The Effect of Trade Openness on Income Inequality
Selected Latin American Countries

Omar Odeh

Submitted to the
Department of Economics
in partial fulfillment of the requirements for the Degree
of

Master of Science
in
Economics

Eastern Mediterranean University
September 2015
Gazimağusa, North Cyprus

Approval of the Institute of Graduate Studies and Research

_____
Prof. Dr. Serhan Çiftçioğlu
Acting Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in Economics.

_____
Prof. Dr. Mehmet Balcılar
Chair, Department of Economics

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Economics.

_____
Assoc. Prof.Dr. Fatma Güven Lisaniler
Supervisor

Examining Committee
_____

1. Prof. Dr. Eralp Bektaş   _____

2.Assoc.Prof.Dr.Fatma Güven Lisaniler   _____

3. Assoc. Prof. Dr. Cem Payaslıoğlu   _____

ABSTRACT

The importance of trade openness has increased after 1990s, too many countries adopted more trade open policies to improve their economies and to improve their population's living standards. At the same period, the importance of the inequality among people has also increased which was and still a topic of interest. The aim of this study is to find out the impact of trade openness on income inequality within five countries of Latin America. In other words, does trade openness have a statistically significant effect on income inequality or not?

The results of the study showed that trade openness had a statistically significant negative effect on income inequality. Moreover, the unemployment had a statistically significant negative effect on income inequality while the ideology of the government had also a statistically significant effect on income inequality with a positive effect. At last, the inflation had no a statistically significant effect on income inequality.

Keywords: Trade openness, Income inequality, Heckscher-Ohlin theory, Globalization, and the Ideology of government.

ÖZ

Dış ticaretin önemi özellikle 1990 sonrası artmış, bir çok ülke ekonomilerini geliştirmek ve vatandaşlarının yaşam standardını yükseltmek için daha dışa açık ekonomi politikaları uygulamaya başlamıştır. Ancak bu dönem, ülkeler ve bireyler arası eşitsiz gelir dağılımının da ön plana çıktığı bir dönem olmuştur. Bireyler arasındaki gelir eşitsizliği bugün de en ilgi çeken konularda biridir. Bu çalışmada beş Latin Amerika ülkesinde dış ticare hacmi ve gelir dağılımı arasındaki ilişki incelenmiştir. Bir diğer deyişle uygulanan dışa açık büyüme modelleri nedeniyle artan dış ticaret hacminin gelir dağılımı üzerinde olumlu ya da olumsuz herhangi anlamlı bir etkisi olup olmadığı araştırılmıştır.

Araştırma bulguları artan dış ticaret hacminin bu ülkelerdeki gelir dağılımını olumsuz etkilediğini göstermektedir. Artan dış ticaret hacminin yanı sıra açıklayıcı değişken olarak kullanılan işsizlik oranının ise gelir dağılımını olumsuz etkilediği tespit edilmiştir. Bir diğer açıklayıcı değişken olarak kullanılan yönetimdeki partinin benimsediği ideolojinin gelir dağılımı üzerinde etkili olduğu sonucuna ulaşılmıştır. Sol ideolojiyi benimseyen partiler döneminde dışa açık büyüme politikaları uygulanmasına ragmen uygulanan sosyal politikalar nedeniyle gelir dağılımındaki eşitsizlik azalmaktadır. Sağ ideolojiyi benimseyen partiler döneminde ise tersi bir ilişki söz konusudur. Enflasyon oranı açıklayıcı değişkeni ile gelir dağılımı arasında ise anlamlı bir ilişki bulunamamıştır.

Anahtar Kelimeler: Trade openness, Income inequality, Heckscher-Ohlin theory, globalization, and the Ideology of government.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1

INTRODUCNTION

During 1990s the countries, especially the developing countries, have become more trade open, at the same time income inequality within and between countries have increased. One of the main questions in science of economics is how to distribute the resources and income fairly among people. Recent events especially the Arabs Spring have shown the importance of unequal distribution of resources and income.

Table 1 show that income inequality has increased in most of the countries. The inequality in Latin America was the highest while the inequality in high-income countries was the lowest. For example, the average of the Gini index in Latin America in 1990 was 46.9 while the average in 2008 was 48.3 which have increased over time.

Table 1: The Average of Gini index of the World

Region	1990	2000	2008
Asia	36.4	40	40.4
Eastern Europe and Central Asia	26.7	33.2	35.4
Latin America and the Caribbean	46.9	49.2	48.3
Middle East and North Africa	39.2	39.2	39.2
Sub-Saharan Africa	49.1	46.1	44.2
High-income Countries	27.4	30.8	30.9

Source: Golobal Inequality Report, UNICEF 2011.

Anderson (2005), claim that there are different factors that may affect income inequality. First, the rate of return on relative factors which suggests that when a country becomes more open, the relative demand on its abundant factors will increase over time which leads to an increase in country's national income. Second, the international trade plays an important role in changing the structure of demand for labor and may lead to increase the demand for skilled labors. If there are differences in skill levels between males and females this may also cause gender inequality. According to Anderson (2005), when the country is subject to trade some groups may suffer income losses. Therefore, some countries that are engaged in international trade may have higher tendency to implement redistributional policies in order to offset the effect of international trade on income distribution. However, Spilimbergo et al (1999) suggest the opposite. They claim that countries that are engaged in trade tend to have liberal governments and there is no tendency to redistribute income in those countries. Therefore, if the benefits of trade are not distributed evenly, there will be a huge inequality as a result of trade within and between countries.

The inequality in Latin America countries is considered as one of the most crucial issue. According to UNICEF (2011), the Gini index of income inequality in Latin American countries is 48.3 which is the highest comparing to the world average which is 39.7 (UNICED, 2011). The World Bank conducted a research in 2004 to find out the income share of the richest 10% of the population of the Latin American countries. That study found that the share of the richest 10% was almost half of the (48%) total income while the share of the poorest %10 of the population was around 1.6% of the total income (WB, 2004). In the developed countries the share of the

richest %10 of the population was about 29% while the share of the poorest 10% was 2.5% of the total income, higher than Latin American countries. According to Barrientos and Santibanez (2009), Latin American countries governments (for instance, Bolsa Esoola in Brazil and Chile Solidario in Chile) have adopted some policies to decrease the unacceptable share of the poorest group. The main purpose of these programs is to decrease the poverty through providing subsidies to the poor families in order to invest and spend on their children's education and health care and help the poor women by increasing the participation of the women in the society's activities. According to Human Development report (2011), these programs have improved the condition of school enrollment and the conditions of children health care. But still Latin American countries income distribution is one of the most unfair income distributions in the world.

Figure 1 shows the Gini index of some countries from Latin America. In general, we can conclude that even the income inequality decreased in time but it is still high. The country with the highest inequality was Bolivia (63%) and the lowest was Uruguay (41%).
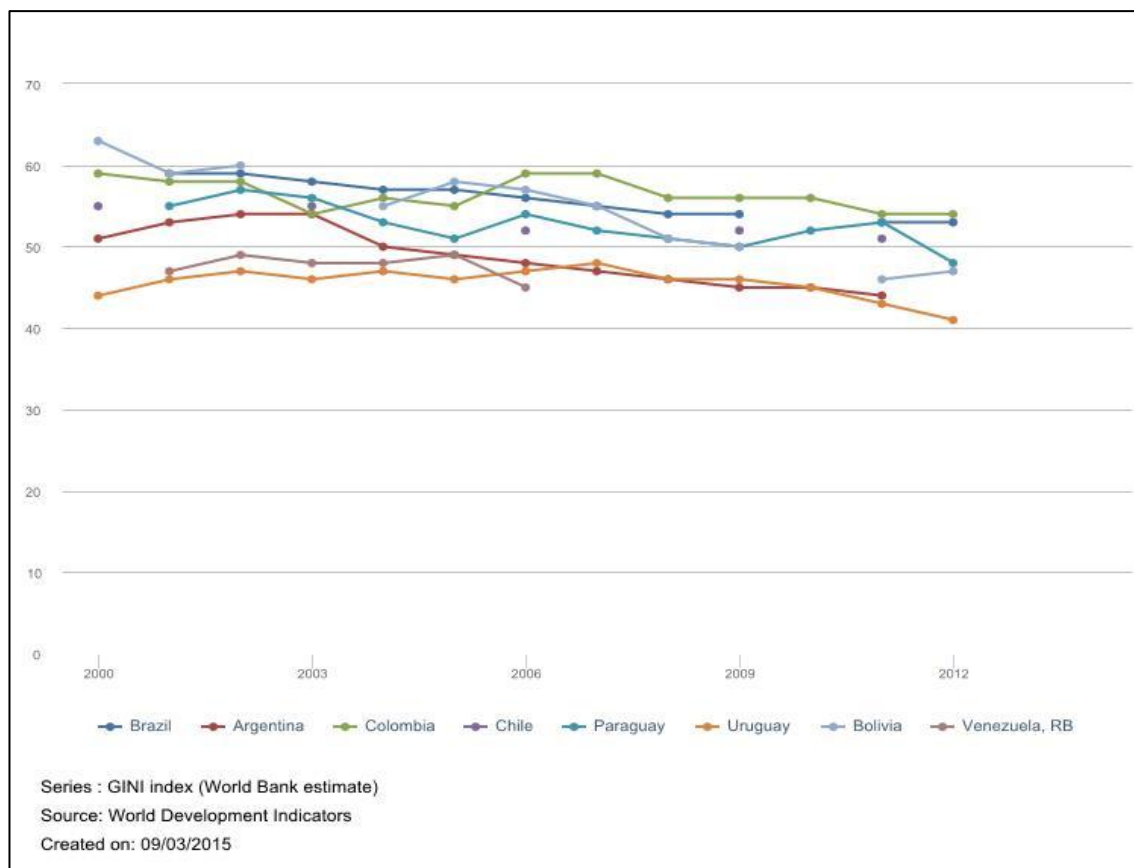
Figure 1: Gini Index for Selected Latin American Countries (2000-2012).

