 5% and 1% levels
*(**) denotes rejection of the hypothesis at the 5% (1%) level

Table-5 Unrestricted Co-integration Rank Test (Trace-India)

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	0.01 Critical Value
None**	0.590019	123.2961	94.15	103.18
At most 1**	0.535496	86.73873	68.52	76.07
At most 2*	0.445699	55.30050	47.21	54.46
At most 3*	0.420690	31.10855	29.68	35.65
At most 4*	0.186015	8.725947	15.41	20.04
At most 5*	0.006991	0.287623	3.76	6.65

Trace test indicates 3 co-integrating equation(s) at the 5% level
Trace test indicates 2 co-integrating equation(s) at the 1% level
*(**) denotes rejection of the hypothesis at the 5% (1%) level

Table-6 Unrestricted Co-integration Rank Test (Maximum Eigen-Value-India)

Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	0.01 Critical Value
None**	0.590019	36.55742	39.37	45.10
At most 1**	0.535496	31.43823	33.46	38.77
At most 2*	0.445699	24.19195	27.07	32.24
At most 3*	0.420690	22.38260	20.97	25.52
At most 4*	0.186015	8.438324	14.07	18.63
At most 5*	0.006991	0.287623	3.76	6.65

Max-eigenvalue test indicates 2 co-integrating equation(s) at both 5% and 1% levels
*(**) denotes rejection of the hypothesis at the 5% (1%) level

Table 3 & 5 show the unrestricted co-integration rank test for trace value of both Pakistan and India. Whereas, table 4 & 6 shows the co-integration rank test for maximum Eigen values of both Pakistan and India. All variables are co-integrated at the 5% significance level.

3.2.2 Methodology

After applying ADF and Johansen co-integration test, we find that there is long-run relation between all five

variables to be included for the further analysis. Now, we are able to apply simple OLS (ordinary least square) method to test the impact of GDP on considered exogenous variables in the model. Simple OLS is as follows:

$$GDP = \alpha_0 + \alpha_1 TO + \alpha_2 EMP + \alpha_3 Ex\,R + \alpha_4 Inf + \alpha_5 FDI + \varepsilon$$

And the variables in above equation are defined in data section.

4 ESTIMATION AND CONCLUSIONS

In this section, we are going to define the results of both countries after applying the OLS and then on the basis of both countries results go for conclusions and policy implications.

4.1 Estimation and Results

4.1.1 Pakistan

After employing, ordinary least square test (OLS), we get the following results in the table-7 given below for Pakistan.

Table-7 Ordinary Least Square Method (Pakistan)

GDP-P	Co-efficient	Std. Error	t-Statistic	Prob.
TO-P	0.297341	0.129422	2.297450	0.0273*
EMP-P	0.556687	0.358445	1.553061	0.1289
Ex R-P	-0.055029	0.019077	-2.884530	0.0065**
Inf-P	-0.195339	0.078314	-2.494316	0.0172*
FDI-P	-0.375693	0.467725	-0.803234	0.4270
Const.	-26.95920	17.21750	-1.565802	0.1259
R^2	0.895253		AIC	-2.291315
Adjust. R^2	0.700016		SIC	-2.537064
F-Stats	3.100216		H-Q C	-2.381940
Prob. (F-Stats)	0.019519		D-W Test	1.981994

** indicates significant at 1% and * at 5% significance level

TO-P is significant at 5% significance level means that GDP of Pakistan has significant impact. Ex R-P is also significant at 1% significance level means that it negatively effects the GDP and Inf-P is also significant at 5% significance level indicating that inflation has negative impact on GDP because its co-efficient is negative here. F-stat is significant, indication of good model. D-W indicates the very minute probability of auto-correlation as its value is 1.981994 but all other i.e., R^2, Adjust. R^2, AIC, SIC and H-Q C all shows that model is good fit.

4.1.2 India

After employing, ordinary least square test (OLS), we get the following results in the table-8 given below for India.

Table-8 Ordinary Least Square Method (India)

GDP-I	Co-efficient	Std. Error	t-Statistic	Prob.
TO-I	0.161058	0.154622	1.041622	0.0043**
EMP-I	0.592729	0.514205	1.152709	0.0464*
Ex R-I	0.049779	0.049843	0.998707	0.0244*
Inf-I	0.013831	0.089685	0.154217	0.8783
FDI-I	-0.458563	1.169788	-0.392005	0.0173*
Const.	-32.52055	31.23015	-1.041319	0.3045
R^2	0.900943		AIC	-2.090117
Adjust. R^2	0.822963		SIC	-2.335866
F-Stats	1.860921		H-Q C	-2.180742
Prob. (F-Stats)	0.024986		D-W Test	2.382499

** indicates significant at 1% and * at 5% significance level

TO-I is significant at 1% significance level means that it has significant impact on GDP of India. EMP-I also have significant impact on GDP in case of India at 5% significance level and Ex R-I also have significant

impact of 5% significance level on GDP in case of India. In case of India, FDI negatively impact of 5% significance level on GDP. F-stat is significant, indication of good model. D-W indicates the very minute problem of auto-correlation as its value is 2.382499 but all other i.e., R^2, Adjust. R^2, AIC, SIC and H-Q C all shows that model is good fit.

4.2 Summary and Conclusion

In this study, we employ simple OLS technique to test impact of TO, EMP, Ex R, Inf, FDI on GDP in Pakistan and India. Before employing the OLS, we use ADF and Johansen's co-integration test to check the stationarity and long run association among the variables. We found that for Pakistan, TO positively and Ex R & Inf negatively impacts on GDP. On the other hand, in case of India we come to know that all variables positively and significantly impact on GDP except Inf. So in conclusion, we can say that both countries have significant different impact on GDP but in case of TO both significantly positively impact on GDP.

Overall, openness of trade significantly impact in both countries means that policy makers of both countries must try to remove the hinderers in opening of trade in both countries, so that both countries have more GDP to grow. Inflation and Rate of Exchange have negative impact on GDP in case of Pakistan, so policy must control these two variables to increase the GDP. In the end, we can say that policy makers of both countries must make very keen observation on the policies to implement for the betterment of trade in their countries to prosper and grow.

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