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Investigating Relationship between Trade and Income Inequalities

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Abstract

This paper investigates the relationship between trade and regional income inequalities in the period 2001-2010 using panel data for 18 selected developing countries. The results show that trade has a significant and negative effect on regional income inequalities, so that an increase of 1 percent of its value, regional income inequalities 0.09 percent decrease. Also, GDP per capita has a negative impact on regional income inequalities in studied countries. However, the population and agriculture value added have a positive effect on regional income inequalities. It can be said that a 1 percent increase in the variables, respectively, regional income inequalities 0.16 and 0.21 increased.

Key Words*:* Trade, income, income inequalities, panel data.

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Introduction

In the last 30 years, a great deal of empirical and theoretical academic research has been conducted on how globalization and trade affects the social welfare and the

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economic performance. There are no doubts that globalization has enhanced international competitiveness through the increasing flows of productive resources and knowledge around the world. Firms, individuals and states have new opportunities and have expanded their ambitions not only economically, but also socially. Developing countries encounter an imperative challenge because they must find solutions to global issues, as well as keep their economic growth in order to have a sustainable development Globalization is a complex concept to compute due to its subjectivity and it may be defined in countless ways. In economic studies there is a special attention to the role of economic globalization, specifically to the openness of the economy and foreign direct investment (FDI) inflows. Openness to trade is considered one important driving force of globalization because as trade barriers decrease, there will be higher exchange flows of goods, services and capital among several countries. Higher cost competitiveness in the goods market and a general improvement of domestic competitiveness are also consequences of trade liberalization, which decreases costs and increases revenue and profits. On the other hand, FDI makes possible the technological transfer of know-how; it improves productivity, increases exports and consequently increases profits. Besides economic concerns, there is the social and economic relation which is an essential issue when boosting a sustainable growth. Governments must be aware that long term policies are crucial to keep (or achieve) equality within a country (Ines, 2011).

It has been widely documented that income inequality has increased significantly in many countries, especially in the developed countries. In Britain, for example, “chief executives can expect to receive average compensation in excess of $4.5m ($ 6.9m) this year. Pay at the top grew by over 300% between 1998 and 2010. At the same time, the median British worker’s real wage has been pretty stagnant. These trends mean the ratio of executive to average pay at FTSE 100 firms jumped from 47 to 120 times in 12 years.” (The Economist, January 14th-20th, 2012, p.11) It has also been documented that job polarization has occurred in many developed countries, including the United States and some European countries, such that the shares of employment in high-skilled occupations and low-skilled occupations grow while that of middle-wage occupation declines (Acemoglu and Autor, 2011).

The effect of trade on income inequality has long been of interest to economists. Until recently, any theoretical reasoning associated with this subject was generally limited to the Stolper-Samuelson theory. More recently Feenstra and Hanson (1996), and Tang and Wood (2000) have developed theoretical models explaining the relationship between trade and inequality. The Feenstra-Hanson model predicts that increased trade always accompanies more inequality. In the two remaining models, the effect that trade has on inequality depends in part, on the stage of the economic development of the country in question. Both models predict an increase in wage inequality in developed countries. Stolper-Samuelson predicts a decrease in wage

inequality in developing countries while the Tang-Wood model predicts the effect on inequality will depend on the circumstances of the developing country. Wood (2000) provides a summary of the aforementioned theories (Torrez, 2006). Thus, the aim of the present study is to investigate the effects of trade on regional income inequalities in 29 selected counties of the world in period 2001-2010.

