

Trade Liberalization and Economic Growth: New Evidence from Afghanistan and Seven ECO Member Countries

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ABSTRACT

The purpose of this paper is to investigate the dynamic relationship between trade liberalization and economic growth of Afghanistan and selected members of Economic Cooperation Organization (ECO), for the period (2001 to 2012) using yearly data from World Development Indicator (WDI). Our observation includes a few less developed countries, some of which have less than \$1000 per capita income. We use volume of trade as share of GDP for liberalization measurement. Our econometric estimation is based on first step and second step system GMM to investigate the dynamic relationship between trade liberalization and economic growth. The empirical finding of this paper suggests a robust and highly significant positive relationship between trade liberalization and economic growth. In conclusion the result of this paper suggests that moving toward economic integration is not harmful even for less developed economies, rather it enhances economic growth.

Key Word: Trade liberalization, Economic Growth, ECO Member Countries

INTRODUCTION

Does trade openness lead to higher economic growth? From the time of Adam Smith to Jan Maynard Keynes.... until now, there are long debates of whether or not trade liberalization enhances economic growth. Along the history some of the theorists enumerate trade openness as engine of economic growth while some of them (protectionist) count it detrimental for growth especially for developing countries. There are many trade theories, describing the relationship between liberalization of trade and growth of GDP as well as welfare gain for trade parties. The earlier trade theory is comparative advantage theory, suggesting that welfare gain from trade will result for both trading countries if they specialize on their comparative advantage goods. Following by Heckscher-Ohlin and Samuelson (factor abundant), specific factor, monopolistic competition model and so on. All these theories are suggesting that there will be positive economic growth if there is free trade without any government distortion. Also the new growth theories which rely on technological diffusion count trade as engine of economic growth. Based on new growth theories, trade liberalization enhance production of new technology, resulting from higher competition as a result of higher economic integration. Production of new technology crosses the borders due to externality and technological diffusion; it also increases the stock of knowledge for technological innovation that contributes economic growth (Andrew Mwaba, 2002).

The empirical studies related to the issue of trade liberalization and economic growth is mixed as well as theoretical aspect of the issue. Many of the previous literature suggest that there is significantly positive correlation between degree of trade liberalization and economic growth (e.g. Yanikkaya 2003, Redding 2002, Wacziarg 2001, and Greenaway 2002, Sarkar 2008). However other literature reports negative association between trade liberalization and economic growth (e.g Rodrik

and Rodriguez 2001). *The questions here arise are: whether the positive relationship between liberalization of trade and economic growth is a general conclusion irrespective to the degree of development of countries? Whether countries like Afghanistan will reach higher economic growth, moving toward trade liberalization?* Therefore, the aim of this paper is to answer the above questions by investigating the relationship between trade openness and economic growth using panel data for the period (2001-2012) for Afghanistan and selected ECO member countries.

This paper encompasses low income countries some of which has less than \$1000 per capita income. We hope this paper enriches the empirical studies related to the impact of trade openness on economic growth, for some countries such as Pakistan, Tajikistan, Uzbekistan... and especially for Afghanistan where empirical studies regarding to economic issues hardly looking. The organization of this paper is as following: the following chapter discusses the theoretical background of trade including review of literature. Chapter three is allocated for methodology and it introduces variables and data sources. Chapter four includes estimation and result of the study and finally the paper closes by conclusion.

