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THE EFFECT OF FTAS ON INCOME INEQUALITIES: WITHIN COUNTRIES

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Abstract

In the mid-1990's, the number of free-trade agreements has increased rapidly. At the same time, it has been said that income inequality increased in many nations of the world. However, it is still a matter of huge debate among scholars whether FTAs increases or decreases income inequality.

Using the unbalanced as well as 5 year-intervals panel dataset of 124 countries over the period 1988-2012, the present study assesses the impact of FTA on income inequalities within-countries. Differing from the existing empirical literature, this study aims to examine the effect of market integration on income inequalities of a country by utilizing the new explanatory variable FTA (Free Trade Agreement). In the framework of neoclassical trade theory, it has been found that increases in FTAs lead to greater income inequalities within-countries. However, the interaction between FTAs and factor endowments, it has been found a negative and significant association with inequality.

Keywords: Free Trade Agreements (FTAs), Income Inequality, Heckscher-Ohlin and Stolper-Samuelson theorem (HOSS)

I. INTRODUCTION

One of the most robust trends in the last two decades of the twentieth century has been a rise in within – country income inequality in many countries. This rise in inequality has been observed in both developed and developing economies.

Some scholars say that one possible explanation for this increasing income inequality is the, in general, globalization and/or trade liberalization. The effect of trade liberalization on income inequality has received widespread attention. However, the effect of trade liberalization on income inequality is still the cause of huge debate whether it is associated with worsening or improving income disparities within – countries.

According to the Heckscher-Ohlin and Stolper-Samuelson (HOSS)'s theoretical framework, trade openness has an equalizing effect in developing countries and raise income inequality in developed countries. More specifically, in developed countries, with an abundance of skilled labor, wages of skilled labors increase relative to unskilled labors and thus inequality rises with the trade. In contrast, the wages of unskilled labor increases in developing countries and consequently, inequality declines with the trade.

Although, in reality, several East Asian countries have experience with the reduced income inequality with trade, and the

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Latin American countries experienced increased income inequality following by the trade.

A number of studies have empirically examined the relationship between trade openness and income inequality. Utilizing various measures of trade openness, such as trade flows, tariffs or capital flows, some of them found evident results with a theoretical standpoint whose income inequality increases in developed countries and decreases in developing countries with the trade. However, others suggest that developing countries experience increased inequality due to trade liberalization and increased openness.

In brief, a number of studies still remain mixed and ambiguous. For instance, some authors have found evidence supporting the results of the Heckscher-Ohlin model (Wood, 1994; Bourguignon and Morrisson, 1990; Calderón and Chong, 2001; Dollar and Kraay, 2004; Hanson and Harrison, 1999). Other authors have found no correlation whatsoever between trade liberalization and income distribution disparity (Edwards, 1997; Li, Squire and Zou, 1998). Finally, several authors have highlighted the existence of empirical evidence that contradicts the Stolper-Samuelson theorem (Barro, 2000; Lundberg and Squire, 2003; Milanovic and Squire, 2005). While, Bergh and Nilsson (2010) used the KOF index of globalization and the Fraser index of economic freedom and concluded that reforms in favor of economic freedom tend to increase inequality in wealthier countries, confirming the results of the Stolper–Samuelson theorem. As for middle-and low-income countries, it has been found that the main driver of the rise of income inequality is social globalization, one of the KOF index components comprising the number of telephone calls and the number of internet users, among other indicators.

As regarding above mentioned controversial and divisive findings on the relationship between trade openness and income inequality, this study aims to examine the effect of trade openness on income inequality, motivated by the theoretical framework as well as empirical specification. Differing from the existing empirical works, this study utilizes new market integration measure, Free Trade Agreements (FTAs).

The study is organized as follows. Section 2 reviews the theoretical background. It produces a brief introduction to the concept of income inequality. Then, theoretical and empirical literature will be presented. In section 3, the model, the econometric methodology and the data will be discussed. Section 4 introduces the empirical results and section 5 gives concluding remarks.

