The Triangle of Trade Liberalization, Economic growth and Income Inequality

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Abstract
Trade liberalization as a move towards free trade by reducing tariffs and other trade barriers is considered to be the main driving force of globalization. One of the controversial issues regarding trade liberalization is how it affects the lives of different classes of society and indicators of inequality. Conditions of poor communities, the distribution of income, and economic growth parallel with the spread of globalization are among the challenging areas where, in the past two decades, a great number of studies on the resulting effects, benefits, and disadvantages of trade liberalization have been done.

The main objective of this study is to investigate the interactions between the three variables of trade liberalization, economic growth, and income inequality using the observations in 30 developed and developing countries within the period 2000–2011 using the econometric model of generalized method of moments (GMM) for dynamic panel models. To this end, the main factors affecting the variables have been identified and tested. Regarding that the validity of the instrumental variables used in the model has been approved by the Sargan test, findings indicate in the first place that there is a positive correlation between trade liberalization and economic growth. It can be interpreted that not only can trade expansion and elimination of trade barriers speed up economic growth, but the increase in GDP also paves the way for globalization. Further liberalization of trade along with higher economic growth can decrease the unequal distribution of income in society. In addition, increases in the literacy rate and government spending on education and health care improve the distribution of income. However, if there is inequality, economic growth and globalization will slow down.

Keywords: trade liberalization, income distribution, economic growth, GMM model, Sargan test.
Jel classification: C33, C36, D31, F43.
1 Introduction

Globalization is a multidimensional phenomenon that incorporates various economic, social and political aspects. Globalization has remembered as a process of rapid economic integration between the countries, which includes liberalization of trade, investment flows, and technological changes. John Art Seholte (1997) knows globalization as liberalization, this kind of globalization refers to a process in which imposed constraints are excluded by the government.[1] Although globalization has many aspects, including trade liberalization, technological change, migration and capital movements, economic literatures focused on trade an trade liberalization where the talk of globalization exist. Trade liberalization as a move towards free trade by reducing tariffs and other trade barriers are defined and it is the main driving force of globalization. In the past two decades, the rapid increase in the flow of goods and services across borders of different countries has been one of the most visible aspects of the increasing economic integration. Situation of poor groups, the distribution of income and economic growth along with development of globalization are challenging areas that many studies have been undertaken effects of its profits and losses in past two decades.

Adam Smith (1776) had raised the issue of economic growth, while Ricardo (1817) examined the issue of income distribution. But the relationship between these two topics in economic science was ignored. The first empirical study on the relationship between economic growth and income inequality was done by Kuznets (1995). He used the combined data for the three countries, America, Germany and England reached the conclusion that income inequality increases during development. Until it reaches a maximum point and then there is a tendency for an increase in per capita income, income inequality decreases. As they reach a maximum level and then there is an interest of income increment to decrease inequality. This result is known as the Kuznets hypothesis and is described by an inverted U-shaped curve. [2] Since then, the relationship between economic growth and income inequality in the globalization has attracted much attention in the literature of the economy. Some believe that the poor share in the benefits of trade liberalization. Some believe that the interests are absorbed, particularly by those who are not poor. [3] Todaro (1989) is stated as follows: “In today’s world, the eradication of poverty and inequality were core issues, and the policy of many countries’ it is clear that if we want to increase the welfare of the society or at least minimize its severity, we should focus on economic growth. Otherwise, poverty will be distributed among each other and this does not mean that economic growth will improve population situation. [4] Advocates of liberalization, argue that trade liberalization gives the extensive opportunities for development. The group is addressed two cited reasons for the positive effect of trade liberalization on poverty and income inequality. First is the impact of trade liberalization on decreasing poverty and inequality by growing income. Joining of the free flow of trade and economic integration causes that poor countries get higher income in global market by producing goods and services that it cause income increment in poor countries and this increment for poor mans the growth and eventually reduce poverty and inequality. Second: the impact of trade liberalization on shift of production factors and decrement of poverty and inequality. According to these experts, the mixing of global markets helps the investment move and trade to a unique price a so the trade liberalization causes decrement of inequality. New topics of the impacts of globalization on poverty have three complex dimensions: growth, inequality and poverty. It is clear that the poverty needs the growth and politics to help poor. As Ravallion (2004) suggested growth would be in benefit of poor when it leads to a reduction in inequality. [3] The aim of this study is to analysis the trade liberalization and its effects on economic growth and inequality and to response to these questions: Does liberalization affects economic growth in developing countries or developed countries? Does it have any impact on income inequality? And finally is there any relationship between economic growth and income inequality?
The second part of this study is to clarify the theoretical foundations and Analysis empirical literature of the interaction of the main three indices of trade liberalization, economic growth, and inequality. The results of empirical model will specify and estimated and resulted at the end.