In order to generate high performance economic growth, the import-substitution policy was adopted in Latin American countries during 1950s until 1980s, but actually, these countries failed to generate a sustainable economic growth through adopting that policy. However, after 1980s, Latin American countries have adopted more open policies toward international trade. Therefore, the aim of the study is to test the impact of trade openness on income inequality in five countries of Latin America between years 2000 to 2012. In other words, the aim is to find out whether the trade openness has a statistically significant effect on income inequality or not.

The study will cover the period of 2000-2012 and five countries from Latin America. The analysis of the study is based on two main methods. First, unbalanced panel data

will be used by fixed effect model. Second, Granger causality test will be conducted to find out the causality relationship between the variables.

The study is structured as follows: First Chapter is the introduction. Second Chapter provides relevant background information for the case study countries. Third Chapter summarizes the relevant literature which is consists of theoretical framework and the empirical study. Fourth Chapter introduces the data and the methodology. Fifth chapter includes the empirical results. Sixth, provides the discussion of the findings and the conclusion.

Chapter 2

BACKGROUND

This chapter shows the relevant macroeconomic indicators of the case countries from 2000 to 2012 such as Gini index, unemployment, inflation, GDP growth rate, GDP per capita, and trade openness.

Figure 1 shows the Gini index for the five countries of the study from 2000 to 2012. Generally speaking, the highest value of Gini was 58% in Paraguay in 2000 while the lowest was 42% in Uruguay in 2012. The lines were almost horizontal with small changes in Gini. Caution should be taken that any small change in Gini can have a considerable effect. Additionally, Paraguay maintained the highest income inequality compared to other countries while Uruguay maintained the lowest inequality. At last, from 2000 to 2006 the inequality in Argentina and Colombia were closed to each other.
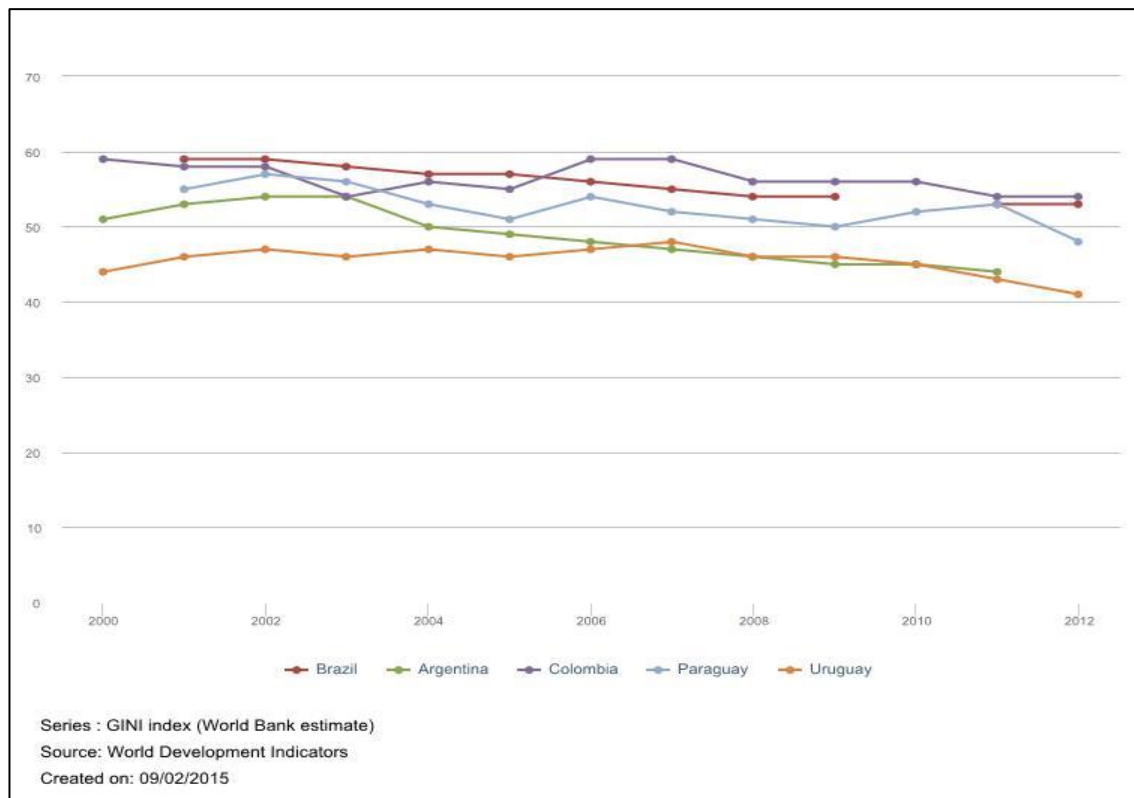
Figure 1: Gini Index for the Case Study Countries (2012-2000).

Figure 2 shows the trade openness (sum of export and import as a percentage of GDP) of each country from 2000 to 2012. Generally speaking, the highest value was 108% in Paraguay while the lowest was 21% in Brazil in 2000. In general, all the countries had not so many changes in the trade openness. However, Uruguay and Paraguay were notable exceptions, they had frequent sharp changes and they were going up in one year and going down in the following year. However, from the figure it can be shown that Paraguay was the most open country toward international trade while Brazil was the least open country toward international trade. For instance, the figure also shows that Argentina and Colombia's were close to each other in terms of trade openness.
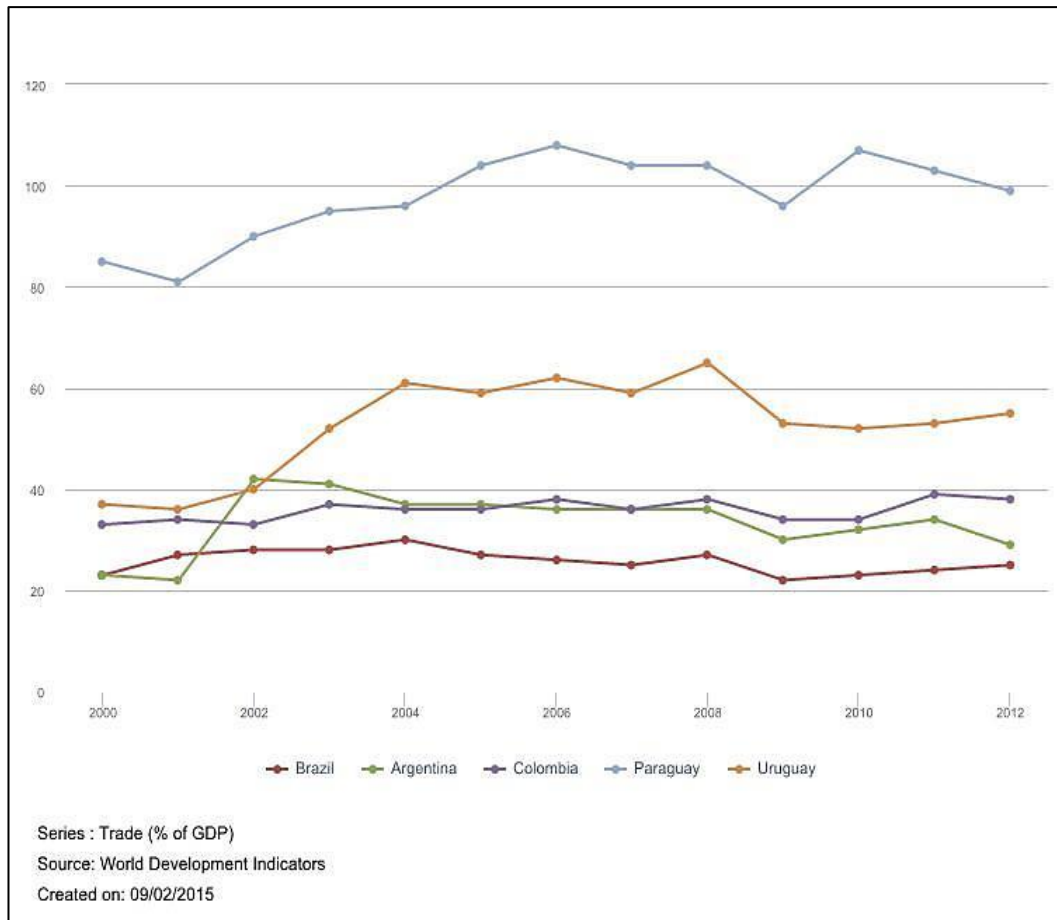
Figure 2: Trade Share of GDP for Each Country of the Study (2000-2012).