II. THEORETICAL FRAMEWORK

1. UNDERSTANDING CONCEPTS OF INCOME INEQALITY

The concept of inequality involves three different levels: national (within-countries) inequality, international (between-countries) inequality and global (between all citizens of the world) inequality.

The “National Inequality” refers to the within-countries economic disparity. It is calculated as the national GDP per capita, but it weights them by the population size of the respective countries. It thus begins to approach global inequality (inequality across world individuals) because the number of people who live in various countries is taken into account, even if they are all assumed to have the average income (GDP per capita) of their country.

The “International Inequality” wherein the unweighted international inequality is the inequality calculated across the unweighted GDPs per capita of all countries in the

world. It is similar to the so-called sigma convergence/ divergence, except that we use a more common measure of inequality, the Gini coefficient, rather than the standard deviation of logs. It basically assesses whether there has been or not convergence among countries' mean income[1].

The "Global Inequality" refers to differences between all individual people in the world. The global inequality is calculated inequality across world citizens, taking in principle everybody's actual income into account[2].

In the present study, focusing on inequality at a national level; distribution of income among people within each country which is measured by income inequality index – Gini. The Gini coefficient will be discussed more detailed below.

2. THE GINI COEFFICIENT

The variable used to measure the concept of inequality is the Gini index (dependent variable). It is the most commonly used measure of income inequality. Named after the Italian statistician Corrado Gini, the Gini index calculates the extent to which the distribution of income deviates from a perfectly equal distribution. The Gini coefficient ranges from the value 0 for complete equality and 1 for complete inequality. Above 0.4 is considered to be high inequality.

I use the Gini index[3] simply which is taken from "All the Ginis" database of World Bank-Income Inequality Database because it contains more Gini values. It actually includes among its Gini values "All the Ginis" from World Income Distribution (WYD) database. This database represents a compilation and adaptation of the Gini coefficients retrieved from five international datasets, as follows:

- The Luxembourg Income Study (LIS) dataset that includes 31, mostly developed, countries (140 Gini observations entirely obtained from direct access to household surveys);
- The Socio-Economic Database for Latin America and the Caribbean (SEDLAC) that includes 20 Latin American and Caribbean countries (198 Gini observations entirely obtained);
- The World Income Distribution (WYD) dataset that covers 146 countries (Gini observations' 75% percent obtained from direct access to household surveys);
- World Bank East and Central Europe (ECA) database that contains 28 countries (229 Gini observations entirely obtained from direct access to household surveys); and
- World Institute for Development Economic Research (WIDER-WIID1) dataset that includes 119 countries (882 Gini observations compiled from various sources, some of which are based on direct access to household surveys and others to grouped data).

These five sources are used to create a new and relatively consistent, dataset called "All the Ginis". Since WYD provides a comprehensive country coverage, even if

1Milanovic (2006)

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limited in the time dimension, and it also provides the data for some country/years which were not present in the LIS, SEDLAC or WIDER datasets, it was thought useful to —not only present the five data sets side-by-side, but combine them. The variables represent new variables based on a combination of the five datasets.
In addition, the following other sources were also used to increase the coverage. As for the advanced economies, the EUROSTAT (European Commission Statistical Database), and the OECD (Organization for Economic Co-operation and Development) inequality database were used. In addition, the WDI (World Development Indicator), and the ECLAC (Economic Commission for Latin America and the Caribbean) data is used for remaining economies of the Latin American and Caribbean region.

However, there were still missing observations on the Gini index. Due to the missing observation, it has been utilized unbalanced panel data[1]. The previous literature utilized not only the unbalanced panel, but also the 5 year-interval Gini data. White and Anderson (2001), Dollar and Kraay (2002) and Spilimbergo et al. (1999) utilized the unbalanced single year data on the Gini coefficient. While Measchi and Vivarelli (2008), Higgins and Williamson (1999), Calderong and Chong (2001), Lundberg and Squire (2003), Milanovic (2005) and Fischer (2001) used the 5–year-period average Gini on their studies. Therefore, it has also been attempted to test whether 5 years period average data show similar or different result than single year unbalanced panel.