2 Literature Review

2.1. Trade liberalization and economic growth

About the impact of trade liberalization policies on economic growth Frederick Bastia (1801-1850) believes in free trade between nations and that any tariffs can cause inequality, since there is no profit and welfare would decrease due to the taxes on imports in long terms. Heckscher and Ohlin (1919) believed on intensity Hypothesis of using production factor that says the difference of production frequency makes a business. [5, 6] Lord Bauer ((1981), Economists of the classical school) believed that innovation and invention increase human skill and they are the reasons for business. [7] Lewis (1990) determined business as economic development motor developed a mechanism that business is free in competition market, inside producers use foreign products and try to make a good with a better quality and finally he argues that competition is an economical estimator. [8] In Myint (1973) view, developing countries have higher feedback due to the use of developed technology that effort continuously to its completion, and this path causes improved international trade. But the countries that made agricultural raw materials stay away from developed technologies and their production and innovation level decreases. As a result, Myint forces the business of (north-east) and (south-west) countries and determines the development of traditional export volume as the only way to gain the external currency. [9] Vernon (1966) declares famous theory of the production cycle and says foreign goods can be used to increase domestic production through imitation and innovation. [10] In the second half of the 1980s, advantage of the endogenous growth theory was defined in terms of the dynamic positioning and the theory of economic growth in this period was undergoing significant improvements. Compared with endogenous growth theory that attributed a large part of the growth to a completely independent process (technical progress), Endogenous growth models move to link the theory of international trade and economic growth. Grossman and Helpman (1991) knew invention and innovation as a function of labor employed in research and development parts and believe that these activities improve the quality and quantity of goods, and are factors of economic growth. [11] Romer and River Batiz (1991) in their studies on the theory of endogenous growth have been mentioned the reasons for the impact of trade on growth:

1. The possibility of greater access to knowledge,
2. Technology development that will reduce costs and increase product variety,
3. prevention of doing industrial researches does not need much innovation,
4. Enhance creativity, innovation and cost-effective identification in great competitions. [12]

Romer (1993) recommends the least developed countries to adopt an open door policy against foreign technology spillovers, to provide increased innovation and increase economic growth rates. [13] Economists like Romer, Lucas, Grossman and Helpman (1991) suggest basic theoretical positive relationship between foreign trade and economic growth and show the impact of foreign trade on dynamic and sustained economic growth. [11] Rao et al (2011) by the adoption of solo growth model used the following model:

\[ Y_t = A_t K_t^\alpha \]
\[ A_t = A_0 e^{\gamma t} \]

where:
- \( Y_t \) is the output
- \( K_t \) is the capital stock
- \( A_t \) is the technology level
- \( \alpha \) is the capital share
- \( \gamma \) is the rate of growth.

0 < \( \alpha < 1 \)
Communications on Advanced Computational Science with Applications

Where $A_0$ is primary technology and $t$ is the time. $Y$ is The Working stock, $K$ is the capital stock and $G$ is steady increase of government workers. Logarithmic figure of the Douglas Cup function above, given the evolution of technology is as follows:

$$\ln y_t = \ln A_0 + gT + \alpha \ln k_t$$

Also $G$ equals to:

$$g = (g_1 + g_2 \text{GLO}_t + g_3 \text{IRAT}_t + g_4 \text{GRAT}_t + g_5 \Delta \text{LP}_t + g_6 \text{CWR}_t + g_7 \text{INSTI}_t + g_8 \text{FDIRAT}_t)$$

By the replacement of $g$ in the logarithm above there will be:

$$\ln y_t = \ln A_0 + (g_1 + g_2 \text{GLO}_t + g_3 \text{IRAT}_t + g_4 \text{GRAT}_t + g_5 \Delta \text{LP}_t + g_6 \text{CWR}_t + g_7 \text{INSTI}_t + g_8 \text{FDIRAT}_t)T$$

$$+ \alpha \ln k_t$$

Where GLO is global variable, including trade liberalization and the ratio of export to GDP. Also IRAT is the ratio of investment to GDP, GRAT is the ratio of government expenditure to GDP, and FDIRAT is the ratio of FDI to GDP, DLP is the inflation rate, CWAR is dummy variable for war and civil unrest and INSTI is institutional reforming index. Rao and his colleagues estimated the generalized logarithmic function using high-torque model, concluded that there is a positive relationship between trade liberalization and economic growth in low-income countries of Africa. [14]