Figure 3 shows the annual unemployment rate for the case study countries from 2000 to 2012. In general, the graph shows a decreasing trend for all the countries in unemployment rate. Additionally, the highest value was 18% while the lowest was 4% in Paraguay in 2011. From the Figure, it can be seen that Colombia maintained on average relatively high unemployment rate compared to the other countries while Paraguay maintained relatively low unemployment rate compared to studied countries. Moreover, all the countries had a smooth decline. However, in case of Uruguay the decrease was not that smooth.
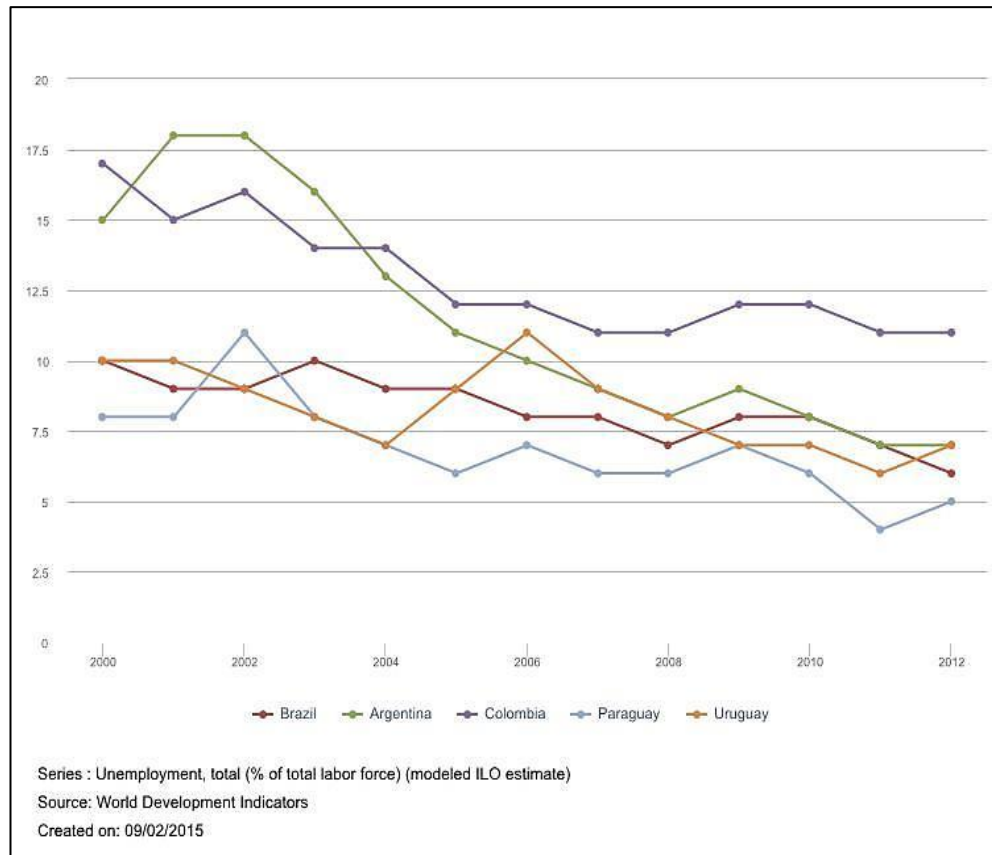
Figure3: Unemployment Rate for the Case Study Countries.

Figure 4 shows the annual inflation rate for the studied countries from 2000 to 2012. According to this graph, the highest value was 32% in Colombia in 2000 while the lowest was at close to -1% in Argentina in 2001. Generally speaking, there were too many fluctuations in the inflation increasing in one year and decreasing in the following year. Additionally, Paraguay maintained relatively high inflation rate compared to the other countries and the instability was relatively high. There was only one negative value for the inflation which was in Paraguay in 2001. The graph also shows by 2000 for Colombia was by far the highest; 32% and after that year the inflation was on stable in Columbia. Moreover, the inflation was so stable in Brazil excepting one year which was 2003; 16%.
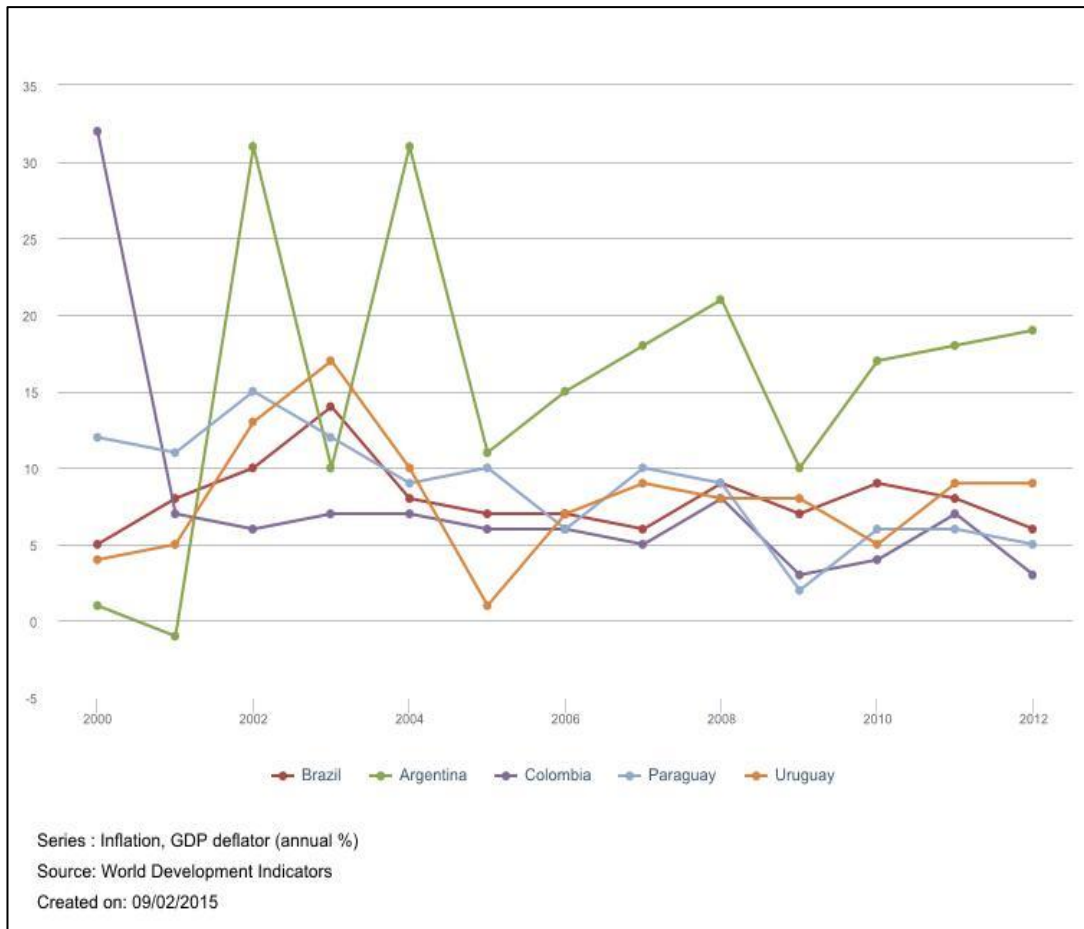
Figure 4: Inflation Rate for Each Country of the Study (2000-2012).