It cannot be approved that the Gini coefficient is always an adequate measurement of income inequality. As it has been pointed out by Spilimbergo et al. (1999) among others, there is no satisfying measurement of income inequality today. Nevertheless, there are a number of different ways to calculate the personal income distribution. The Gini coefficient or the Gini index is the most widely used among scholars.
As mentioned before, the Gini coefficient is an aggregate numerical measure of the income inequality ranging from 0 (perfect equality) to 1 (perfect inequality). It is measured graphically, by dividing the area between the perfect equality line and the Lorenz curve by the total area lying to the right of the equality line in a Lorenz diagram shown by graph 1. The higher the value of the coefficient, the higher the inequality of income distribution; the lower it is, the more equal the distribution of income. It should be noted that the Gini data used in this study is a Gini index equal to 100* Gini coefficient, i.e. a value of 100 would indicate complete inequality.

One familiar interpretation of this coefficient comes from the Lorenz curve, which graphs the cumulated income shares versus the cumulated population shares, when the population is ordered from low to high per capita incomes. In this context, the Gini coefficient can be computed as twice the area between the 45-degree line that extends northeastward from the origin and the Lorenz curve[2].

3. THEORETICAL BACKGROUND AND PREVIOUS EMPIRICS

1 In the first, I constructed balanced panel dataset by interpolating Gini coefficients since Gini is known not to change significantly from one year to another. However, most other studies utilize unbalanced dataset and 5 or 10 years average periods of Gini index. Therefore, I decided to follow existing empirical works.

2 Barro (2000).

This section draws a basic theoretical framework to identify the channels through which FTA can affect the income inequality. It also discusses the empirical evidence based on theoretical aspects.

1) Theoretical Background

The principal framework for understanding the analytical link between FTA and inequality is the Heckscher-Ohlin and Stolper-Samuelson (HOSS) theorem. In the 1930s, the Swedish economists Eli Heckscher and Bertil Ohlin developed their theory which predicts that a country exports goods that are intensive in the use of its "abundant" factor and imports goods that intensively use its "scarce" factor.

The American economists Wolfgang Stolper and Paul Samuelson further developed this theory in the 1940s. It predicts that in a two-country and two-factor framework, increased trade openness would reduce the real wages of the scarce factors and increases the demand for those of the abundant factors. In general, this means that in developed countries (such as the United States, with an abundance of skilled labor[1]), wages of the skilled workers should increase in relation to the unskilled workers in developing countries. Consequently, inequality will increase in developed countries. In short, trade openness will lead to a reduction in inequality in developing countries and an increase in inequality in developed countries.

The HOSS framework is further extended to account for multiple skill-related categories of workers (Wood, 1994), country groups (Davis, 1996) and traded goods (Feenstra and Hanson, 1996, 1997, 2003).

Wood (1994)'s model assumes two factors of production skilled and unskilled labor and two countries, the North (developed countries) and the South (developing countries), each producing two commodities (skilled and unskilled labor-intensive). The prediction is that trade openness should increase the relative demand and prices for unskilled labor in the developing countries and lead to a better distribution of wages in low skilled labor abundant countries.

Davis (1996) argues that theoretical link between trade and income distribution in the HOSS model may be reversed if one takes into consideration the country's production factor abundance (capital and labor). The fact is that a rich country can be thought as capital abundant relatively to its production and that its wages will be reduced by trade.

However, a growing share of trade occurs when intermediate goods and firms increasingly engage in "global production sharing". Trade in intermediate goods and global production sharing can affect the wage inequality through its influence on the wage gap between the skilled and unskilled workers, and through its differential effects on wages of workers in different industries, occupations and firms.

Feenstra and Hanson (1996, 1997, 2003) emphasized the growing importance of trade in intermediate inputs (i.e. production sharing or outsourcing). They show that recent trade liberalizations with the removal of restrictions on capital flows and technological change have enabled firms to "outsource" some stages of production to cost-minimizing locations abroad, either through the imports of intermediate inputs or by setting up their own production facilities in a host country. LDCs are yet to engage in more sophisticated channels of trade: trade intermediate inputs.