2.2. Economic growth and income distribution

With the onset of industrialization, especially after World War II, poverty and inequality always have engaged more human societies thought, especially in developing countries. These societies according to the development circuit and adopting strategies to address the problems associated with the distribution of the economic growth and development seek to improve the living conditions of their people. But many cases, especially in third world countries for various reasons, a large group of people were not affected by distributional impacts of growth and this leads to economic and social gap and develop poverty. The poor condition worsened in the 1980s, as the World Bank call the decade "the decade of the forgotten poor". 1990s had no choice but to develop alternative strategies from growth strategies to poverty alleviation strategies, this decade was called the War on Poverty. There were different views about the alignment of economic growth and income distribution in all parts of society to enjoy the blessings of growth that praised the role of distributive justice in each of them, and tried to explain the transposition of a model showing the relationship of these two together. Growth and income distribution literature in the world include the old literature of growth and distribution that examines the impact of economic growth on income distribution. The first researcher, who is also the founder of the literature on growth and income distribution, is Kuznets. In one of his articles of economic growth and income inequality, he hypothesized that income inequality first increase in the economic development of each country, and after stabilization at a certain level, it gradually decreases. This model was known as the curve (invert U) of Kuznets. In the 1990s discussions about the benefits of growth, while a consensus regarding the lack of the development tool as the only mean of poverty reduction, took the attention of many researchers about income redistribution policies. Therefore reduction of poverty will depends on the mean level of income and inequality. Increment of income, reduction of poverty and increment of inequality will increase poverty. Economic growth will increase due to the income inequality, but inequality can be increased or decreased. Tabassum (2010) knows markets in low-income countries as a reason for possible negative relationship between economic growth and income inequality and believes that physical and human resources, trade liberalization and increased government spending along with economic growth can reduce country income inequality. [15]
Galor (2000) refers to this in an article, the issue of the relationship between growth and income inequality, all models are often described within both classical and modern, or a combination of these two models. In the classical model of growth and inequality are associated with each other through savings factor or physical investment. Thus, by the rises in income inequality, more wealth goes for affluent segments of the population that have a higher marginal propensity to save. This increase in total savings and more capital accumulation and eventually raises economic growth. In the modern pattern, unlike the classical model, correlation between growth and income inequality is negative and human capital factor is the reason of this negative relationship. As greater equality in society for more people provides more invest in the education of the community. As a result, more human capital and economic growth can be achieved for much less income inequality. [16] Leight (2010) believes that democratic and political control has significant impact on economic growth and income inequality. [17] Many studies have been done in the matter of economic growth and income distribution that studies of Kravis (1956), Oshima (1962), Paukert (1973), Ahluwalia (1976), Papanek & Kign (1986), Garcia & Furquim (2001), Jeffrey G. (2007), Risso & Carrera (2010), Mekenbayeva & Barış (2011) and etc can be mentioned. [18, 19, 20, 21] Richard Adams (2002) stated the following model:

$$\Delta \log p_{it} = \gamma + \beta \log \bar{\mu}_{it} + \Delta \epsilon_{it}$$

$$\log \mu_{it} = \log \bar{\mu}_{it} + \nu_{it} \Rightarrow \log \bar{\mu} = \log \mu_{it} - \nu_{it}$$

Where \((\Delta \log p_{it})\) is the rate of reduction in inequality and \((\log \bar{\mu}_{it})\) is the average consumption or average GDP and also \(\gamma\) and \(\nu_{it}\) are time and country-specific variables over time, respectively used to estimate the relationship between economic growths measured by median income (consumption) and reducing inequality in countries with low income levels pay. The result of the study was a negative correlation between these two variables. [22]

2.3. Trade liberalization and income distribution inequality
The main issues surrounding globalization are poverty, wealth distribution, inequality, justice and injustice. Ali Khan and Bashir (2011) in a study in India showed that trade liberalization in short term increase the inequality but in long term the correlation between trade and inequality is negative. Meschi & Vivarelli (2007) estimate following equation for developing countries:

$$EHII_{iT} = \alpha + \rho EHII_{i,t-1} + \beta OPEN_{it} + \sum_{k} \delta_{k}X_{ikt} + \varphi_{i} + \epsilon_{it}$$

In this equation” i ”indicates the countries and t indicates the time period. \(EHII\) Shows the inequality of family income and OPEN is overall trade including export and import, \(X_{k}\) is controlling variable and \(\eta_{i}\) is the personal effects and \(\epsilon_{it}\) is violate item. The results indicate a weak relationship between trade liberalization and income inequality and it is possible that trade liberalization will lead to differences in household income inequality. [23]

Seholte (1997) argued that developing countries faced more inequalities during the period of accelerated globalization. In these countries have substantial financial resources due to get into the global capitalist elites of the new bonds, while most people's standard of living had fallen. For the relations between the countries, a number of critics believe that globalization leads to a polarization of rich and poor countries.[1]