Figure 5 shows GDP per capita growth rate for each country (2000 – 2012). We can say that there were considerable trends among the countries through years. Argentina and Uruguay show an increasing trend until 2003 and then it fluctuates in a narrow range. Moreover, from 2003 Brazil and Colombia show small increases followed by small decreases. We can notice that Brazil and Colombia showed almost identical patterns. At last, Paraguay followed the same pattern of Columbia. However, the changes were sharper than Colombia with higher magnitude.
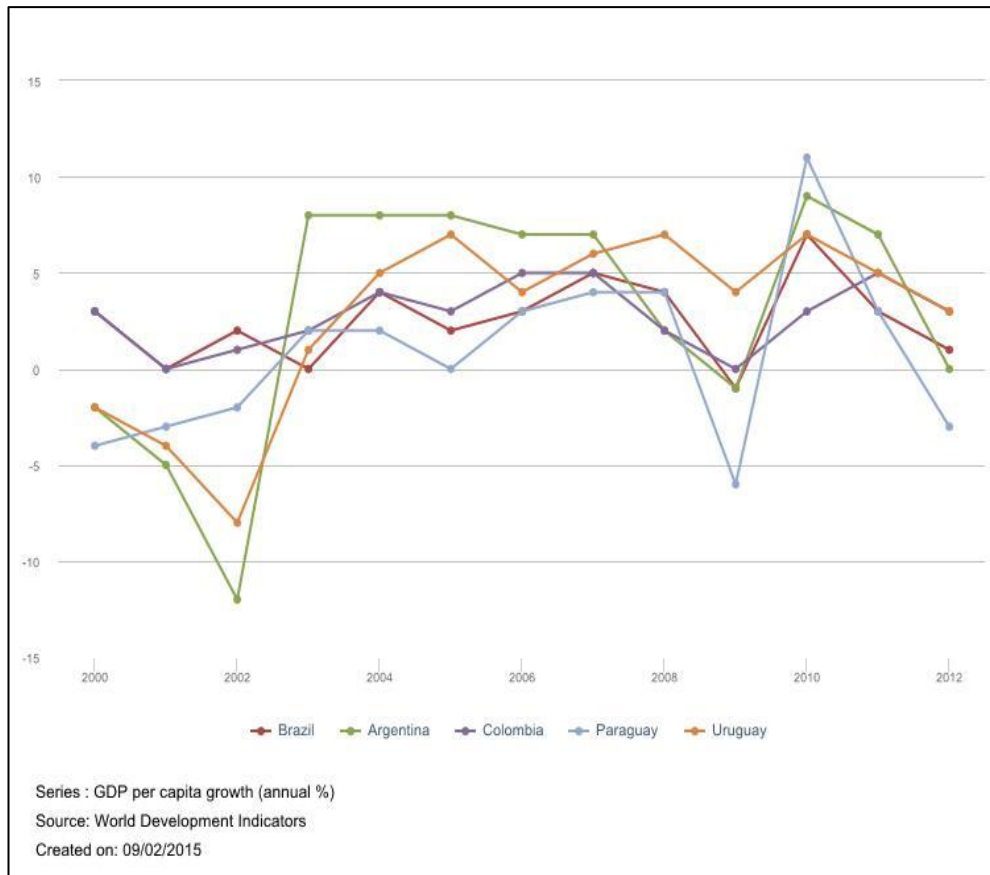
Figure5: GDP Per Capita for the Case Study Countries From (2000-2012).

Figure 6 shows the GDP annual growth rate for each country (2000-2012). We can notice that there were identical trends among the countries through years. Uruguay and Argentina show an increasing trend until 2003 and fluctuates. Moreover, from 2003 Brazil and Colombia had unstable GDP growth; followed by small increases and decreases. We can conclude that Brazil and Colombia on average were similar. At last, Paraguay followed the same pattern with Colombia. However, the changes in Paraguay's GDP growth were sharper than Colombia's GDP growth.
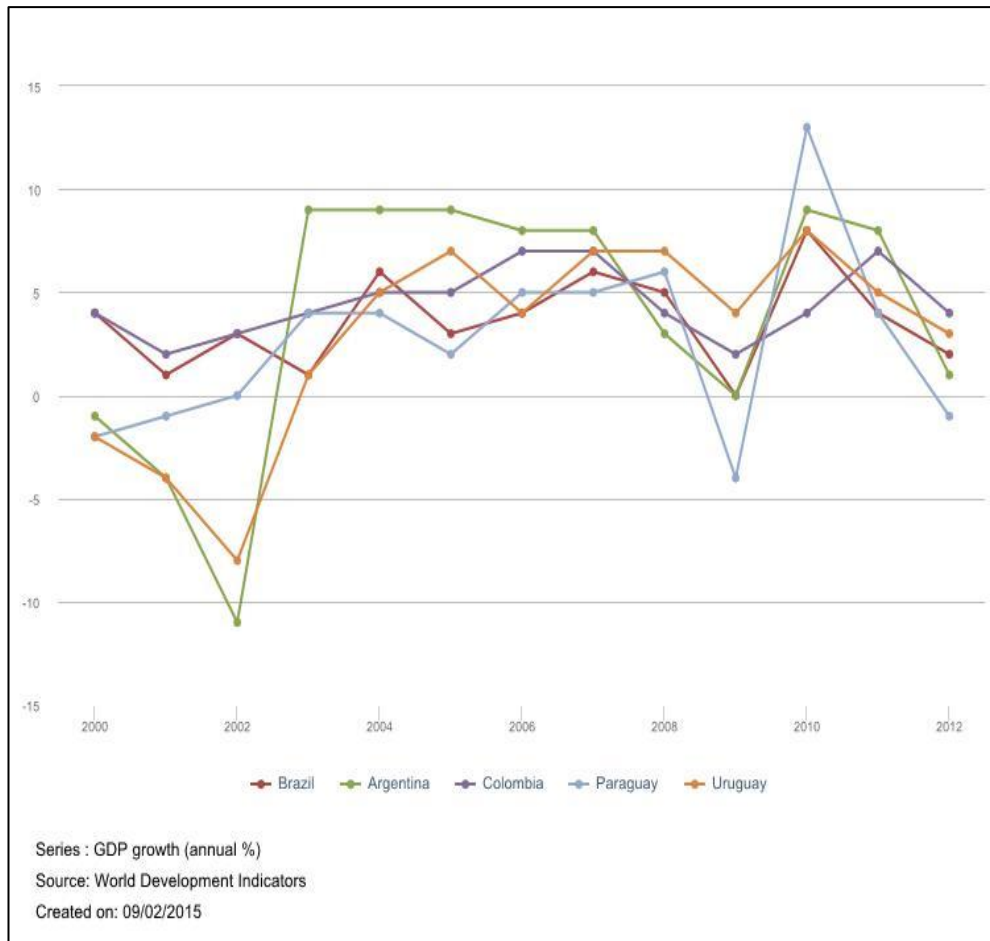
Figure6: GDP Growth for the Study Case Countries (2000-2012).

In general we conclude that the unemployment has a decreasing trend for all the countries, the trade openness has an increasing trend, the Gini index for all the countries has decreased over time but not sharply, the inflation was fluctuating, and GDP annual growth rate was also fluctuating.

Chapter 3

THEORETICAL FRAMEWORK & THE LITERATURE

REVIEW

This chapter provides the main concepts of the study and it also provides the theoretical framework of the study. In other words, we want to find out that the theory agrees with the results of the study or not which suggests that in more trade open countries there is less inequlity.

3.1. The Concepts of the Study

There are two main concepts that the study is based on which are as follows: the income inequality and trade openness. This section attempts to explain the defintion of these two concepts.

3.1.1. The Concept of Income Inequality

The concept of inequality is the unequal distribution of the resources and income among the people in a country. According to Neoclassical theory, the inequalities in income distribution spring from the differences in the productivity of different group of labors. The wages are determined by the marginal productivity of each person in the economy. When the inequality increases, the gap between high and low skilled labor will be wider (Hunt, 2014).