However, all these models by Wood (1994), Davis (1996) and Feenstra and Hanson (1996, 1997, 2003) are directly derived from the HOSS approach. They borrow the

1 An alternative factor of production for this example would be well endowed with capital.

central idea that the return to factors of production is conditional on their relative distribution among countries.

On the one hand, the classical trade theory predicts that the effect of a greater openness on the income distribution depends on the endowment factors. On the other hand, a large part of the literature has focused on the impact of trade liberalization on inequality and labor markets, both at the household and firm level[1]. Studies looking at the impact of wage inequality post trade liberalization and integration in Mexico show that contrary to the HOSS models, the ratio of skilled to unskilled wages increased dramatically[2].

The theory and emerging empirical evidence about firms' relocation, founded in the standard theory, i.e. the Heckscher-Ohlin model, suggests that trade in tasks affects the global income inequality, particularly in the developing countries, due to skill differentials and a relative return to skills. That is, rising inequality of skilled/unskilled wages, relative skill abundance, and the persistence of international differences in factor prices, results from the acceleration of globalization. Thus, services traded internationally at an arm's length generate gains from trade, and their effects on production, national income, and economic welfare (i.e. employment and wages) are not qualitatively different from those of the conventional exchange in goods[3].

However, instead of studying the well-extended models of the trade and income inequality relationship, the study focused more on the fundamental theory which shows the link between openness and inequality.

2) Previous Empirical Studies

This section describes the empirical research which has been undertaken in recent years toward testing various effects of trade openness on income inequality.

The empirical findings on the relationship between trade and income inequality are mixed. It means the effect in either direction can be positive or negative in previous literature[4].

To the best of our knowledge, there were found dissimilar findings which examine the trade effect on the income distribution.

The first group of studies deals with whether the trade openness leads to an increased income inequality in all countries. This is more loosely related to economic theory than the following two, although it has been argued that openness, in general, tends to increase the vulnerability of the economy, especially in developing countries.

$$INQ_{it}=\alpha_0+\alpha_1 openness_{it}+\alpha_2 Z_{it}+e_{it}$$

INQ represents an aggregate measure of inequality, $openness$ is a measure of openness (openness to capital flows, openness to trade, FTA, etc.) and Z is a set

1 Hanson and Harrison (1999), Feliciano (2001), Galiani and Sanguinetti (2003), Robertson (2004), Goldberg and Pavnick (2005), Nicita (2009).

2 Hanson and Harrison (1999). Feenstra and Hanson (1997), Robertson (2004), Nicita (2009).

3 Feenstra (1998).

4 A summary of previous empirical evidences can be found in Table 1.

of control variables that are thought to affect inequality. The subscripts i and t represent country i at time t. This hypothesis is more loosely related to economic theory than the following two, although it has been argued that openness, in general, tends to increase the vulnerability of the economy, especially in developing countries.

However, there is almost no support for this approach. White and Anderson (2001), Ravallion (2001), Dollar and Kraay (2002), Edwards (1997), and Calderon and Chong (2001) found no results according to which trade openness increases inequality in all countries. Dollar and Kraay (2002) found that openness has no systematic and significant effect on inequality.

They consider a number of factors that might have direct a impact on the incomes of the poor through their effect on income distribution. Openness to international trade is found to raise incomes with marginal systematic effect on income distribution. However, the finding might be biased by the empirical specification and the set of countries. Edwards (1997) suggests that there is no evidence between openness or trade liberalization and increased inequality. However, this finding may have related with cross-country regression studies. Calderon and Chong (2001) show that the intensity of capital controls, the exchange rate, the type of exports, and the volume of trade appear to affect the long-run distribution of income. They use an unbalanced panel data set of developed as well as developing countries which have been organized in 5-year averages for the period 1960-1995 and apply a class of estimators that helps control for country heterogeneity and especially for problems of joint endogeneity of the explanatory variables.