THEORETICAL BACKGROUND AND LITERATURE REVIEW

Theoretical Background

The relationship between openness and economic growth has been being discussed in two general frameworks, trade based framework and growth frame work. The conventional trade theorem, first introduced by David Ricardo (1817) relies on technology differences between two countries as main source of gain for trading partners (Penélope Pacheco-López, 2009). The theorem states that each country should specialize on production of goods in which it has comparative advantage and leave production of other goods to other countries. Conventional trade theory, then, was further contributed by (Heckscher, 1919 & Ohlin, 1933). They describe comparative advantage between two countries from another perspective (relative factor endowment). They argue that difference in factor endowment is the main cause of trade. The main idea of this theorem is that the gain from trade will arise if each country specializes on the good in which its abundant factor is intensively used. On the other hand in growth framework, the issue of economic growth and its sources and consequences are the important phenomena that have been discussed for a long time. From the time of classical economist from William Petty, Adam Smith to David Ricardo until now, plenty of discussions and theories on source, determinant and consequences of economic growth existed. Despite mass of theory on economic growth, there is not a unifying theory discussing the determinant of economic growth. Recently there are some partial theories discussing various determinant of economic growth, are of more interest (Petakos, 2007). The exogenous growth theory based on Solow Swan (1956) model (developed by Robert Solow and Trevor Swan) known as neoclassical exogenous growth models, describes how economic growth sustains for long run. This theory states that a sustained economic growth is only related to technological progress which is considered as exogenous, it does not describe how international trade relate to economic growth, however.

The recent endogenous growth literatures (Romer 1986, 1990, Grossman and helpman, 1990, 1994, Lucas 1988,) explain how international trade foster and contribute long run economic growth. Based on these literatures, the main sources that international trade influence economic growth are greater productivity resulting from greater specialization, scale economy that further motivate innovation by investing more on research and development (R&D), positive externality that allows new innovation spread across the border and enable countries' firms to gain from new knowledge and innovation that has been developed in the trade partner countries, and finally access to international capital market that support firms through availability of better investment opportunities.

Literature Review

The cause and effect relationship between trade liberalization and economic growth is one of the important issues being discussed since long time. Despite plenty of studies both theoretically as well as empirically have been discussed on this relation, no unifying causal relationship has been found between the two. Some studies find positive association between trade liberalization and economic growth while others find negative relation, depending on various factors. The causal relation between liberalization and economic growth in empirical studies can be affected by one of the issues such as: using different data series (time series, cross sectional or mixture of both), applying different measurement of liberalization and the choice of countries being included in sample (Harrison, 1996).

An alternative reason of why different relationship is reporting in empirical study is argued by Wacziarg (2003). He concludes, those countries experiencing positive liberalization-growth effect, tend to have better policy reforms while those experiencing negative liberalization effect on growth suffer from contractionary macroeconomic policy or political instability and so on.

Marelli and Signorili (2011) study this relation for the case of China and India using panel data for the period (1980-2007). Their finding suggests that trade liberalization and integrating to the world economy lead to higher economic growth during the study period. Also Sarkar (2007) examine this relation by investigating for a sample of 51 countries of the south during the years of (1981- 2002) using panel data and also for period (1961-2002) using time series data for each individual country. This study concludes that for the first period observation, only in 11 rich countries, a higher growth rate is associated with a high level of liberalization. While the second period observation suggests that among various regions, only middle income countries experience positive long run relation between trade liberalization and economic growth. Gries and Redlin (2012) examine this relation with respect to long and short term effects, for a sample consisting 158 counties during (1970 – 2009) using panel co-integration test with GMM estimation. The finding of their study suggests that in the long run, significant positive correlation between trade liberalization and economic growth exist. By contrast, they found negative association in the short term, suggesting that trade liberalization is purposive and helpful for growth improvement in long run, while it can be harmful during the short term adjustment. A large number of studies use volume of trade (export plus import) as a ratio of GDP while some of them use average tariff as measure of trade openness, for example Lee (1993) and Edward (1998) have used average tariff as a measure of trade liberalization and found negative relation between trade restrictions and economic growth, however Rodriguez and Rodrik (2001) criticize the result of Edward (1998) and report positive relationship for trade restrictions and growth. Harrison (1996) and Yanikkaya (2003) use a large number of openness measures, and they find positive relationship for openness and growth using volume of trade and negative relation for other measures.

MODEL, DATA & ESTIMATION PROCESS

Model and Data

Following Yanikkaya (2003), our empirical model includes per capita income, physical capital, human capital, and trade liberalization measurement. The general form of the model is as follow:

$$y_{it} = F(KSTOCK_{it}, HSTOCK_{it}, OP_{it}) \quad (1)$$

Where y_{it} denotes per capita income of country (i) at time (t), $KSTOCK_{it}$ denote physical capital stock, $HSTOCK_{it}$ used to indicate human capital stock and OP_{it} shows the measurements of trade liberalization (here we use total trade as share of GDP). Since there is no exact data information about physical capital stock and human capital stock, therefore we use gross capital formation as proxy for physical capital stock (by Harrison, 1996) and life expectancy (by Yanikkaya, 2003) as proxy for human capital.