Economists who are interested in income inequality claim that the inequality has too many effects on the society like lower social cohesion, health, and the homicides. David (2000) argues that the inequality has negative effects on social cohesion and

health conditions. Moreover, according to Neapolitiana et al. (1999) and Fajnzylber et al. (2002) the probability of crime increases in the societies that have large differences in income inequality which means that as the inequality is high, the probability of homicides also increases. Additionally, the inequality can affect the happiness of people. According to Robert et al (2009) the inequality has a negative impact on the happiness of people which as the higher income inequality the less happiness is.

Istvan (1995), Navarro (2007) and Charlton (1997) suggest some general causes of income inequality as globalization, neoliberalism, taxation policy, and gender discrimination. For instance Cornia and Court (2001) argue that there are traditional and new causes. Traditional causes are rising from the impact of natural resources sector on GDP and the urban bias. The new causes are the changes in technology, trade liberalization, and financial liberalization. Additionally, Coll (2011) divides the causes of income inequality into two groups. The first group is endogenous causes, for example individual characteristics like intelligence which can determine the future personal income and physical differences like the race and gender. The second group is exogenous causes, such as land concentration and education inequality.

According to Clarke (1995) economists usually divide the inequlaity into three groups. First is in consumption, the second is in wealth and the third is in income. The scope of this study is limited to income inequality.

According to the economists another categorization of the inequality is by the context. They divide income inequality into three. First is the global inequality; the income inequality between the citizens of the world (Milanovic, 2006). Second is

international inequality; inequality between countries mean income per capita (Milanovic and Yitzhaki, 2002). Third is the national inequality; the income gap between individuals within countries (Bergesen and Bata, 2002). This paper focuces of national inequalities.

Beinhocker (2006) argues that there are two kinds of income inequality. First, is the vertical income inequality; the inequality between citizens. Second is the horizontal income inequality which defines the inequality between people belonging to different religions, cultures, genders, and ethnicity. The scope of this study is limited to vertical income inequality.

The economists implement several methods to measure vertical inequality. First is the income share ratio which takes into account the income shares of different groups of people such as the income share of the richest group over the share of the poorest group. This measure is widely used in the literature of income inequality because it is easy to compute and interpret. The most popular ratio used in income share ratio is 20:20 ratio which makes a comparison between the income share of the poorest 20% of the population and the richest 20% of the population. However, the changes in income share makes 20:20 ratio so sensitive and consequently the absolute value of income inequality is not provided by this ratio which is considered as a drawback of 20:20 ratio (Coll, 2011).

The second measurement of income inequality is Gini index. This index is the commonly used tool by scholars in order to measure inequality within the country because understanding and computing it is easy and Gini index can be easily represented by Lorenz curve. This index has a range of 0 to 1, whereas 0 is perfect

equality and 1 is imperfect equality (Coll, 2011). Giovanni and Liberati (2006), Stefanescu (2009), and Litchfield (1999), suggest some advantages for Gini Index. First is the scale independence which means that the economy size is not prominent. Second is the population independence which means that the population number is not prominent. And it is comprehensive, provides the absolute value of income inequality.

3.1.2. The Concept of Trade Openness

After the Second World War, the importance of international trade has increased and the world has become more open toward international trade. Trade openness is considered as one of the globalization consequences and economic globalization is defined by Gao (2000) as the national economies are supposed to be more integrated, interdependent and interacted to each other through increasing movements of international trade and finance, and technologies. According to Anderson (2008), and Obstfeld (2008), trade openness is divided into two parts. First is international trade which means that the exchange and flow of goods and services between the countries and it is included as a significant share in the gross domestic product (GDP). Second is international finance which means the flow of domestic capital and foreign capital across borders and it has a significant impact on exchange rate. There is no exact definition for liberalization and trade openness; however there are several definitions for these two concepts. Peitchett (1996) attempts to differentiate these two concepts. The meaning of liberalization is the sum of policies that its aim is to increase trade openness while the openness is the country's trade sector size. For instance, Berg and Kruegar (2003) define the concept of trade openness as the situation that nationals and foreigners will be able to transact with each other without any cost imposed by the governments.

There are conflicts among scholars about trade openness measurements. For example, according to David (2007), there are different ways to measure the trade openness introduced by different studies investigating the issue. First, trade shares, that is exports plus imports divided by GDP and this measure is widely used due to the availability of data and easy to compute. Therefore, it will be used in this study. Second, those that measures the restrictions of trade among countries (measures of trade barriers).

3.2. Theoretical Framework

According to Krugman (1990), Heckscher-Ohlin theory (HO) attempts to explain how the international trade helps the countries to decrease the gap between the developed and developing countries, to increase inhabitants' welfare of the country, and to find out the way the trade openness will decrease the income inequality among people within the country. HO theory springs from a fundamental concept called "comparative advantage" which means that each country should specialize in producing the product that they have comparative advantage. This theory states that if a country that has a comparative advantage in exports of labor-intensive goods while another country has a comparative advantage in exports of capital -intensive goods then in order to increase total production each country should specialize and export those goods that they have comparative advantage. Furthermore, the country will import those scarce factors. The Stolper-Samuelson (SS) theory springs from HO theory which attempts to explain the correlation between the relative output prices and relative factor prices and how the income inequality is affected by those relative prices. SS theory assumes that the rate of return on abundant factors would increase due to the foreign demand. The rate of return on scarce factors would decrease due to the importation of these resources. Additionally, as a result, income

inequality is increased in capital-abundant countries, because it increases the return of capital owners and decreases the return of labour, and income inequality decreases in labour-abundant countries, because wages go up and returns on capital go down as a country is open for trade.

HO theory assumes that there is no difference in the production and technology level of countries. However, Frances (1989) keeps the opposite stance and claims that, in terms of technology, there is a huge gap between the developed and developing countries. For instance, Avi and Geoffoey (2003), argue that the theory could not explain how the capital can be measured theoretically. One of the crucial economic indicators is the unemployment. According to Shiozawa (2007), the unemployment is excluded from the theory.

3.3. Recent Studies

Investigating the relationship between trade openness and income inequality is not something new. Moreover, the literature review has been shown that there are different findings as trade openness is positively or negatively or no effect or nonlinear relationship with income inequality.

First group of empirical studies are agreed with HO theory which suggest a negative relationship between trade openness and income inequality such as Guillaumont-Jeanneney and Kpodar (2011), Singh and Huany (2011), Mundell (1957), and Reuveny and Li (2003), and Ben- David (1993). These studies argue that the wage gap between skilled and unskilled workers shrinking when countries become more trade open.

Second group of studies argue that trade openness and income inequality has a positive relationship (such as, Hurrell and woods, (2000; Bergh and Nilsson, 2010; Miguel and Juan (1999); Gordon et al., 2007 and Partico, Harald, and Rodrigo, 1999). They suggest that when the international transactions rise among countries, this will increase the wage gap between skilled and unskilled labors and raise the income inequality within unskilled-labor abundant countries.

Third group of studies on contrast, found that trade openness has no effect on income inequality within countries such as the studies of Beck et al (2007) and Kpodar and Singh (2011), and Dollar and Kruay (2011). They found no evidence supporting positive or negative relationship between trade openness and income inequality within the countries in low income group countries.

Finally, some studies show that the link between trade openness and income inequality is nonlinear (unpredictable) such as the studies of Baro (2000) and De Santic (2002).

As we have seen, these studies show different relationships between trade openness and income inequality that is because the researchers always use different samples, different countries, different methodologies, and different countries in different development stages. As mentioned before besides trade openness there is other factors capable of effecting income inequalities within countries such as inflation, , income distribution policies, unemployment rates etc.

Chapter 4

THE DATA & THE METHODOLOGY

This chapter provides the data and methodology of the study. First section will introduce the data and the sources of the data. Second section explains the variables. Third section introduces the methodology.

4.1. Data Source

The study covers the period of 2000-2012. It includes five Latin American countries Brazil, Argentina, Colombia, Paraguay, and Uruguay. The reason of choosing these countries is that the sample represents countries in different geographical and economic sizes like Argentina; geographically one of the largest Latin American country, Brazil; economically one of the largest economy and Uruguay; geographically one of the smallest and Paraguay economically one of the smallest and Colombia which is historically ruled by right-wing parties. All the data were taken from the World Bank database with only three missed observations in the Gini of the Brazil and Argentina.