On the other side, Barro (2000) and Lundberg and Squire (2003) showed different conclusions. Using fixed effect estimation, Barro (2000) found that trade openness (proxied by adjusted trade to the GDP ratio) can have an effect to raise inequality within all countries. Employing two alternative openness indicators, Lundberg and Squire (2003) showed that trade openness increases inequality in all countries. They found the de jure openness indicator; Sachs-Warner (1995)[1] considers that it positively affects the income inequality. However, they found no correlation between openness and inequality when using the de facto openness ratio, measured by the sum of exports and imports as a percentage of GDP. These findings are also supported by Dollar and Kraay (2004).

The second group of studies evaluate whether the trade openness increases the income inequality in developed countries, but reduces in developing countries. The

1The index is constructed by Sachs and Warner (1995), is dummy variable for openness based on five individual dummies for specific trade-related policies. Relying on this index, a country is classified as closed if it displays at least one of the following characteristics: Average tariff rates of 40 percent or more; Non-tariff barriers covering 40 percent or more of trade; A black market exchange rate that is depreciated by 20 percent or more relative to the official exchange rate, on average, during the 1970s or 1980; A state monopoly on major exports; A socialist economic system.

central idea is typically derived from the basic 2x2x2 HO model. As mentioned in the theoretical background section, it says that a greater openness generates increased income inequality in developed countries, but reduced inequality in developing countries.

Developing countries are thought to have more unskilled labor relative to skilled labor (and/or relative to capital), while the opposite is thought to be the case in developed countries. Skill is assumed to be unequally distributed across the population and the increase in the relative demand for skilled labor in developed countries as a result of trade would therefore raise the income inequality. In developing countries the effect would be the opposite: as the demand for the equally distributed factor unskilled labor increases with trade, inequality falls.

$$INQ_{it}=\beta_0+\beta_1 openness_{it}+\beta_2 openness_{it}\cdot Y_{it}+\beta_3 Z_{it}+e_{it}$$

Y is a measure of the income level of a country, either a quantitative measure such as GDP per capita or a qualitative measure such as (high/low/middle-income country, OECD/non-OECD).

However, the existing works do not show any clear conclusion on a given theoretical framework. Results are mixed and conflicting. An important issue is that different authors reach different and contradictory results depending on the different econometric method of estimations, different definitions of variables (different proxies for the same variable) and different sample (cross-section or panel data analysis, small sample or not).

Calderong and Chong (2001), Savvides (1998) and Milanovic (2005) found that a greater openness reduces the inequality in developing countries. Savvides tries to find the impact of trade policy on the income inequality for a cross-section of developed and developing countries using the trade protection index advanced by Lee and Swagel (1997) and the data on income distribution from Deininger and Squire (1996). The author found that the trade protection does not contribute significantly to the increase of inequality in developed countries. However, trade protection and changes in income distribution are negatively related to the developing countries.

Barro (2000), Ravallion (2001), and Rodriguez (2010) showed that openness increases in inequality in developing countries. However, Dollar and Kraay (2002), Edwards (1997) and Higgins and Willamson (1999) found that there is no significant effect of openness on inequality at any level of development. In contrast, Bergh and Nilsson (2010) used the KOF[1] index of globalization and the Fraser index of economic freedom

1KOF index is combined six groups: actual flows of trade and investment, restrictions, political integration, data quantifying the extent of personal contact with people living in foreign countries, data measuring transborder flows of information, and a proxy for cultural integration.

and concluded that reforms in favor of economic freedom tend to increase inequality in wealthier countries, confirming the results of the Stolper-Samuelson theorem.

The third group of studies is more corresponding to country's relative factor endowment, examining whether a greater openness has different effects on the income inequality depending on the countries' factor endowments.

$$INQ_{it} = \gamma_0 + \gamma_1 openness_{it} + \gamma_{2j} openness_{it} \cdot E_{ijt} + \gamma_3 Z_{it} + e_{it}$$

E is a set of variables representing the factor endowments, each one relative to labor, which interacts with the openness measure. Each coefficient γ_{2j} measures the direction and amount by which the effect of openness on inequality varies according to a country's endowment of factor j (relative to labor).