Since, current growth rate is correlated to the past growth rate, we would use a lagged of dependent variable as explanatory variable to form a dynamic model. In other word current GDP per capita is related to the past years' GDP per capita, therefore it is batter to incorporate lagged of GDP per capita as one of the variables that affect economic growth. Also, we transform our model in log linear form which is consistent with previous literatures (Dutta & Ahmad 2006, Frankel & Romer 1999). After transforming, our model takes the following form:

$$\ln y_{it} = B_0 + B_1 \ln y_{it-1} + B_2 \ln KSTOCK_{it} + B_3 \ln Hstock + B_4 \ln OP_{it} + \epsilon_{it} \quad (3)$$

Our observation consists of panel data for eight countries (Afghanistan, Pakistan, Tajikistan, Turkmenistan, Iran, Kazakhstan, Azerbaijan and Uzbekistan) for the years (2001 to 2012). World Development Indicators (WDI) data, provided by World Bank (WB), is the main source of our data collection. Data for all variables have been taken from this reference except some data for Iran have been collected from other sources (post 2007 data for openness from IMF and for the same period data for gross capital formation from National Bank of Iran). Summary of data and its source and other informative statistic are reported in table 1.

Estimation process

Unit root test

Since a nonstationary data leads to spurious or nonsense regression result, it becomes popular among researcher to test it for stationarity (Gujarati, 2009). We use Fisher unit root test (introduced by Maddala and Wu, 1999) and IPS test (developed by Im, Pesaran & Shin (2003), proposed for panel data. Both Fisher and IPS type tests are relying on augmented Dickey-Fuller (Dickey and fuller, 1979) in excess of combining the result of all cross sectional dimension to use it for panel data. In other word the IPS test computes the t-bar statistic by averaging the result of all cross sectional and Fisher test combine the information by averaging the significance level of individual test (Redlin, 2002).

GMM Testing

Use of lag dependent variable as independent variable, leads to autocorrelation or correlation between lag regressor and error term. This comes out because the error term u_{it} in the following equation is a function of y_{it} and it must also be related to y_{it-1} , therefore the OLS estimator leads to be biased (Demitredes and law, 2009). This problem can be solved if time tends to infinity ($T \rightarrow \infty$).

$$y_{it} = \delta y_{it-1} + u_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (1)$$

Arelano and Bond (1991) proposed GMM method to solve the problem of correlation between lag and error term by using some additional instruments by first differencing equation (1).

ESTIMATION AND RESULT

Unit root test

The result of Fisher and IPS unit root tests are reported in Tables (2a) and (2b) respectively. Column 1 of tables shows the lists of variables, while Column 2 and 3 of them show the result of the test at level and at first difference respectively. The result of Fisher test at level shows that some of the variables are not stationary at 5% level while on the other hand it shows that at first difference, all data are highly stationary at 1% level for both cases, with only intercept and intercept and trend. The result of IPS test shows that except human capital which is stationary for any level of significance (for the cases with intercept and trend), all other variables are nonstationary at level. But on the other hand based on IPS at first difference, all variables are stationary at least for 5% level of significance irrespective of intercepts or trends.

Dynamic Panel GMM Estimation

Our empirical result is reported in Table 3 and 4. In table 3 we report the result of one step system GMM while in Table 4 we show the result of two step system GMM. Column (1) of both table shows list of interest variables and some of important test (test of AR(1) AR(2), Sargan test, Henson Test) while Column 2, 3 and 4 indicate coefficients, standard errors, and p-value respectively. Both table shows that all coefficients have the right signs and are economically meaningful. Coefficients of trade liberalization and lagged per capita GDP are highly significant at 1% level and they are not sensitive to changes (both one step and two step system GMM show almost the same result) while the coefficients of physical capital and human capital or insignificant and they show sensitivity for different system GMM. The coefficient of trade liberalization indicates that there is positive correlation between trade liberalization and economic growth for countries included in our sample. It implies that on average a one percent increase in volume of trade results a 0.11 percent increase in economic growth, holding all other factors constant.