4.2. Variables

As mentioned before due to the properties of the Gini we prefer to use Gini index in the measurement of the income inequality. It is the dependent variable of the study. The independent variables of the study were drawn from the literature review. These are trade openness and unemployment, inflation and the ideology of the ruling party as the control variables.

4.2.1. Gini Index

As mentioned in the literature review, Gini index is used to measure the income inequality and it has a range of 0 to 1 whereas 0 is perfect equality and 1 is perfect inequality.

4.2.2. Unemployment

The reason of choosing this variable is that most of the scholar shows that the relationship between the unemployment and income inequality is positive. According to Royuela et al (2012), suggest some effects of the unemployment on the society. For example, it increases the poverty, increases the conflict within the society and increases the inequality among people. For instance, Cardoso (1993), Beach (1997), and Mirer (1973), found out that the unemployment negatively affect the income distribution.

4.2.3. Inflation

According to George (1981), the purchasing power falls as the inflation goes up which has some negative impact on the economy such as the investment and saving would decrease due to the price instability which has the potential to mislead the investment and the growth performance of the country which may cause unemployment and poverty; thus increase income inequality. According to Li and Zou (2002), the inflation has a negative effect on the inequality and economic growth. In contrast, according to Heer and Sussmuth (2007), inflation has no effect on income inequality.

4.2.4. Ideology of the Governing Political Parties

This variable is a dummy variable whereas 1 is for leftwing parties and 0 is for rightwing parties. Mcleod et al. (2011) claims that, the poverty and inequality fall in the countries when left wing parties are on the government. Cornia (2011) argues

that the leftist regimes are considered as one of the reasons that could decrease the inequality in countries in South America in the last 15 years. We expect that left-wing party is negatively related to income inequality.

Table 2: Dummy Variable

	brazil	argentina	colombia	paraguay	uruguay
2000	0	1	0	0	0
2001	0	1	0	0	0
2002	0	1	0	0	0
2003	1	0	0	0	0
2004	1	0	0	0	0
2005	1	0	0	0	0
2006	1	0	0	0	1
2007	1	0	0	0	1
2008	1	0	0	1	1
2009	1	0	0	1	1
2010	1	0	0	1	1
2011	1	0	1	1	1
2012	1	0	1	1	1

1 is left and 0 is right

4.2.5. Trade Openness

As mentioned above, the aim of the study is find out whether there is a statistically significant relationship between trade openness and income inequality. The literature review shows that the relationship is controversial. We expect that as trade openness increases the inequality also increases.

4.3. Methodology

The empirical analysis used unbalanced panel data and was conducted by Fixed Effect Model which included the variables that are supposed to affect the income distribution.

4.3.1 Panel Unit Root Test

What it means by the stationarity itself is that the mean and variance of variables should be constant as time changes. The main systematic problem of non-stationary variables is that the econometric model cannot be forecasted or modeled. In other words, in order to conduct the model, the variables should be stationary. For the purpose of finding out the variables are stationary or not, Levin, Lin, and Chu test, Augmented Dicky-Fuller Fisher test, and Philips-Perron Fisher test were conducted to serve this aim. The null hypothesis of these tests is that the variable has a unit root. In other words, if we accept the null hypothesis, this means that the variable is non-stationary (Gujarati, 1995; Wooldrige, 2013).

4.3.2. Granger Causality Test (GC)

The main reason of using GC test in favor of economic is that springs from two questions. Frist, does trade openness cause income inequality or the inequality is a result of trade openness. Second, does the ideology of the governments make the inequality to go down or the changes in the inequality causes government ideology? Theoretically, the definition of GC test by itself is that although we regressed variable y on variable x to estimate the relationship between them but it does not necessarily imply causation between them. The main idea of GC test is that if event 1 happens before event 2, then it is possible to find out that event 1 is preceding event 2. Since we know that, in order to conduct GC test, the variables should be stationary. The null hypothesis of this test is that variable x does not granger cause variable z, then in case of falling to accept the null hypothesis; this means that variable x precedes variable z (Gujarati, 1995; Wooldrige, 2013).

4.3.3. Fixed Effects

In order to analyze the impact of variable for each unit that differs by passing the time, fixed effect model (FE) is beneficial. However, these instable variables that are specific to each unit and are unobserved are not of interest. The other prominent feature of the fixed effects model is that the time invariant individual characteristics are correlated with those variables that change over time. The model is described as the following:

$$Yit = \beta_i x_{i_t} + ai + u_{i_t} \qquad T = 1,2, \ldots \ldots T$$

In the model described above, Yit is the dependent variable and xit represents the independent variables of each entity for the ith unit in a period of t, and ai is the unobserved effect that does not change during t time, but changes across units. In other words the differences between individual units are captured by unknown element. uit is the error term.

In order to estimate the model, there are two alternatives the least squares dummy variable estimator and the fixed effect estimator that are equivalent. The main rational is to reduce and remove the effects of individual units that are unobserved and do not change over time. Therefore, assessing the net effect of the Xit variable and Yit would be easier (Gujarati, 1995; Wooldrige, 2013).

4.3.4. The Model of Random Effects

In this model, there is no relationship between the differences among units. In other words, they are not correlated. The model is as following:

$$Y_i = \beta_i X_{i_t} + (\alpha_i + U_i)$$

Accordingly, there are two components for the error term: Ui, which is the individual error and εg, which is the random element that vary across the units and over time.

The sum of two error terms is the composite error. According to this model, the random sampling process by which the data are gained is taken into account.

In both FE and RE models, in order to control the time effects, ex $D = 1$ for the specific time and zero otherwise, the dummy variables could be added. The usual error term assumptions of the model are similar to the error term assumptions: $(U_{i_t}) = 0, Var(U_{i_t}) = \sigma^2 u$, the idiosyncratic errors are not correlated, $Cov(u_{i_t}, u_{i_s}) = 0$ (Gujarati, 1995; Wooldrige, 2013).

4.3.5. Fixed Effects vs Random Effects

The basic difference between FE and RE is that; in RE the error term component and the regressors are not correlated. Therefore, one needs to make sure whether there is any correlation between the individual effects and the regressors in the model. To do so, Hausman test is applied. The main idea is that, if there is no correlation between the error term and explanatory variable, both fixed and random effects are consistent (Gujarati, 1995; Wooldrige, 2013).

4.3.6. The Model

$gini = F(trade, unemp, inf, left)$.

$gini_{i_t} = \beta_1 trade_{i_t} + \beta_2 unemp_{i_t} + \beta_3 inf_{i_t} + \beta_4 left_{i_t} + u_i + \varepsilon_{i_t}$

$i = 5 \ldots\ldots N, t = 13 \ldots. T$

$gini$ is the gini index; represent income inequality.

$trade$ is Export+ Import/ GDP; represent trade openness.

$unemp$ is the unemployment rate.

inf is the inflation rate.

$left$ is the ideology of the government. 1= left-wing parties and 0= right wing parties

u is the error term

4.3.7. The OLS Regression Assumptions

In order to obtain reliable results, the econometric model should not have autocorrelation which means that the error terms should not be correlated, should not have heteroscedasticity which means that the variance of error should be constant at all level of independent variables and should not have multi-colinearity which means that the independent variables should not be correlated with each other. That is why Q-test, Breusch-Pagan test, and correlation matrix are used (Gujarati, 1995; Wooldrige, 2013).

Chapter 5

EMPIRICAL RESULTS

This chapter will provide the results of the above mentioned tests that were used to examine the relationship between the trade openness and income inequality. These are as follows; correlation matrix; heteroscedasticity test; autocorrelation test; panel unit root test; hausman test and the findings of the unbalanced panel data fixed effects model and Granger causality.

5.1. Descriptive Statistics

Table 2 shows the basic statistics for each variable which implies mean, median, standard deviation, maximum, and minimum values of each variable. According to Table 2, the basic statistics of the Gini index shows that all the values are between 41 and 58 which means that the value are relatively high. This can be more confirmed by the fact that the value of standard deviation is 4.8 with mean value 51 which is relatively high and even the minimum value is also relatively high.

Table 3: Descriptive Statistics

	GINI	INF	TRADE	UNEMP
Mean	51.71274	9.478195	50.21707	9.546774
Median	53.43500	7.898245	36.88393	8.750000
Maximum	58.88000	31.76135	107.7700	18.30000
Minimum	41.30000	-1.09576	21.85242	4.300000
Std. Dev.	4.870345	6.530850	26.88563	3.286471

5.2. Correlation Matrix

In order to examine whatever we have multi-collinearity, correlation matrix is conducted. Table 3 shows that the variables are not correlated with each other. Meaning that the multi-collinearity among the variables is low and we can conclude that the model does not suffer from this problem.