Theatrical Background and Previous Empirical Literature

The Hecksher-Ohlin-Samuelson (HOS), which is also referred to as Hecksher-Ohlin-Viner (HOV) model and the Stolper-Samuelson (SS) and Rybczinski(RYB) theorems derived from that model. According to HOS/HOV, under certain assumptions the relative returns to factors of production are proportional to the relative prices of skill-intensive versus unskilled-intensive tradable goods and technology. In the absence of trade barriers, if technology is identical over countries, then wage levels and relative wages are equal over countries, the Factor Price Equalization theorem (FPE). Countries may impose tariffs upon goods in which they do not have a comparative advantage. Thus, the skill-rich North might impose tariffs on the imports of shoes while the South, relatively endowed with unskilled labour, imposes tariffs on imports of computers. The Stolper-Samuelson theorem predicts that a fall in tariffs lowers the price of shoes in the North, raising the relative price of computers versus shoes in the domestic market in the North. In the South the opposite occurs, as falling tariffs on computers lower the price of computers, and hence lower the relative price of computers versus shoes in the Southern domestic market. Because relative wages everywhere are proportional to the domestic relative prices of skill-intensive versus unskilled-intensive goods (here computers versus shoes), trade liberalization leads to rising relative wages in the North and falling relative wages in the South. The Rybczinski theorem is easily understood in this context. With constant tariffs, if the endowments of factors change exogenously in one country, then the relative wages in that country remain unchanged. This is because relative wages are determined by the relative prices of tradable goods in the domestic economy, which are determined by the international relative prices and domestic tariff structure. International relative prices depend upon global supply and demand, and changes in domestic factor supply will not appreciably change global supply. This result is key to the methodology of studying the impact of trade on wages, as discussed below. While changes in domestic relative factor supply do not affect relative factor prices, the domestic sectoral structure of production does shift: output and employment shift towards sectors intensive in the factor that has become more plentiful (Robbins, 2003).

Further arguments related to comparative advantage and Stolper-Samuelson have been put forth to link trade and distribution. Some authors have argued that policies encouraging manufactured exports will lower relative wages in developing countries. The key to this argument is the assumption that the skill content of manufactured exports is lower than for import-competing industries and other exports. Then export-

promotion policies that raise the relative prices of exportable goods versus importable or non-tradable goods, particularly the promotion of manufactured exports, may raise the demand for unskilled workers and tend to equalize the distribution of wages [Krueger (1983), Wood (1994)].

Trade theory and distribution - the drawbacks of broad distributional measures

The Hecksher-Ohlin-Samuelson/Viner trade theory described above relates to relative wages or returns to schooling, not to other non-wage sources of income or broader measures of the distribution of wages or income. However, many studies examine the impact of trade and trade liberalization upon measures of income that include non-wage income and broad measures of distribution, principally Gini coefficients. The reason for using such measures appears to be that they are more readily available than measures of relative wages. Whatever the motivation, using these measures to understand the impact of trade policies on wage structure, and ultimately distribution, is highly problematic because those measures typically reflect factors that are likely to be entirely unrelated to trade policies. The first problem with linking broad distributional measures to trade is that factors other than trade may change the overall distribution even though wage structure might be unaltered. For example, if the dispersion of education or experience (age) rises or falls, the dispersion of wages will rise or fall. This latter effect is referred to as the “composition "effect. Trade theory has had little to say about the determinants of the level or dispersion of human capital. This concern is not merely academic. The distribution of human capital, in particular education and experience in developing countries has often varied rapidly over time, [e.g. Knight and Sabot (1983) Robbins (2001), Barro and Lee (1994)], leading to large composition effects. And the changing level of skill is widely documented as affecting relative wages and hence distribution. The second problem with using broad distributional measures is that, even absent composition effects, they are not precisely linked to relative wages. Of greater concern, though, is the third problem: studies that employ broad distributional measures rarely, if ever, control for the impact of changes in the domestic relative supply of skill upon relative wages. In standard labour market models such relative supply shifts have first order effects upon relative wages – and hence the distribution of wages. Only if the Rybczinski theorem holds can one ignore the impact of relative supply shifts upon wages. In summary, the link between trade theory and broad measures of distribution is tenuous at best. While broad distributional measures may incorporate the effects of trade on wage structure, they also reflect “composition” effects that are unrelated to trade, and rarely do such studies control for the impact of changes in relative supply upon relative wages, or “wage compression effects”. Relative wages or returns to schooling are a far more appropriate measure for measuring the impact of trade on distribution (Robbins, 2003).