This study cited three mentioned study groups; we'd like to consider the interaction between the three main variables of income inequality, economic growth and liberalization. Thus, the advantage of the present
study compared with previous studies is that in addition to considering the three variables, determines the interaction between them. The following three equations are presented the theoretical model in this study:

\[ TGP = f(\text{TRM}, \text{FDI}, \text{GDP}, \text{POP}, \text{GIN}, \text{CPI}) \]
\[ \text{GDP} = f(\text{TGP}, \text{FDI}, \text{TRM}, \text{POP}, \text{GIN}, \text{CPI}) \]
\[ \text{GIN} = f(\text{TGP}, \text{GDP}, \text{EDU}, \text{PEH}, \text{CPI}) \]

GIN : Index of income inequality, GDP: Annual growth rate of GDP, TGP: ratio of Total exports and imports relative to GDP as an indicator of trade liberalization, FDI: ratio of Net foreign direct investment to GDP, PEH: ratio of Total state spending for education and health to GDP, CPI: Annual growth rate of consumer price index, TRM: The ratio of total revenue to total tariff value of imported goods, the average tariff rate, POP: Annual population growth rate and EDU: The number of people with secondary education are measured as literacy rates.

3 Methodology and Data:

In this paper, dynamic panel method (GMM) is used to investigate the interaction effects of trade liberalization, economic growth and income inequality. This approach allows us to examine the short term effects of these variables. In these experimental studies, evaluation and selection of appropriate indicators to analyze the behavior of the variables, especially the control variables are in the focus of study, u and got utmost importance. Control variables such as the total volume of trade to GDP, Customs tariff rates, government educational spending, literacy rates, and other factors detailed as follow. For this study a sample of 30 developing and developed countries are used for the period 2000-2011: Argentina, Belarus, Bolivia, Brazil, Colombia, Costa Rica, Dominican, El Salvador, Honduras, Moldova, Paraguay, Philippines, Poland, Iran, Romania, Russia, Turkey, Ukraine, Uruguay, Armenia, Panama, Georgia, Macedonia, Serbia, Kazakhstan, Bangladesh, Thailand, Ecuador, Mexico, Hungary. Among the countries regarding to their ranking in 2011 by the World Bank, Poland and Hungary were among developed countries and Ukraine, Turkey, Macedonia, Serbia, Russia, Romania, Moldova, Georgia and Armenia are among the countries that have a significant economic progress compared to other countries.

3.1. Determination of variables and model

Many economic relationships are dynamic in nature and one of the advantages of panel data is that it allows researchers to better understand the adjusted dynamics if we have:

\[ \text{it} = 1,2,\ldots, T \quad \text{i} = 1,2,\ldots, N \]

Dynamic panel models in general can be expressed as follows:

\[ y_{it} = \alpha y_{i,t-1} + x_{it}^T \beta + \eta_i + v_{it} \]

i and t represent the area and the following data dimension, respectively. \( x_{it}^T \) is explanatory variable and \( y_{i,t-1} \) is dependent variable with a break that is done as an explanatory variable. In this formula, \( v_{it}, \eta_i \) ingredients include normal distribution disturbing and are distributed as follows. These two elements are independent and don’t have serial correlation.

\[ \eta_i \approx iid(0, \sigma^2_{\eta}) \]
\[ v_{it} \approx iid(0, \sigma^2_v) \]

GMM method, unlike the method of maximum likelihood estimators, is a robust estimator, does not require detailed information on the distribution of violate sentences. The method that was used in dynamic
Panel data is based on the assumption that the disturbance terms in equations are non-correlated with the sets of instrumental variables. Fixed or random effects model as may have delay correlations among error variables may result in inconsistent estimate or bias. When the dependent variable in the panel data model appears on the right side as an interruption, other OLS estimates are not consistent. [24]

Due to the nature of this model in this study that the variable with interval equation is in the right equation to estimate the dynamic Integrated model. One of the advantages of the Integrated is to better understanding of dynamic situation by research. Dynamic relationships are interrupted with the dependent variables between explanatory variables in modeling. Therefore, two-stage estimation methods (2SLS) Anderson & Hsiao (1981) or generalized method of moments (GMM) Arrelano and Bond (1991) appealed based on dynamic panel model. According to Matyas and Sevestre (1996), 2SLS estimates may be due to the choice of instruments determine large variances and the estimates of the coefficients are not statistically significant, so GMM was suggested by Arrelano and Bond to solve this problem. In this method continuous variable is used as instruments GMM estimator to fix the gap between the dependent variable and error interruption. Also the consistency of GMM estimators depends on the used valid instruments that can be a powerful estimator due to choosing proper applying tools and by a weighting matrix for variance anisotropy and unknown correlations. [25, 26]

The consistency of GMM estimators are used depends on the credit assuming no correlation between the error components and the authentic s tools. Arrelano and Bond (1991), Arrelano and Bover (1995) and Blondel and Bond (1998) are used to investigate and address this issue by proposing a specific test. In this study, Sargan test which measures the validity of the instruments is used for the limited validity of torque and are used the tools in the estimated equations. [24, 27, 28, 29]

The consistency of GMM estimators are used depends on the credit assuming no correlation between the error components and the authentic s tools. Arrelano and Bond (1991), Arrelano and Bover (1995) and Blondel and Bond (1998) are used to investigate and address this issue by proposing a specific test. In this study, Sargan test which measures the validity of the instruments is used for the limited validity of torque and are used the tools in the estimated equations.

