Human Development and Trade Openness: A Case Study on Developing Countries

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Abstract

According to the international trade theory, open market oriented industries, sectors or economies are more effective in allocating production factors among economics actors than the relatively closed ones. However; it is wondered whether being open market oriented is good for societies as a whole. Therefore, this study uses panel data analysis in order to examine the effects of trade openness with control variables on the living standards of medium high income level countries. For life standards indicators, human development index (HDI) was taken into account. Data were obtained from World Bank and data set covers the years between 1995 and 2010.   In conclusion, the present study found positive effect of openness on living standards.

1   Introduction

Trade openness affects the human development through two canals. Open market oriented economies increase their welfare by specializing on the sectors that they have comparative advantages, as Ricardo Ricardo discussed in the literature. More effective goods and services can be traded thanks to positive effect of specialization and scales of economies. In modern trade theories, economies can have higher growth rates by export led growth policies. Export led growth policies can be applied only in open market oriented economies. These kinds of arguments show the indirect effect of openness on human development. Openness positively affects economic growth and then economic growth affects human development. In the second canal, openness directly affects the

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human development. Countries not only exchange goods and services by free trade, but also exchange technology, ideas and ideology. By trading technology, ideas and ideology, world population has opportunity to choose the better and the more fruitful ones. This argument shows the direct effects of openness on human development.

This study scans relevant literature and then examines the effects of trade openness with control variables on Developing Countries' life standards using panel data analysis. HDI was taken as life standards indicators Data were obtained from World Bank.

2   Theoretical Framework

Arguments on the relationships between trade openness and human development have a broad history as open market arguments in economics literature. After the criticisms of David Hume on Mercantilism and the valuable contributions of honorable Adam Smith to economics science, open market economy had received a general approval in the environment of economist. David Ricardo systemized Adam Smith's absolute advantages as comparative advantages. If countries specialize on the production of tradable goods and services that they have comparative advantages in trading them, they will increase their prosperity as a whole. Hecksher and Ohlin improved the theory of comparative advantages and developed the factor endowment theory. Until that period, all arguments about open market economy agreed that open market economy was better as a whole. Stolper and Samuelson claimed that free trade is advantageous for factors of production employed in export led industries and disadvantageous for the factors that employed in import led industry.

Many empirical and theoretical studies in literature mainly examined the effects of openness on economic growth rates; on the other hand few studies researched the effects of openness on human development. In the theoretical study of Villenueva (1993),, the effect of openness on steady state growth rates was examined by neoclassical approaches. The effect of openness has the similar rate of effect of increase on health and education expenditures and it requires having higher steady state growth rates.

Fatah et al (2012) examined the growth rates of China, Malaysia and Indonesia. They examined the effects of life expectancy at birth, openness, civil liberties, political rights, foreign direct investment and human development on economic growth. They used quantitative models to analyze the effects of explanatory variables on economic growth. Data were collected in 1980 and in 2005. They found that openness and HDI have positive and statistically significant effect on economic growth.

Rigobon and Rodrick (2004) examined the relationship between rules of law, democracy, openness and income. Classic OLS models and GMM were used to analyze relationships between variables. For OLS model, income levels were taken as independent variable, and rule of law, democratic institution, openness, distance to equator, log of area and population were taken as explanatory variables. They concluded that openness has positive effects on income level but t statistic values are relatively lower. Although they found negative relationship between democracy and openness, positive relationship between openness and rule of law was found by GMM model.

Eusufzai (1996) asked the question "Can higher growth rates cause higher development in open countries?" He examined the relationship between openness and human development. The Pearson correlation coefficients were calculated   between Dollar's Openness Index and different types of HDIs for different types of country group. In

conclusion, positive and higher correlation was found between openness and HDI.

One of the studies that examined the effect of openness on human development is the article by Nourzad and Powell (2003). In that study, there different opened descriptions were used: total trade volume over GDP, black market premium and Dollar's openness index and panel data analysis were used for forty seven developing countries. The data set covered 1965 and 1990. Two main regression models were used. In the first regression, they examined the effect of openness through the variables as accessibility of clean water sources, real GDP, infant mortality rates, government expenditure on education and urban population growth rates on HDI. They examined the effect of openness, HDI and the other variables on real GDP. In conclusion, they found positive effect of openness (total trade over GDP) on both real GDP and HDI.