Trade and Income Inequality

The traditional model employed by researchers to study the distributional effects of greater openness on income inequality is the Heckscher-Ohlin (HO) model. As reported in Anderson (2005), the model predicts for developing countries that greater openness boosts the demand for unskilled relative to skilled labor, which raises their wage and share of national income relative to skilled labor. This decreases an overall income inequality because unskilled labor is more equally distributed than skilled labor. One of the problems is that the outcomes of the HO model are based on many restrictive assumptions that are far from the real world (Meschi and Vivarelli, 2009).

A number of papers, departing from some of the main assumptions of the HO model, find interesting additional results which conflict with the standard prediction. For instance, Leamer (1987) used a *3-n* model where there are 3 factors of production (capital, labor and land) and *n goods* produced by allowing the inclusion of natural resources into the model, and showed that greater openness may increase income inequality in developing countries that have relatively abundant supplies of those resources. The argument is that greater openness will raise the relative returns to natural resources which are less equally distributed than other assets.

Furthermore, one of the main hypotheses of the HO theory is that all countries have equal access to the best available production technology. In Pissarides (1997), this assumption is relaxed and greater openness to technology may well increase the relative demand for skilled labor, even in developing countries. The reason is that learning and adapting to a new technology always requires the use of skilled labor, whose wages rise. In line with the outcome of Pissarides (1997), Feenstra and Hanson (1999) pointed out that the wage gap between skilled and unskilled workers in developing countries increases if globalization is characterized by the transfer of production technology from developed to developing countries.

In recent years, there has been a growing interest for empirical studies on the distributional effects of trade openness. Among the authors finding that openness increases income inequality, we have Barro (2000) who studied a relationship between inequality and growth and used a panel of countries to estimate a Kuznets curve. After adding an interaction term between the openness ratio and the per capita GDP, Barro (2000) pointed out that the inequality increasing effect of trade openness is most pronounced in poor countries. Also, Lundberg and Squire (2003), estimating simultaneously the evolution of growth and inequality, found that trade liberalization goes along with higher income inequality.

However, other empirical papers support the prediction of the HO model by asserting a decrease in inequality after trade openness (Bourguignon and Morrisson, 1990; Calderon and Chong, 2001; Dollar and Kraay, 2002). In a cross-sectional analysis, the

empirical findings obtained by Bourguignon and Morrisson (1990) suggest that differences in income inequalities within developing countries are determined by the endowments in mineral resources, trade protection and land concentration in agricultural exports. They obtain a significant and large effect of comparative advantages and the foreign trade structure on income inequality. Using a panel of countries, Calderon and Chong (2001) find that an increase in the volume of trade leads to a long-run decline of income inequality.

Alternatively, other scholars show that the effects of trade on inequality are contingent upon the level of countries' factor endowments. Spilimbergo et al. (1999) obtained that the link between trade liberalization and inequality depends on the level of human capital and arable land per capita. They found that trade openness reduces inequality in capital- abundant countries, whereas it increases inequality in skill-abundant countries (Fisher, 2001).

Finally, several studies do not find any significant and systematic impact of greater openness on income inequality (Edwards, 1997; Li et al., 1998).

Rydzek (2013) examined the impact of trade on income inequalities in 13 selected OECD countries. In addition study finds the low levels of income inequality in the countries studied and export trade in the country increases.

De Hoyos (2013) tries to analyze the effects of trade expansion on poverty and inequality in Mexcian economy after joining NAFTA. The study suggests that the poverty headcount ratio would have increased more than 2 percentage points above the observed level of 1996. The relative increase in labor remuneration and participation in the expanding tradable sector helped cushion the negative income effects of the peso crisis.