In most of the studies carried out, usually the effects of one variable on regression parameters are analyzed. But one of the strengths points of this study was to investigate the interactions between the three main indicators of trade liberalization, economic growth and income inequality on each other. At each step, one of the main indicators introduced as the dependent variable and estimating will be carried out by using the explanatory and controlling variables and so will continue to be overestimated in three steps. In this study we used trade openness to show the trade liberalization as can be achieved by the sum of imports plus exports divided by GDP and we used foreign direct investment variables and average tariff rate to determine the impacts. Gini coefficient also is used to show income inequality and we used education and health variables, Literacy rate and consumer price index to investigate the effects. Finally, to demonstrate the economic growth rate of GDP and to study their effects we use population growth rates.

According to theoretical arguments and considering the proposed empirical studies about the Trade Liberalization, Economic growth and Income Inequality, such as; Richard Adams (2002), Meschi & Vivarelli (2007) and Rao et al (2011), an experimental model for the study is presented as follows:

**The first model:**

\[ TGP = f(TRM, FDI, GDP, POP, GIN, CPI) \]

\[ TGP_{lt} = \beta_0 + \gamma_0 TGP_{lt-1} + \beta_1 GIN_{lt} + \beta_2 GDP_{lt} + \beta_3 TRM_{lt} + \beta_4 FDI_{lt} + \beta_5 POP_{lt} + \beta_6 CPI_{lt} + \tau_i + \theta_{lt} \]

**The second model:**

\[ GDP = f(TGP, FDI, TRM, POP, GIN, CPI) \]

\[ GDP_{lt} = \alpha_0 + \theta_0 GDP_{lt-1} + \theta_1 GDP_{lt-2} + \alpha_1 TGP_{lt} + \alpha_2 GIN_{lt} + \alpha_3 \log TRM_{lt} + \alpha_4 POP_{lt} + \alpha_5 CPI_{lt} + \alpha_6 \log FDI_{lt} + \varepsilon_i + \delta_{lt} \]
The third model:
\[ GIN = f(TGP, GDP, EDU, PEH, CPI) \]

\[ GIN_{lt} = \varphi_0 + \epsilon_0 GIN_{lt-1} + \epsilon_1 GIN_{lt-2} + \mu_1 TGP_{lt} + \mu_2 GDP_{lt} + \mu_3 EDU_{lt} + \mu_4 PEH_{lt} + \mu_5 CPI_{lt} + \omega_l + \sigma_{lt} \]

"For the abbreviated variables, Theoretical details are given in the last section."

4 Empirical Results

4.1. Unit root tests in panel data

Prior to providing a model, it is necessary to estimate and test the reliability of all variables used in estimations since the reliability of the variables cause problems of spurious regression.

Levine, Lin & Chu (2002) showed that the use of unit root test data in panel data to combine data has the power and reliability more than the unit root tests which have been done for each section separately. Therefore, it is essential to use one of the five panel unit root test methods:

- Levine, Lin & Chu test (LLC)
- Im, Pesaran & Shin test (IPS)
- Breitung test
- Fisher-ADF test
- Hadri Test

These tests often so-called the panel unit root tests. And analyzing reliability of the variables were the same except Hardy method. Thus null hypothesis in the statistic tests of Levin, Lin & Chu, Im, Pesaran & Shin, Breitung and Fisher shows non-stagnation. By rejecting H0, unreliability is rejected and validity of variables is fixed, while in Hadri test the null hypothesis shows stagnation. [24]