Reuveny and Li (2003) examined the effect of openness and democracy on income inequality. GINI coefficient was taken as an indicator of income equality. The data set of the study covered the years between 1960 and 1996. The pooled time series analysis were used for 69 countries in order to control the hypothesis that trade openness increases income inequality in developed countries and decreases income inequality in less developed countries. GDP per capita, one decade lagged Gini coefficient and education spending were taken as control variables. They found statistically significant coefficient in openness for developed and less developed countries. When trade openness increased, the level of income inequality was found to decline.

In the study of Asongu (2012), the effect of trade and financial openness on 52 African countries' human development were analyzed through two-stage least squares instrumental variable methodology. The study period ranged between 1996 and 2010. It was found that while trade openness positively affects human development, financial openness has the opposite effect on human development in African countries.

3 Empirical Framework

The empirical framework of the study included the effects of openness (OPEN) with some other control variables; GDP per capita growth rates (GRWTPC), health expenditures (HLTH) and a number of scientific and technical journal articles (PUB). Openness were calculated by summing up export and import over GDP (Makin, 2008, p: 8). All variables were obtained from World Bank database. The data set was collected from the countries with medium-high income level from 1995 and 2010. The logarithm of HLTH and PUB were used. Equation 1 shows the relationship between dependent and independent variables. .

$$HDI_{i,t} = C_0 + OPEN_{i,t} + GRWTPC_{i,t} + LPUB_{i,t} + LHLTH_{i,t} + u_{i,t} \qquad (1)$$

where,

$i = 1, \cdots, 30$; $t = 1995, \cdots, 2010$

Then, stationary properties of the variables were examined using first and second generation unit root tests. Levin, Lin, Chu and Im, Pesaran, Shin tests (Levin et al, 2002; Im et al, 2003) were applied for the first generation unit root test. Table 1 shows the tests results.

Table 1: First Generation Unit Root Tests

	LLC		IPS	
	Constant	Constant and Trend	Constant	Constant and Trend
Variables				
HDI	-5.639[A]	-0.995	1.802	1.091
OPEN	-2.749[A]	-1.046	-1.518[C]	0.309
GRWTPC	-5.904[A]	-5.193[A]	-5.503[A]	-2.714[A]
LPUB	-3.668[A]	-0.286	0.706	0.744
LHLTH	-1.630[C]	0.976	5.275	1.018
ΔHDI	-5.428[A]	-5.704[A]	-4.022[A]	-1.998[B]
ΔOPEN	-4.372[A]	-2.219[B]	-5.503[A]	-2.704[A]
ΔGRWTPC	-10.033[A]	-7.693[A]	-11.297[A]	-7.697[A]
ΔLPUB	-6.845[A]	-5.786[A]	-7.491[A]	-5.891[A]
ΔLHLTH	-4.340[A]	-3.663[A]	-5.202[A]	-2.415[A]

Notes: Δ is first differential operator. C, B and A are level of significance at 10%, 5% and 1% rate, respectively. Newey-West bandwidth selection with Bartlett kernel is used for both LLS and IPS.   Schwarz info criteria are used in order to determine optimal lags .

The results of LLC and IPS tests indicated the stationary of all variables by taking first difference. Cross section dependency was examined through Frees (1995), Friedman (1937) and Pesaran (2004) tests. When the number of cross section (N) is greater than time section (T), Pesaran tests results are useful. In our study, N = 30 and T = 15, therefore Pesaran test results were taken into consideration.

Table 2: Cross Section Dependency Tests

Frees Test		Friedman Test		Pesaran Test	
Stat.	P. Val.	Stat.	P. Val.	Stat.	P. Val.
5.34	0.211	31.341	0.341	3.691	0.00

As shown in Table 2, the null hypothesis of the absence of cross section dependency was rejected by Pesaran cross section dependency test. In case of cross section dependency, Cross-section dependence and Augmented Dickey-Fuller tests (CADF) were applied and Table 3 shows the estimated results (Pesaran 2006).