Diagnostic Testing

Sargan/Hansen Test

One of the conditions to get unbiased and efficient GMM estimator is the condition of validity of instrumental variable. Since the number of moment condition raise with T, using dynamic GMM estimation, Arellano and Bond (1991) suggest Sargan test to check for validity of instrumental variable. The null hypothesis based on Sargan test is that over identifying restriction is valid, or the instrumental variable is valid and it does not serially correlated to the error term. In table 3 and 4 we also report the

outcome of Sargan test in which the P-value of the test is 0.326 for both one and two step system GMM implying that the result support the null hypothesis of validity of instrumental variable. In other word base on Sargan test we are not able to reject the null hypothesis of no serial correlation of instrumental variable with the error term at 1%, 5% and 10% level. This result is also supported by Hansen test in which the p-value for both one step and two step system GMM is too far from the rejection of null hypothesis. Therefore both Hansen and Sargan tests are indicating that we have chosen the right instruments.

AR(1) and AR(2) Test

We also report the first order and second order serial correlation (AR1 and AR2) in tables 3 and 4. The null hypothesis here is that no serial correlation exists in our estimation. Arellano and Bond (1991) suggest that the result should reject the null hypothesis for AR(1) but do not reject it for AR(2). The p-value for AR(1) is 0.012 which indicates that there is strong evidence against null hypothesis for AR(1) and we reject the null hypothesis of no first order serial correlation. The P-value for AR(2) is 0.52 which is not significant at 1 and 5 percent level and we are not able to reject the null hypothesis of no second order serial correlation especially at 1% level.

CONCLUSION

There is a long debate both in theoretical as well as empirical literatures that whether liberalization of trade leads to higher economic growth or they are negatively correlated. Unfortunately no unifying result comes out on positive or negative causal relation between the two. We study the relationship between trade liberalization and economic growth for ECO member countries and we find robust positive correlation between trade liberalization and economic growth. There are also arguments that trade liberalization is suggestive for developed nations while it is damaging for those of developing ones. Since our empirical work includes some less developed countries, therefore, our finding suggests that trade openness leads to higher economic growth even for developing countries. In contrast to the finding of this study, there is still doubt that, higher economic growth during the mentioned period in these countries are maybe due to external factors and macroeconomic factors like better policy reforms and so forth. For example for the case of Afghanistan higher economic growth can be due to outpouring of foreign aids post 2002. Therefore, to get clearer result on the relationship of trade liberalization and economic growth, further investigation is needed.

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TABLE 1A: Informative Statist (2001-2012, Observation=96)

Variable	Unite of measurement	Source	Mean	Over all Standard division	Between Standard Division	Within Standard Division	minimum	maximum
GDP per capita	USD	WDI	2369	2643.4	2044.5	1814.3	115	12116
Trade liberalizati on	%of GDP	WDI, IMF for Iran	79.22	31.60	28.52	16.71	30	158
Physical capital	%of GDP	WDI, National Bank of Iran for Iran Post	24.35	10.25	7.712	7.251	8	58
Human capital	Average years of living at birth	2007 WID	66.30	4.085	4.112	1.317	55	74

TABLE 2A: Fisher Unit Root Test

variables	Fisher test at level	Fisher test at 1 st difference
Per capita income (y)	intercept 27.7421 (0.0339)***	intercept 49.62 (0.0000)****
	intercept +trend 25.899 (0.0556)**	intercept +trend 36.15 (0.0028)****
Traded liberalization (RTRADE)	intercept 27.7421 (0.0339)***	intercept 61.29 (0.0000)****
	intercept +trend 23.09 (0.0934)**	intercept +trend 48.36 (0.000)****
Physical Capital (Kstock)	intercept 23.12 (0.111)*	intercept 43.67 (0.0002)****
	intercept +trend 18.67 (0.28)*	intercept +trend 27.32 (0.032)***
Human capital (Hstock)	intercept 3.33 (0.999)*	intercept 41.06 (0.0002)****
	intercept +trend 21.9 (0.14)*	intercept +trend 48.9 (0.0000)****