In this paper, three types of unit root tests are used to assess reliability of variables, these tests include unit root test of LLC, Fisher-ADF test and IPS.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF-Fisher Chi-square</th>
<th>Im, Pesaran and Shin W-stat</th>
<th>Levin, Lin &amp; Chu</th>
<th>Level of stability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prob</td>
<td>Statistic</td>
<td>Prob</td>
<td>Statistic</td>
</tr>
<tr>
<td>TGP</td>
<td>0.0000</td>
<td>114.640</td>
<td>0.0000</td>
<td>-3.95481</td>
</tr>
<tr>
<td>GDP</td>
<td>0.0130</td>
<td>86.9704</td>
<td>0.0014</td>
<td>-2.98102</td>
</tr>
<tr>
<td>GIN</td>
<td>0.0038</td>
<td>60.0823</td>
<td>0.0125</td>
<td>-2.24089</td>
</tr>
<tr>
<td>CPI</td>
<td>0.0000</td>
<td>160.893</td>
<td>0.0000</td>
<td>-9.31261</td>
</tr>
<tr>
<td>FDI</td>
<td>0.0000</td>
<td>136.191</td>
<td>0.0000</td>
<td>-5.46890</td>
</tr>
<tr>
<td>TRM</td>
<td>0.0001</td>
<td>71.9447</td>
<td>0.0000</td>
<td>-9.47221</td>
</tr>
<tr>
<td>POP</td>
<td>0.0000</td>
<td>346.539</td>
<td>0.0000</td>
<td>-32.0528</td>
</tr>
<tr>
<td>EDU</td>
<td>0.0021</td>
<td>75.6443</td>
<td>0.0089</td>
<td>-2.37106</td>
</tr>
<tr>
<td>PEH</td>
<td>0.0364</td>
<td>35.2586</td>
<td>0.0017</td>
<td>-2.92690</td>
</tr>
</tbody>
</table>

Results of tables and calculated statistics values and their acceptance likelihood show that all variables except the average tariff rate were steady. The average tariff rate varies with making a steady lasting difference.
4.2. Panel Cointegration tests
The most important thing in cointegration analysis is that despite of static time series and a random increase or decrease in the long term, it is possible that a linear combination of these variables be always static, and with no trend. The long-term relationships are discovered by using cointegration analysis. In other words, if every economic theory is correct and there is a relationship in the set of variables, we expect that the combination of these variables on the long-standing become static and without a trend. As in time series, analyzing the variables in the panel data cointegration is also important. Cointegration tests have more credibility and authority compared to each level of panel cointegration tests individually. The tests can be used even when the sample size is small and the period is short. [24]

Cointegration tests of panel data hypothesis are as follows:

\[
\begin{align*}
H_0 & : \rho = 1 \\
H_1 & : \rho < 1
\end{align*}
\]

The null hypothesis suggests a lack of Cointegration between all levels and hypothesis against shows the integration between variables.

In this study, we use both t-panel test type Phillips Perron (PP-Statistic Panel) and Statistic panels test type augmented dickey–fuller showed by Statistic Panel ADF. Group Phillips Perron test statistics type P (Group PP-Statistic) and group Dickey Fuller test (Group ADF-Statistic) will be used to analyze the presence or absence of cointegration relationships among the variables.

Table 2: Panel Cointegration test results

<table>
<thead>
<tr>
<th>Test statistic</th>
<th>Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel PP-Statistic</td>
<td>-8.359462</td>
<td>0.0000</td>
</tr>
<tr>
<td>Panel ADF-Statistic</td>
<td>-1.766041</td>
<td>0.0387</td>
</tr>
<tr>
<td>Group PP-Statistic</td>
<td>-9.698676</td>
<td>0.0000</td>
</tr>
<tr>
<td>Group ADF-Statistic</td>
<td>-4.165693</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

As shown in the results of table and considering the low significance level of 0.05, null hypothesis about cointegration relationship between variables can be rejected and there is a convergence testified by variables of four tests and variables in the long-term are cointegration and there is a long-run relationship between them.

4.3. Model estimation and interpretation of the results

Table 3: GMM results for the first model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGP(-1)</td>
<td>0.171755</td>
<td>5.240944</td>
<td>0.0000</td>
</tr>
<tr>
<td>TRM</td>
<td>-1.209997</td>
<td>-8.369135</td>
<td>0.0000</td>
</tr>
<tr>
<td>POP</td>
<td>-0.419206</td>
<td>-0.512750</td>
<td>0.6089</td>
</tr>
<tr>
<td>FDI</td>
<td>0.655599</td>
<td>4.962675</td>
<td>0.0000</td>
</tr>
<tr>
<td>GDP</td>
<td>0.563710</td>
<td>9.393014</td>
<td>0.0000</td>
</tr>
<tr>
<td>GIN</td>
<td>0.489871</td>
<td>3.669704</td>
<td>0.0003</td>
</tr>
<tr>
<td>CPI</td>
<td>0.313941</td>
<td>8.046588</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