Bourguignon and Morrisson (1990), Spilimbergo, Londono and Szekely (1999) and Fischer (2001) found that the effect of openness decreases inequality as the countries' endowment of capital increases.
However, the effect of openness has no effect on countries' endowments of arable land per capita. They also both found that openness increases inequalities as countries' endowment of human capital increases.
Based on theoretical predictions, Spilimbergo et al. (1999) studied the impact of trade openness on inequality depends on the relative factor endowments. The result shows a negative link between trade and income inequality in countries that are relatively capital-abundant.

Gourdon et al. (2008) studied how the trade policy within the country (expressed by tariff measure) changes the income inequality, while disaggregating the factor endowments. Taking the standard factor-endowment model, their overall results suggest that changes in inequality are correlated with changes in tariffs.

Meschi and Vivarelli (2008) conducted the unbalanced panel data for 65 developing countries in order to examine how trade significantly affects inequality. Unlike other studies, their trade liberalization variable is not expressed by trade to the GDP ratio but trade flows. In doing so, authors employed the FDI model of Feenstra and Hanson[1] (1996, 1997), in which the skill-intensive technologies shift from developed to developing countries through trade channels and increase in the skilled labor demand and the relative wage. An increase in skilled labor demand becomes the main channel through which trade can affect the income inequality. Consistent with the previous evidence, their results suggest that the total aggregate trade flows are not significantly related to the income inequality in developing countries.

Jamoutte et al. (2008) studied not only the trade liberalization effect on income inequality but also the financial liberalization utilizing the data of capital stock, total cross border assets, the stock of inward FDI private credit. The authors utilized two different trade openness data, namely the de facto and de jure trade openness. the de facto trade openness data is expressed by trade-to-GDP ratio and de jure trade openness is calculated as 100 minus tariff rate. Their main result was the financial

1 Feenstra and Hanson (1996, 1997) found that exports from developing to developed countries appear to be significantly and positively correlated with income inequality. This finding is also concluded in the case of transition economies.

liberalization and the foreign investment income inequality. In contrast, the trade liberalization reduces the income inequality in the case of both developed and developing countries.

The most recent empirical work done by Bensidoun et al. (2011) extended Spilimbergo et al. (1999)'s work and tried to re-evaluate the link between international trade and income disparity in the framework of factor endowments' theorem. The authors try to examine the impact of international trade patterns by measuring the factor content of trade. The findings showed that a change in the factor content of trade has a significant effect on income distribution. More detail, the authors found that an increase in the labor content of trade, in comparison to the capital content of trade, increases income inequality in poor countries, but tends to reduce inequality in rich countries.

Given the diversity of findings in theoretical and empirical studies, the question on the relationship between trade openness and income inequality remains open. Therefore, I try to shed light on this topic both on the basis of the theoretical and empirical perspectives.

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III. MODEL, ECONOMETRIC METHODOLY and DATA

1. THE BENCHMARK MODEL

I start exploring the traditional HOSS prediction that trade openness has different effects on income inequality depending on factor endowments. In addition, I bring factor endowments, which is interacted with the FTA variable to isolate the effects of differing endowments on income inequality. Most of the previous studies introduce relative endowments interacting term with the openness measure (e.g. Bourguignon and Morrisson 1990; Spilimbergo et al. 1999; Fischer 2001). This allows testing whether the conditional correlation of protection on inequality is sensitive to factor endowments.

The equation (1) below is the baseline equation to be estimated:

$$Gini_{it} = \alpha_0 + \beta_1 \ln FTA_{it} + \beta_2 \ln FTA_{it} * \ln ¿ K/L ¿_{it} + \beta_3 \ln FTA_{it} * SKILL_{it} + \beta_4 \ln FTA_{it} * SKILL_{it} * ln ¿ K/L ¿_{it} + e_{it} \quad (1)$$

$Gini_{it}$ is the Gini index of country i in time t . i = 1, 2, ... , 124, t= 1988 – 2012.