Note:

* Reject the null hypothesis of unit root at more than 10% level

** Reject the null hypothesis of unit root at 10% level

*** Reject the null hypothesis of unit root at 5% level

**** Reject the null hypothesis of unit root at 1% level

TABLE 2B: IPS Unit Root Test

variables	IPS test at level	IPS test at 1 st difference
Per capita income (y)	intercept 5.2046 (1.0000)*	intercept -2.3923 (0.0084)****
	intercept +trend 0.2152 (0.2552)*	intercept +trend -1.2935 (0.0097)****
Traded liberalization (RTRADE)	intercept -0.1258 (0.4499)*	intercept -2.1079 (0.0175)***
	intercept +trend 0.7385 (0.7699)*	intercept +trend -0.6738 (0.0247)***
Physical Capital (Kstock)	intercept -1.5771 (0.0574)*	intercept -2.0879 (0.0184)***
	intercept +trend -0.4801 (0.3156)*	intercept +trend -0.3832 (0.0377)***
Human capital (Hstock)	intercept 3.8280 (0.9999)*	intercept -6.1001 (0.0000)****
	intercept +trend -5.8001 (0.0000)****	intercept +trend -1.8000 (0.0000)****

Note:

* Reject the null hypothesis of unit root at more than 10% level

** Reject the null hypothesis of unit root at 10% level

*** Reject the null hypothesis of unit root at 5% level

**** Reject the null hypothesis of unit root at 1% level

TABLE 3: Dynamic Panel-Data Estimation, One-Step System GMM, (No Of Ob 96, T=12, N=8).

Variable	Coefficient	Std.error	P value
GDP per capita (lagged)	.9851509	.0330409	(0.000)****

Trade liberalization	.1159946	.0239541	(0.000)****
Physical capital	.0202458	.0469266	(0.666)*
Human capital	.1931072	.296074	(0.514)*
Intercept (C)	-1.108562	1.099542	(0.313)*
AR(1)	z = -2.50 Pr > z = (0.012)		
AR(2)	z = -1.94 Pr > z = (0.052)		
Sargan test of overid	chi2(2) = 2.24 Prob > chi2 = 0.326		
NO. OF GROUP	8		
NO. OF INSTRUMENTS	7		
HANSEN TEST	chi2(1) = 1.28 Prob > chi2 = 0.258		
DIFFERENTIAL	chi2(1) = 0.05 Prob > chi2 = 0.831		

Note:

* Reject the null hypothesis of at more than 10% level

** Reject the null hypothesis of at 10% level

*** Reject the null hypothesis of at 5% level

**** Reject the null hypothesis of at 1% level

TABLE 4: Dynamic Panel-Data Estimation, Two-Step System GMM, (No Of Ob. 96, T=12, N=8).

Variable	Coefficient	Std.error	P value
GDP per capita (lagged)	.9640225	.033076	(0.000)****
Trade liberalization	.1118993	.0224379	(0.000)****
Physical capital	.0360249	.0532472	(0.499)*
Human capital	.3606005	.3357153	(0.283)*
Intercept (C)	-1.691532	1.250542	(0.176)*
AR(1)	z = -2.45 Pr > z = (0.014)		
AR(2)	z = -1.95 Pr > z = (0.051)		
Sargan test of overid	chi2(2) = 2.24 Prob > chi2 = 0.326		
NO. OF GROUP	8		
NO. OF INSTRUMENTS	7		
HANSEN TEST	chi2(1) = 1.28 Prob > chi2 = 0.258		
DIFFERENTIAL	chi2(1) = 0.05 Prob > chi2 = 0.831		

Note:

* Reject the null hypothesis at more than 10% level

** Reject the null hypothesis at 10% level

*** Reject the null hypothesis at 5% level

**** Reject the null hypothesis at 1% level