Monir et al (2013) studied the relationship between trade and income inequalities in Pakistan in the period 1972-2008 by using VECM and Johanson & Joselius methods. Estimation results indicate that no significant relationship between trade liberalization and income inequality in Pakistan in the interval of time under study.

Oloufade (2013) examined the effect of trade openness on income inequality in 39 selected developing in the period from 1984 to 1999. The results suggest that trade liberalization has a negative effect on income inequality, which means that increasing trade with the countries studied, income inequality decreases.

Furusawa and Konishi (2013) in the analytical study have investigated the effects of international trade and income inequality. The results show that trade liberalization leads to an increase in exports to countries which can be helpful in reducing income inequality.

Szekely and Samano (2012) studied the effect of trade openness on income distribution in 18 Latin America countries in period 1980 to 2010. The results show that the liberalization of trade in previous decades did not represent a permanent obstacle for improvements in income distribution thereafter. One example is the prevalence of the inequality-reducing forces generated by the secular increases in the skill level of the population, which seem to have dominated the arena in the distributional dynamics in Latin America during the 2000s decade.

Bouet et al (2012) examined the effects of trade liberalization on urban-rural remittances and income inequalities in Senegal by CGE analysis. In this study they explore by working on Senegal, and to deepen it, they design a single-country computable general equilibrium (CGE) to capture all the redistributive channels implied by domestic transfers in an African economy. This model is then used to simulate macroeconomic shocks liberalization and they show the importance of introducing micro foundations of domestic transfers in a general equilibrium to better capture the effects of trade liberalization on domestic income inequalities. They test the robustness of our results, by using alternative micro founded specifications of domestic transfers.

Gruber (2011) investigated the relationship between trade liberalization and inequality. Results showed that falling trade barriers are not an important source of increasing pay inequality among executives.

Rodriguez (2010) examines the relationship between openness and within-country regional inequality across 28 countries over the period 1975–2005, paying special attention to whether increases in global trade affect the developed and developing world differently. The results showed that while increases in trade per se do not lead to greater territorial polarization, in combination with certain country-specific conditions, trade has a positive and significant association with regional inequality. Also changes in trade regimes have had a more polarizing effect in low and middle-income countries, whose structural features tend to potentiate the trade effect and whose levels of internal spatial inequality are, on average, significantly higher than in high-income countries.

Research Method and introduce the model and variables

Panel Data

Panel data is data from a (usually small) number of observations over time on a (usually large) number of cross-sectional units like individuals, households, firms, or governments. In other words panel data analysis is a method of studying a particular subject within multiple sites, periodically observed over a defined time frame. With repeated observations of enough cross-sections, panel analysis permits the researcher to study the dynamics of change with short time series. The combination of time series with cross sections can enhance the quality and quantity of data in ways that would be

impossible using only one of these two dimensions (Gujarati, 638). Some more advantages of panel data as given in 'Basic Econometrics' by Gujrati are:

- Since panel data relate to individuals, firms, states, countries, etc over time, there is bound to be heterogeneity in these units. The techniques of panel data estimation can take such heterogeneity explicitly into account by allowing for individual-specific variables.

- By studying the repeated cross section of observations, panel data are better suited to study the dynamics of change.

- Panel data can better detect and measure effects that simply cannot be observed in pure cross-section or pure time series data.

- By making data available for several thousand units, panel data can minimize the bias that might result if we aggregate individuals or firms into broad aggregates.