Table 4: Correlation matrix

	GINI	INF	TRADE	UNEMP
GINI	1.000000	-0.036143	0.253124	0.427386
INF	-0.036143	1.000000	-0.154940	0.143433
TRADE	0.253124	-0.154940	1.000000	0.407649
UNEMP	0.427386	0.143433	0.407649	1.000000

5.3. Heteroscedasticity

The problem of Eviews is that heteroscedasticity tests are not offered by Eviews for panel analysis. Therefore, the only way to solve this problem is to use the unstructured/undated option that is available on that software. The test was conducted by Breusch-Pagan test and the null hypothesis of that test is that the heteroscedasticity is not exist. The probability was 0.38 which means that we accept the null hypothesis that assumes no heteroscedasiticty in the model.

Table 5: Heteroscedasticity Test

Heteroscedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.051862	Prob. F(4,57)	0.3888
Obs*R-squared	4.261927	Prob. Chi-Square(4)	0.3717
Scaled explained SS	1.428287	Prob. Chi-Square(4)	0.8393

5.4. Autocorrelation

In order to capture if the autocorrelation is exist in the model or not, Q test was used for this aim. The null hypothesis of this test is that there is no autocorrelation and we accepted the null hypothesis. Table 3 shows that there is no autocorrelation in the model. Meaning that the error terms are not correlated.

Table 6: Q-test

lag	AC	PAC	Q-Stat	Prob*
1	0.032	0.032	0.0370	0.847
2	-0.011	-0.012	0.0415	0.979
3	-0.068	-0.067	0.2132	0.975
4	-0.044	-0.040	0.2867	0.991
5	-0.110	-0.110	0.7782	0.978
6	0.045	0.046	0.8626	0.990
7	0.004	-0.007	0.8633	0.997
8	-0.059	-0.076	1.0227	0.998
9	0.030	0.033	1.0665	0.999
10	-0.055	-0.070	1.2154	1.000

5.5. Panel Unit Root Test

Unit root test table shows that Gini index, unemployment, inflation, and trade openness are stationary at level.

Table 7: Panel Unit Root Test (level)

Statistics	Gini	Trade	unemp	inf
τ_T (ADF) Fisher	14.36	11.09	13.27	**-**
τ_μ (ADF) Fisher	2.70	15.60	11.26	50.72*
τ (ADF) Fisher	35.56*	2.38	19.51*	-
τ_T (PP) Fisher	12.92	21.66*	10.57	-
τ_μ (PP) Fisher	3.31	15.71	5.43	42.86*
τ (PP) Fisher	40.15*	2.27	26.91*	-
τ_T (Levin)	-2.27*	-2.97*	-2.28*	-
τ_μ (Levin)	0.38	-2.47*	-3.15*	-16.34*
τ (Levin)	-7.23*	0.81	-3.18*	-

τ_T indicates drift and trend; τ_μ indicates only drift; τ indicates no trend and drift.
* rejection of null hypothsis at 1% level.

5.6. Fixed Effect Model

Table 8: FE model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.632	3.4256	3.6875	0.0006**
TRADE	0.0768	0.0325	2.3574	0.0224*
UNEMP	0.4386	0.0747	5.8654	0.0000**
INF	-0.0132	0.0084	-1.5647	0.1239
LEFT	-1.3823	0.4021	-3.4376	0.0011**
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.7637	Mean dependent var		51.494
Adjusted R-squared	0.74803	S.D. dependent var		4.7993
S.E. of regression	0.8211	Akaike info criterion		3.3301
Sum squared resid	298.51	Schwarz criterion		3.6918
Log likelihood	-83.244	Hannan-Quinn criter.		3.4703
F-statistic	83.798	Durbin-Watson stat		2.1653
Prob(F-statistic)	0.000000			

*= significance at 5% level.
**= siginfigance at 1% level.

According to Husman test, the fixed effects model is more appropriate. Therefore, the fixed effects model is applied. Table 5 shows that the R^2 is equal to 76%;

meaning that the total variation in the Gini was explained by trade, inf, unemp, and social policies. The probability of F-test shows that model as a whole is statistically significant.

The empirical analysis used unbalanced panel data and was conducted by FE model which included the variables that are supposed to affect the income distribution. The FE model suggests that in terms of adopting more open polices toward international trade, the relationship between the trade openness and income inequality is positive and statistically significant. Therefore, as international trade increase (as trade openness increase) the less equal the distribution of income is. The unemployment has a statistically significant effect on the income inequality and its effect is negative which means that the more unemployment the high income inequality is. In terms of politics parties, this model suggests as the inhabitants of the country voted for a left-wing party, the inequality would fall and it is statistically significant. At last, the inflation is the only variable that is not statistically significant.

This model shows that the 1% increases in the trade the 0.07% increases in the inequality which is statistically significant at 5% significance level. But this result does not necessary mean that the openness hurts all the people equally. One may find that the effect of the trade on the richest is positive or negative. Second, if the unemployment increases by 1%, the inequality raises by 0.43% which is statistically significant at 1% significance level. Third, if the government of the country adopts left-wing view, the inequality decreases by -1.38% which statistically significant at 1% significance level.

5.7. Granger Causality Test

Table 9: GC Test

Null Hypothesis:	Obs	F-Statistic	Prob.
LEFT does not Granger Cause GINI	50	1.39475	0.2584
GINI does not Granger Cause LEFT		2.03312	0.1428
TRADE does not Granger Cause GINI	50	1.46263	0.2424
GINI does not Granger Cause TRADE		3.30000	0.0460
UNEMP does not Granger Cause GINI	50	0.57951	0.5643
GINI does not Granger Cause UNEMP		2.02037	0.1445
LEFT does not Granger Cause INF	55	0.47397	0.6253
INF does not Granger Cause LEFT		3.21846	0.0484
TRADE does not Granger Cause INF	55	3.66084	0.0328
INF does not Granger Cause TRADE		1.20246	0.3090
UNEMP does not Granger Cause INF	55	4.23453	0.0200
INF does not Granger Cause UNEMP		1.27101	0.2895
TRADE does not Granger Cause LEFT	55	0.23190	0.7939
LEFT does not Granger Cause TRADE		0.23629	0.7904
UNEMP does not Granger Cause LEFT	55	8.07510	0.0009
LEFT does not Granger Cause UNEMP		1.00647	0.3728
UNEMP does not Granger Cause TRADE	55	5.52784	0.0068
TRADE does not Granger Cause UNEMP		1.58414	0.2152

In order to examine the causality among the variables, the Granger test was conducted. Taking a look at Granger test table at 10% significance level, in term out that there are single relationships between the variables such as from Gini to trade, from inf to left, from trade to inf, from unemp to inf, from unemp to left, from trade to inf, and from unemp to trade. In other words, this research suggests that Gini precedes trade, inf precedes left, trade precedes inf, unemp precedes inf, unemp precedes left, at last, unemp precedes trade. Moreover, Granger test shows that there is no bi-directional relationship between the variables.

Chapter 6

CONCLUSION

This chapter summarizes and discusses the findings of the study. Five countries were included in the study from Latin America. The study aims to find out if there is a statistically significant relationship between income inequality and trade openness in those countries or not. We chose the variables that might affect the inequality and tested them by fixed effects model. This chapter is also to show what the restrictions of the study and suggests further studies for the researchers who are interested in income inequality.

6.1. Discussions

The study sample is consisted of five countries: Argentina, Brazil, Colombia, Paraguay, and Uruguay. The study period was from 2000 up to 2012. The independent variables were: trade openness, unemployment, inflation, and ideology of the governing parties which is the dummy variable while the dependent variable was Gini index.

First finding of the study is the positive relationship between the trade openness and income inequality which means that if the government decided to open the country toward international markets, this would lead to more unfair distribution of income. As we know that with globalization countries integrated to the world economy through international trade. HO theory suggested that more international trade will increase the world production and income. Besides this will decrease the income gap

among countries. The question is this; does all individuals benefited equally from increasing international trade?

The second findings of the study shows that the unemployment was positively related to income inequality as the unemployment increases, the income distribution becomes more unequal. This result is consistent with the findings of some of the previous studies. The reason of this relation may spring from the facts that if the unemployment is relatively high, certainly we will find some people are jobless. Meaning that, there is no income for those who are jobless which makes the inequality to go up.