Table 3: Panel Unit Root Tests Under Cross Section Dependency

	Level		First Difference	
	Constant	Constant and Trend	Constant	Constant and Trend
Variables				
HDI	-1.978[C]	-2.086	-2.590[A]	-2.973[A]
OPEN	-1.554	-1.746	-3.174[A]	-3.417[A]
GRWTPC	-3.090[A]	-3.239[A]	-4.380[A]	-4.408[A]
LPUB	-2.289[A]	-2.339	-4.200[A]	-4.524[A]
LHLTH	-2.076[B]	-2.861[A]	-3.662[A]	-3.606[A]

The results of CADF test indicated that HDI, GRWTPC, LPUB and LHLTH are

stationary in level and the statistic for OPEN is relatively high. All variables are stationary by taking first difference.

The fixed effect model is an appropriate model for focusing on a specific set of countries or firms (Baltagi, 2008). Therefore fixed effect panel data analysis was applied and Table 4 shows the results.

Table 4: Results for Panel One Way Fixed Effect Estimation

Dependent variable: HDI

Variables	Coefficient	t statistic
OPEN	0.0207[A]	3.287
GRWTPC	0.0404[A]	2.787
LPUB	1.107[A]	5.981
LHLTH	5.164[A]	41.397
Constant	32.888[A]	34.256
R-squared	0.953	
Adj. R-squared	0.950	
DW- Stat	0.322	
F-statistic	279.902[A]	

The results of panel data analysis indicated that the coefficients of all variables are statistically significant and the coefficient signs are theoretically expected. Openness was found to have a positive effect on human development. Durbin Watson statistics obtained from the model were relatively low so it could be spurious regressions. Therefore, long term relationships between variables were examined using Kao (1999) and Pedroni (1999) residual based co-integration tests. Table 5 and Table 6 show the estimation outputs.

Table 5: Kao Residuals Co-integration Test

	t stat	prob
ADF	-5.304	0.00

The results of Kao co-integration tests rejected the null hypothesis of no co-integration.

Table 6: Pedroni Residuals Co-integration Test

	Weighted Statistics	Prop
Panel v stat	-0.068	0.527
Panel rho stat	2.980	0.998
Panel PP stat	-1.757	0.039
Panel ADF stat	-0.826	0.204

Four statistics were calculated for Pedroni test, and the null hypothesis of no co-integration was rejected considering PP statistics.

The regression models stated in Table 4 were decided to have long term relationships;

however disequilibrium were possible in the short run. Error correction model (ECM) was applied in order to examine short run relationships of the variables. Equation 2 parameterizes ECM of the variables.

$$\Delta HDI_{i,t} = \Delta OPEN_{i,t} + \Delta GRWTPC_{i,t} + \Delta LPUB_{i,t} + \Delta LHLTH_{i,t} + u_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

$$u_{i,t} = HDI_{i,t} - C_0 - OPEN_{i,t} - GRWTPC_{i,t} - LPUB_{i,t} - LHLTH_{i,t} \tag{3}$$

Table 7 shows the ERC's estimation outputs.

Table7 : Results of Error Correction Model

Dependent variable: HDI		
Variables	Coefficient	t statistic
ΔOPEN	0.0017	0.440
ΔGRWTPC	0.0173[A]	3.803
ΔLPUP	0.144	1.448
ΔLHLTH	1.283[A]	5.412
U_{t-1} (Error Correction Coefficient)	-0.113[A]	-4.327
Constant	0.376[A]	11.449
R-squared	0.389	
Adj. R-squared	0.339	
DW- Stat	0.934	
F-statistic	7.778[A]	

The results of ECM indicated that the effect of openness on human development was statistically insignificant but the coefficient's sign was still positive. In the short run, openness had no significant effect on human development. Openness   positively affected human development in long run. In addition, possible shocks on the variables tend to equilibrium at 11% rate in a year considering error correction coefficient.

4   Conclusion

World economies have different factor endowments, production sources and different locations on earth. These kinds of differences give countries different capabilities to produce different goods and services and also give countries the abilities to produce the same goods and services with different cost of production. International trade lives on these kinds of differences. World countries have a chance to consume many kinds of goods and services that cannot be domestically obtained or produced relatively cheaply.
Many works in literature examines the effects of openness on the growth rates of economies; but this study directly researches the effects of openness on human development. Panel data analyses were used to examine the effect of openness on human development with latent variables of component of human development index. In conclusion, openness was found to have positive effects on human development.

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