Panel Data Regression

Panel data analysis endows regression analysis with both a spatial and temporal dimension. The spatial dimension pertains to a set of cross-sectional units of observation. These could be countries, states, counties, firms, commodities, groups of people, or even individuals. The temporal dimension pertains to periodic observations of a set of variables characterizing these cross-sectional units over a particular time span. There are several types of panel data analytic models. There are constant coefficients models, fixed effects models, and random effects models etc. The Constant Coefficients Model has constant coefficients, referring to both intercepts and slopes. In the event that there is neither significant country nor significant temporal effects, we could pool all of the data and run an ordinary least squares regression model. This model is also called the pooled regression model. The Fixed Effects Model would have constant slopes but intercepts that differ according to the cross-sectional (group) unit—for example, the country. Although there are no significant temporal effects, there are significant differences among countries in this type of model. While the intercept is cross-section (group) specific and in this case differs from country to country, it may or may not differ over time. The Random Effects Model assumes a regression with a random constant term (Greene, 2003). One way to handle the ignorance or error is to assume that the intercept is a random outcome variable. The random outcome is a function of a mean value plus a random error. But this cross-sectional specific error term which indicates the deviation from the constant of the cross-sectional unit must be uncorrelated with the errors of the variables.

Data and Variables

The study population consisted of 18 selected developing countries of the world, Argentina, Armenia, Brazil, Colombia, Costa Rica, Dominican Republic, Guatemala, Honduras, Indonesia, Iran, Mexico, Malaysia, Peru, Romania, Russia, Ukraine, Uruguay and Venezuela respectively. Period is used 2001-2010. Time series data from these countries have been collected from WDI 2013. The model presented in this research paper inspired by Rodriguez (2010) is as follows:

$$LGINI_{it}=\beta_0 + \beta_1 L(TRADE_{it}) + \beta_2 L(GDPC_{it}) + \beta_3 L(POP_{it}) + \beta_4 L(AGR_{it}) + U_i \quad (1)$$

$LGINI_i$: Logarithm of Gini coefficient of country i

$LTRADE_i$: Logarithm of the of the degree of economic openness (the ratio of the sum of exports and imports to GDP) as a percentage of GDP for country

$LGDPC_i$: Logarithm GDP per capita of country i

$LPOP_i$: Logarithm of market access in terms of population for country i

$LAGR_i$: Logarithm of agriculture value added (% of GDP) of country i

Empirical Analysis

Checking Stationary of variables

If the time series are non-stationary, the estimated coefficients will lead to a spurious regression. So before estimating the model it is required to check the stationary statues of all variables used in the estimates. In Contrast to what is customary in the case of time series, to test the reliability of the model, Dickey - Fuller and Augmented Dickey - Fuller cannot be used, but the reliability of the collective variables needs to be tested. For this purpose, the Levin, Lin & Chu (LLC), Im, Pesaran and Shin (IPS), Augmented Dickey – Fuller (ADF-Fisher), Fisher - Phillips and Peron (PP-Fisher) test presented by Maddala & Wu (1999) and Choi (2001) tests are used. These four tests are most important Common unit Root tests in panel data. Although Different methods of common unit root tests may provide conflicting results on panel data. In all these tests the null hypothesis is the presence of a unit root. This study Check the Stationary of variables by the Levin, Lin & Chu test. The null hypothesis indicates the non-stationary variables. Examining the calculated values of statistics and their probability shows that the null hypothesis based on the non-stationary variables on confidence level of 99 % is rejected. Table 1 shows the results of common unit root test of Levin, Lin & Chu test with intercept and trend on used variables for investigating the effect of trade on income inequalities in selected countries.

Table 1: Results of stationary of variables using LLC Statistics

Variables	LLC Statistics	Prob.	Stationary
LGINI	5.5798	0.0000	Stationary
LTRADE	5.8576	0.0000	Stationary
LGDPC	2.8782	0.9980	Non Stationary
D (LGDPC)	7.3860	0.0000	Stationary
LPOP	11.2570	0.0000	Stationary
LAGR	6.7067	0.0000	Stationary

As stationary test results show, all variables used in the model except the GDP at the level of with intercept and trend are stationary. In other words, all stacked variables are of order I (0), but GDP is I (1).

Results of F- Lymr and Houseman test

Table 2 shows that the value of F test statistic using fixed effects would be more appropriate. Houseman also test statistic indicates the suitability of the method for estimating the fixed effects model.