J-Statistic=23.99339
Instrument Rank= 30
Sargan- Test= 0.404174
According to the results of this estimation, the positive impact of delay dependent variable confirms that Expansion of trade in the studied countries requires the stable and long-term macro-economic policy and planning prospective. According to theoretical expectations, reduction of tariff rates, entry of foreign investment and increment of economic growth rate provide further growth of international trade. Increase in the Gini coefficient means the more unequal income distribution in the country. Production specialization according to comparative advantage (that is essential for trade liberalization), caused an increase in the income of the low-income sectors with comparative advantage and a decrease in sectors without comparative advantages. Thus, the advantage of the basic principles of international trade makes the income inequality. Society must accept this fee to use the advantage of the expansion of international trade. However, the expansion of international trade in later steps can create a more equitable distribution of economic growth that reduces inequality. Rising inflation will limit exports, while imports should be encouraged. If the sum of exports and imports increase with the increment of the inflation rate, it means that import has more shares in the international trade of countries than exports. For further understanding of this relationship both the ratio of exports and imports to GDP can be mentioned as the dependent variable and again, the effect of inflation can be seen. This review could be the subject of another study.

Functional studies and the results of this estimate support overall growth rate of the GDP growth rate that was positively related with the degree of openness and internal trade investment, the relationship between openness and population growth is not clear.

Table 4: GMM results for the second model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP(-1)</td>
<td>-0.170066</td>
<td>-1.312221</td>
<td>0.1919</td>
</tr>
<tr>
<td>GDP(-2)</td>
<td>-0.732912</td>
<td>-14.14682</td>
<td>0.0000</td>
</tr>
<tr>
<td>TGP</td>
<td>0.221628</td>
<td>7.517194</td>
<td>0.0000</td>
</tr>
<tr>
<td>LTRM</td>
<td>-3.511648</td>
<td>-1.954737</td>
<td>0.0529</td>
</tr>
<tr>
<td>LFDI</td>
<td>4.059112</td>
<td>8.778116</td>
<td>0.0000</td>
</tr>
<tr>
<td>CPI</td>
<td>-0.392140</td>
<td>-6.879566</td>
<td>0.0000</td>
</tr>
<tr>
<td>GIN</td>
<td>0.279522</td>
<td>3.685490</td>
<td>0.0003</td>
</tr>
</tbody>
</table>

J-Statistic= 13.57150
Instrument Rank= 29
Sargan- Test= 0.915987

According to the results of these estimates, the growth rate has a negative sign. Interpretation of this flag must be given according to the composition of states and degree of development. Economic growth in developed countries could have stable growth due to the strength of the economic infrastructure, but in developing countries, the process is not stable over time due to poor infrastructure and lack of stability because of poor management or economic development strategies. States that have been considered in this study are most of the developed countries that have been in developing path. However, none of Poland and Hungary will be fully developed based on countries ranking by the World Bank in 2011. According to theoretical expectations, liberalization will strengthen economic growth. Gradual reduction of tariff rates and increased export and import growth rates increase economic growth. It is noteworthy that in the second model, changes in tariff, not tariff rate itself, has a negative coefficient. In other words cutting import tariffs at once is not recommended for more economic growth. Since industry-sponsored to adapt trade liberalization competition takes time and results in a gradual reduction of tariff rates. On the other hand, gradually increases in foreign investors can faster economic growth. What's more important than entry of foreign capital in a developing country is how to attract and manage the capital in the economy of country. Proper management of foreign investment, and how to lead them to lucrative business, guarantees
much entrance of foreign investment and this leads to speedy economic growth. Slowly increase in the
general level of prices can help investment and expand production in the economy. So, more increment
reduces the economic growth speed due to the social inequality and tension in country. As explained in
the first detailed model, the allocation of resources and productive tools according to comparative advantage
can make it difficult for sectors without comparative advantage and this may increase the inequality.
However, to achieve long-term economic growth, society is forced to pay the costs.

Table 5: GMM results for the third model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIN(-1)</td>
<td>0.393979</td>
<td>18.97711</td>
<td>0.0000</td>
</tr>
<tr>
<td>GIN(-2)</td>
<td>0.173747</td>
<td>7.230095</td>
<td>0.0000</td>
</tr>
<tr>
<td>GDP</td>
<td>-0.038367</td>
<td>-2.234797</td>
<td>0.0283</td>
</tr>
<tr>
<td>TGP</td>
<td>-0.065317</td>
<td>-2.451158</td>
<td>0.0164</td>
</tr>
<tr>
<td>EDU</td>
<td>-4.54E-07</td>
<td>-6.379177</td>
<td>0.0000</td>
</tr>
<tr>
<td>PEH</td>
<td>-0.410819</td>
<td>-29.51178</td>
<td>0.0000</td>
</tr>
<tr>
<td>CPI</td>
<td>0.136045</td>
<td>4.169960</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Instrument Rank=24
J-Statistic= 14.38519
Sargan Test= 0.639673