It should be noted that the Gini data used in this study is a Gini index which is equal to 100*Gini coefficient. For example, a value of 100 would indicate complete

inequality and a value of 0 would indicate complete equality. FTA_{it} is FTA member countries' total GDP per capita/own GDP per capita. The measurement of the FTA variable is discussed more specifically in the data section. $\ln FTA_{it} * \ln ¿^{K/L¿_{it}}$ is the interaction term of FTA and capital-labor ratio. $\ln FTA_{it} * SKILL_{it}$ is the interaction term of FTA and skill ratio. $\ln FTA_{it} * SKILL_{it} * \ln ¿^{K/L¿_{it}}$ is the interaction term of FTA, skill ratio and capital-labor ratio.

Next, I bring another HOSS framework that trade openness reduces inequality in developing countries and increases it in developed countries. To do so, GDP per capita, i.e. the quantitative measure of the level of development has been utilized. In this regression, the level of development interacting term with FTAs has been tested. The equation can be shown as:

$$Gini_{it} = \alpha_0 + \beta_1 \ln FTA_{it} + \beta_2 \ln FTA_{it} * \ln ¿^{K/L¿_{it}} + \beta_3 \ln FTA_{it} * SKILLl_{it}$$

$$+ \beta_4 \ln FTA_{it} * SKILL_{it} * \ln ¿^{K/L¿_{it}} + \beta_5 \ln FTA_{it} * \ln gdp_{it} + e_{it} \quad (2)$$

$GDPpc_{it}$ is per capita GDP of country i in time t and represents the development stage of the country. It could be either a quantitative measure such as the GDP per capita or a qualitative measure such as (high/low/middle-income country, OECD/non-OECD).
As it is closely related to the factor endowments (i.e. developed countries are capital–abundant, developing countries are labor-abundant). The model also uses a multiplicative form of the FTA and GDP per capita, $\ln FTA_{it} * \ln gdp_{it}$.

Besides factor endowments, other macroeconomic and domestic variables explain the income disparity. One of the important factors which should be considered is the Kuznets effect.
Many years, empirical studies on inequality have focused on the Kuznets hypothesis of an inverted “U” shaped relationship between economic growth and income inequality. The Kuznets curve (KC) is the graphical representation of the “Kuznets hypothesis” that economic inequality increases over time while a country is developing, then after a critical average income is attained, it begins to decrease. However, the findings are still ambiguous. Some of them confirm the Kuznets hypothesis and others found contrasting results. The KC measure was introduced as the GDP per capita and its squared term in the base specification to follow standard practice as much as possible. It is tested trade openness and Kuznets effect on income inequality following by the previous literature. The equation is shown in the following

$$K/L¿_{it}+\beta_3 \ln FTA_{it}*SKILLl_{it}$$
$$Gini_{it}=\alpha_0+\beta_1 \ln FTA_{it}+\beta_2 \ln FTA_{it}*\ln ¿$$

$$K/L¿_{it}+\beta_5¿_{it}+\beta_6 GDPpc_{it}+\beta_7 GDPpc_{it}^2+e_{it}$$
$$+\beta_4 \ln FTA_{it}*SKILL_{it}*\ln ¿ \qquad (3)$$

In addition, other drivers have been included into the equation which can affect it to inequality. Those are the financial depth, the government expenditure civil liberty, political rights, the fertility rate, the age dependency, economic globalization, and investment.

$$K/L¿_{it}+\beta_3 \ln FTA_{it}*SKILLl_{it}$$
$$Gini_{it}=\alpha_0+\beta_1 \ln FTA_{it}+\beta_2 \ln FTA_{it}*\ln ¿$$

$$K/L¿_{it}+\beta_5 Z_{it}+e_{it}$$
$$+\beta_4 \ln FTA_{it}*SKILL_{it}*\ln ¿ \qquad (4)$$

Z_{it} is the other additional variable, as mentioned above.