Table 2: Results of F-Lymr and Houseman test of the estimated model

Test	F-Lymr Test	Houseman Test
Statistics	7.2448	34.2480
Prob.	0.0000	0.0000

The Estimation Results

Accordingly, the results of model estimation are introduced to determine the effect of trade on income inequalities using a fixed effects panel data are presented in Table 3. It is due to the logarithmic nature of the model, the coefficients of variables are expressed traction.

Table 3: Results of estimating the effect of Trade on Regional Income Inequalities

Variables	Coefficient	T Statistics	Prob.
LTRADE	-0.3398	-2.7883	0.0059
LGDPC	-0.1998	-5.1043	0.0000
LPOP	0.2429	5.6014	0.0000
LAGR	0.3570	3.3746	0.0009
R^2 =0.6332	$\overline{R^2}$ =0.6247	D-W =1.87	

The results show that all the coefficients of the variables using a fixed effects model was statistically significant and have the theoretically expected signs. Trade and GDP per capita have a negative effect and population and agriculture value added have a positive effect on income inequalities during the period under study were 18 selected developing countries. As you can see, with a 1% increase in trade, income inequalities rate of 0.3% decrease. When the trade grows, exports and imports are increasing; this issue can be caused by increased production in various sectors, causes an increase in the level of income of the population and reduce the income inequalities. The estimated elasticity for GDP per capita is equal to -0.19. It shows that 1% increase in GDP per capita, income inequalities rate of 0.19% decrease. Increase in a country's GDP per capita, leads to economic conditions improve, and consequently income increased and economic growth is achieved. Improve facilities, increase employment, reduce unemployment, and improve health facilities and the implications of increase production levels and progress of a country. It can therefore be expressed the GDP per capita makes the improving in whole economic and social welfare of the community. With progress in different sectors, share and backward areas will increase the level and distribution of wealth and income; this will reduce inequality in the central region and consequently the surrounding areas. Uncontrolled population growth is one of the most important factors for sectorial and regional disparities are. Increasing concentration of population in the country and at the regional level will have a positive effect on inequality. Consequences of such an event cause loss of quality of life and increase economic deprivation, social and psychological. Thus, with increasing population and inefficient management, disparities in different sectors the country and divide grows more every day. Finally, the agriculture value added has a direct relation to the increase in income inequalities which indicates that a 1% increase in agriculture value added, income inequalities increased by 0.35 percent increase. Agriculture and its value is a factor in the growth of one of the three countries. With the rise of agriculture, share of national production and national income in developed and developing countries will be growing process. So in general, can be concluded, increasing the share of manufacturing value added in agriculture, national income and national wealth will increase, this boundary will reduce regional disparities. But the trend in some developing countries, due to a not conversion from traditional agriculture to industrial mode, whereby causes an increase in government spending, than in developed countries is quite industrial, will be lower. In this study, most of the developing countries than in developed countries, there is a direct relationship between agriculture's shares of regional inequality. R^2 estimated by the model is equal to 0.63. In their model the correlation is not observed, because Durbin Watson 1.87 to clarify this issue.

Conclusions

Today, unbalanced growth, one of the most important has become among countries. There is a dichotomy in migration, population growth poles has been confirmed. In this

paper, we examined the effect of trade income inequalities for 18 selected developing countries using a panel data for the period 2001-2010 were studied. The results showed that the trade has a negative and significant effect on income inequalities in studied countries. Also GDP per capita has a negative effect on income inequalities, so that we can say when GDP per capita increases, the amount of inequality is reduced. As well as the estimated elasticity is positive for the population. This indicates that there is a direct relationship between population and inequality. Then be acknowledged, as the population increases, levels of inequality increased. Finally, the elasticity of the agriculture value added is also positive obtained in studied countries. So, Increase in value-added agriculture, will increase the inequality.

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