According to the obtained results it can be seen that the estimated delay values of the dependent variable
has a positive sign that was consistent with theoretical expectations and shows that Gini coefficient is a
stable process as an index for computing of income distribution inequality over time. Income distribution
in community affected by infrastructure of cultural, social, political and economic variables that take time
to the changes, and in most cases the effects are long-term and thus short-term results can not alter the
distribution of income in society. In other words, all the factors affecting these variables are not necessarily
economic. But economic factors that have been examined in this study includes economic growth, trade
liberalization, literacy rates, educational spending and the inflation rate, all have the expected theoretically
signs and may be predictable on the Gini coefficient. Increment of economic growth rate and trade
liberalization would betterment the distribution of income in society. However, the coefficients of these
variables are small; they represent a minor impact on the income distribution. It should be noted that the
case study of countries in this field, such as a study by Ali Khan & Bashir (2011), Milanovic (2005) and
the Wood, A. (1994) were mostly confirmed by the Kuznets hypothesis that in this hypothesis the increase
in the rate of economic growth and trade liberalization in the early stages worsen income distribution, then
over time, improve income distribution with complementary government policies. [23, 30, 31] Literacy
rate increment and government educational spending improve distribution of income, but the impact of
higher public education spending is more. Rising inflation causes higher inequality and confounding
economic justice.

4.4. Sargan test
Sargan test statistic has been proposed by Arrelano and Bond (1991), Arrelano and Bover (1995) and
Blondel and Bond (1998). The test used to measures the validity of the used instrument. Sargan test is used
to analyze the validity of instrumental variables defined in the model and due to being too specific
equation and defined as follows:

\[ s = \hat{\Sigma}'Z\left( \sum_{i=1}^{N} Z'_i H_i Z_i \right)^{-1} Z' \hat{\Sigma} \]
In this case $\hat{\Sigma} = y - x\hat{\alpha}$ and $\hat{\alpha}$, matrices $K \times 1$ is the estimated coefficients, $Z$ is instrumental variable matrix, $H$ is a matrix with dimensions $(T-q-1)$, where $T$ is the number of observations, $q$ is the number of explanatory variables. We examined two hypotheses to defined validity of the instrumental variables:

$$H_0 = m(\theta_0) = 0$$
$$H_1 = m(\theta) \neq 0$$

In Sargan test, the hypothesis $H_0$ determines the correlation between the instrumental variables and disturbing element and is based on the authentic model. Alternative hypothesis ($H_1$) is based on the invalidity model. Sargan test is asymptotically follows the distribution of $\chi^2$ with degree of freedom of $k-q$, where $k$ equals the number of instrumental variables and $q$ is equal to the number of explanatory variables. To confirm Sargan test in 95% of testing level, calculations $\chi^2$ with degrees of freedom $k-q$ is compared with $\chi^2$ of Table. If calculated $\chi^2$ be less than table $\chi^2$, then $H_0$ is accepted. (variable to obtain the degrees of freedom of table $\chi^2$ detract rated instrumental number of variables from the number of estimated variables in the model).

Also the other way to accept the hypothesis $H_0$ of the Sargan test is to use p-value that if the p-value is up to 0.05, assuming $H_0$ is accepted. To obtain p-value following command is used in Eviews software:

Scalar $pval = @chisq (J-statistics value, Instrument rank – the number of estimated coefficients)$

In This test if the hypothesis $H_0$ does not reject, then valid instrumental variable is defined in the model and the model does not need to define more instrumental variables. But if the hypothesis $H_0$ rejected, the defined instrumental variables in the model were inadequate and it is needed to define a better instrumental variables for model. [24]

$$H_0 : j \langle q \chi^{2-q} \right.$$
$$H_1 : j \rangle q \chi^{2-q}$$

Results for three models show the acceptance of the null hypothesis and there is no correlation between the instrumental variable and disturbing elements. [32, 33]

5 Conclusion

Globalization may sustain or exacerbate economic injustice, but the results are displayed only when the globalization with social infrastructures that reinforce the unfair consequences, come into force. Jan Aret Seholte (1997) argues that the globalization process is neither positive nor negative, we can say, globalization is an adaptation and relates to the adaptation of new situation in countries. The most important dimension of globalization is in economics. Countries inter in the complex network and adapt themselves for being able to achieve a degree of economic growth and development. The criterion for entrance is the ability and willingness to compete. There is a direct relationship between countries' exploiting of globalization and competitiveness. Given the inevitability of globalization, the governments of the studied countries should appear to be consistent with stable and long term economic policies and planning to improve cultural, social and economic infrastructures (For Example, inflation control and improvement of income distribution), with a gradual reduction of tariff rates and resolving non-tariff barriers, encouraging entry of foreign investments, Shaping imports and exports policies and try to increase the balance of economic growth provided further growth of international trade too.
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