Under equations (1-3), the econometric methodology pooled OLS is employed in order to assess the original question whether FTAs and other explanatory variables affect the income inequalities and whether this relationship changes over time[1].

2. DATA

1) Measurement of FTA Variable

Evidence on the impact of trade liberalization on inequality has until recently been seriously deterred by data limitations. Most empirical works have been utilizing Sachs and Warner Openness Index, Average Black Market Premium, Average Import Tariff on Manufacturing, Average Coverage of Non-Tariff Barriers, Dollar Index of Openness[2], and Heritage Foundation Index of Distortions in International Trade as a proxy of trade openness. For instance, Spilimbergo et al. (1999) distinguish between the incidence-based measures of openness, based on the tariff data and trade policy, and outcome-based measures of openness, based on trade data.

Calderón et al. (2005) make the same distinction between policy or legal measures and outcome or the de facto measures of openness. They point out that the benefit of an outcome measure is that it in a way reflects the country-specific features. In addition to the qualitative measures mentioned above a quantitative (outcome

1 See more detailed description of the previous works' econometric specification in Table

2 It is often called the World Development Outward Orientation Index.

based) measure of openness was also used many studies expressed by $(Exports+Imports)/GDP$ [1] [2]

$$FTA_{it}=\frac{\sum_{j=1}^{n} GDP_{jt}}{GDP_{it}}$$

j i

$$FTA_{it}=GDP_{it}+GDP_{jt}/GDP_{it}$$

$$FTA_{it}=GDP_{it}+GDP_{jt}+GDP_{nt}/GDP_{it}$$

i t FTA_{it} FTA_{jt} FTA_{it}

[3]

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1 It is also can be called

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cross-borderglobalization

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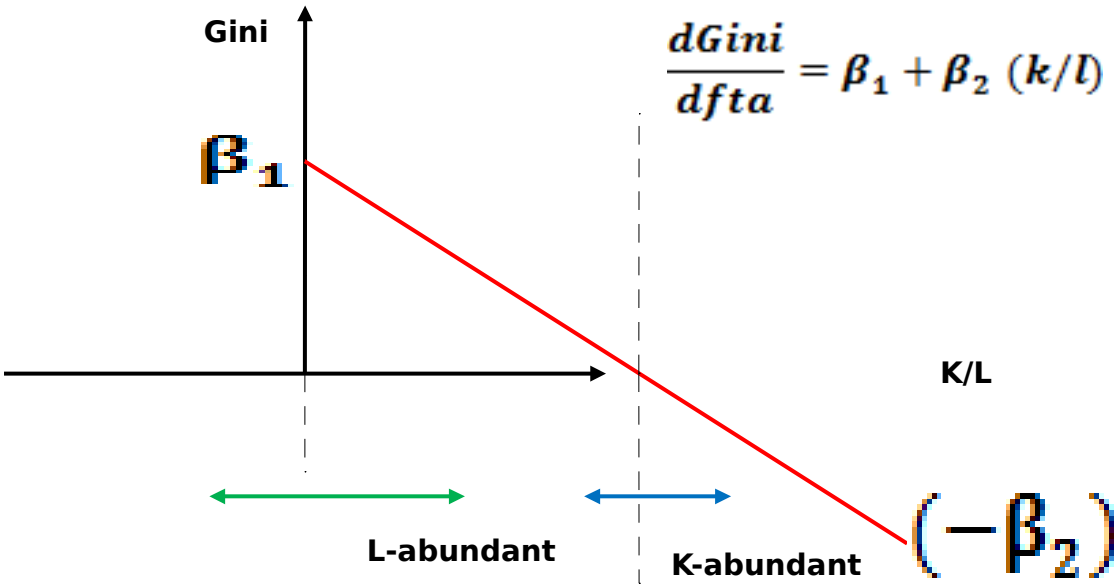
$-\beta_2$



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