The third finding of the study was that if the people voted for leftist party and ruled by a leftist party, the income would be more fairly distributed. Some groups of the scholar claim that the leftist governments was one of the reasons that made the inequality fall down especially in South American countries. But does it really mean that the leftist governments are able to decrease the inequality among people or there were other factors that have helped them while those factors were not available for the rightist governments when they are in charge.

The last finding was that there is no relationship between inflation and income inequality which means that whether the inflation is relatively high or low, it makes no difference in the income inequality level.

6.2. Restrictions of the Study

The problem of the research usually springs from one main point. The data availability such as Gini index data. Meaning that, it is difficult to find out more than 10 observations for each country especially developing countries and it was difficult

to extend the sample to the all Latin American countries. The problem also will be more much complicated when it comes to finding data for the quantiles like the rich 10% and the poor 10%.

6.3. Further Studies

First it is possible to investigate the relationship between the trade openness and income inequality in other regions as Europe, Africa etc. Second is possible to make a comparison between the developed and developing countries.

REFERENCES

Alberto A., Rafael Di To, Robert M. (2009). Inequality and Happiness: Are Europeans and Americans Different? *Journal of Public Economics.* (88): 20-42.

Anderson E. (2005). Openness and Inequality in Developing Countries. A Review and Recent Evidence. *World Development* 33 (7): 1045-1063.

Baldwin, R. E., & Seghezza, E. (1996a). Trade-induced investment-led growth. NBER working paper no. 5582. *Cambridge, MA: NBER.*

Baro, R.J. (2000). Inequality and Growth in a Panel Data of Developing Countries. *Journal of Economic Growth*, 5, 5-32.

Barrientos A., Claudio S. (2009). New Forms of Social Assistance and the Evolution of Social Protection in Latin America. Journal of Latin America Studies. *Cambridge University Press* (41): 1-26.

Beach M., Ross F. (2005). The Impact of Macroeconomic Conditions on the Instability and Long-Run Inequality of Workers' Earnings in Canada. *Erudit Journal.* (60): 244-277.

Beck, T., Deriguc-Kunt, A., and Levine R. (2007). Finance, Inequality, and the Poor. *Quarterly of Economic Growth.* (108): 653-679.

Berg A., Jonathan D. (2011). Equality and Efficiency. *Finance and Development International Monetary Fund.* 48 (3).

Bergesen, Albert J. and Bata, Michelle (2002), Global and National Inequality: Are They Connected? *Journal of World-Systems Research, Special Issue on Global Inequality – Part I winter* 2002, 130–144.

Berman, E., and Machin, S. (2000). Skill-based Technology Transfer around the World. *Oxford Review of Economic Policy.* (108): 635-679.

Branko Milanovic (2006). Global Income Inequality: What It Is And Why It Matters? *DESA   Working Paper No. 26, ST/ESA/2006/DWP/26,* August 2006.

Bulkley G. (1981). Personal Savings and Anticipated Inflation. *The Economic Journal* 91 (361): 124-135.

Burkhard H., Bernd S. (2007). Effects of Inflation on Wealth Distribution. *Journal of Economic Dynamics and Control* 1 (31). 227-303.

Castells-Quintana D., Royuela V. (2012). Unemployment and Long-Run Growth: The Role of Income Inequality and Urbanisation. *Investigations Regionals* 12 (24): 153-173.

Charlton B.G. (1996). What Is the Ultimate Cause of Socio-Economic Inequality in Health? An Explanation in Terms of Evolutionary Psychology. *Journal of the Royal Society Medicine* 89 (1): 3-8.

Clarke G. (1995). More Evidence on Income Distribution and Growth. *Journal of Economics Development.* (47): 403-427.

Cohen Avi J, Harcourt Geoffrey (2003). Whatever Happened to the Cambridge Capital Theory Controversies? *Journal Of Economic Perspectives* 17(1): 199-214.

Cornia G., and Court J. (2003). Inequality, Growth, and Poverty in the Era of Liberalization and Globalization. *UNU World Institute for Development Economics Research* (4). ISBN 9789291900138.

Cornia, GA 2011. Income Distribution Under Latin America's New Left Regimes, Employment, inequality and globalization : a continuous concern, *London: Routledge*, 83-112.

Dan Ben - David 1993. Equalizing Exchange: Trade liberalization and Income Convergence. *Journal of Economics* (108): 653-679.

De Santic, R. A., (2009). Intra-Ind,ustry Trade, Endogenous technological change, and Wage inequality and welfare. *International Economics Journal.* (16): 59-79.

Dollar, D., Kraay, A., 2001. Trade, Growth, and Poverty, mimeo. *Development Research Group. The World Bank, Washington.*

Eric Beinhoker (2006). The Origin of Wealth: Evolution, Complexity, and the Radical Remarking of Economics. *Harvard Business School Press.*

Gao Shangquau (2000). Economic Globalization: Trends, Risks, and Risk Prevention. *CDP Background paper No. 1. ST/ ESA. P.4.*

Guillaumont-Jeanneney, S., Kopdar, K., 2011. Financial Development and Poverty Reduction: Can there be a benefit without a cost? *Journal of Development Studies* 47 (1), 143-163.

Gujarati Damodar N. (1995). Basic Econometrics. 3th Edition. New York: McGraw-Hill. ISBN 978-0-67-025182-3.

H Lane David (2007). A Guide to Measures of Trade Openness and Policy. *Claremont Graduate University Working Paper.*

Hongyi Li, Heng-Fu Zou (2002). Inflation and Income Distribution: A Cross Country Study. *Annals of Economics and Finance* (3): 85-101.

Hunt, E.K., Lautzenheiser, Mark, 2014. History of Econmomic Thought: A Critical Perspective. *PHI Learning*.

Hurrell, A., Woods, N., 2000. Globalization and Inequality. *The New political Economy of Globalization.*

Isabel O., Matthew C. (2011). Global Inequality: Beyond the Bottom Billion. *UNICF*. P.26.

Jacob W. and Zelealem Y., 2015. The Impact of Trade Openness on Growth: The Case of Kenya. *Journal of Policy Modeling* 37, 342-354.

James E. Anderson (2008). International Trade Theory, the New Palgrave of Economics. 2nd Edition. Palgrave Macmillan. ISBN 978033378665.

Jeffrey M. Wooldrige. Introductory Econometrics: A Modern Approach. 5th Edition. ISBN 9781111531041.

Jin, J., 2004. On the Relationship between Openness and Growth in China: Evidence from Provincial Time Series Data. *The World Economy* 27, 1571-1582.

John w. Mellor (1989). Dramatic Poverty Reduction in the Third World: Prospects and Needed Action. *International Food Policy Research Institute.* 18-20.

Jorge A. Charles-Coll (2011). Understanding Income Inequality: Concept, Causes, and Measurement. *Management Journals* (3): 17-28.

Julie A. Litchfield (1999). Inequality Methods and Tools. *The World Bank.*

Kopdar, K,, Singh, R., 2011. Does Financial Structure Matter for poverty? Evidence from Developing Countries. *World Bank Policy Research Working Paper, P WP55915.*

Krugman, P. (1990). Rethinking international trade. Cambridge, *Massachusetts: MIT Press.*

Levin, A., et al., 1993. Unit root Tests in Panel Data: Asymptotic and Finite Sample Properties. *University of California, San Diego (Discussion paper).*

Lorenzo G., Paolo L. (2006). Inequality Analysis- the Gini index. *Food and Agriculture Organization, United Nations.*

Maddala, G., Wu, S., 1999. A Comparative Study of Unit Root Tests with Panel Data and a new Simple Test. Oxford Bulletin of Economics and Statistics, Special Issue, November 61.

Marwrice Obstfeld (2008). International Finance, the New Palgrave of Economics. 2nd Edition. Palgrave Macmillan. ISBN 978033378665.

Mcleod D., Nora L. (2011). Inequality and Poverty Under Latin America's New Left Regimes. *Tulane Economics Working Paper 1117.*

Meszaros, Istvan (1995). Beyond Capital. London: Merlin Press. ISBN 978-85-7559-068-3.

Milanovic, Branko and Yitzhaki, Shlomo, 2002. "Decomposing World Income Distribution: Does the World Have a Middle Class?", *Review of Income and Wealth, Blackwell Publishing,* vol. 48(2), pages 155-78, June 2002.

Mirer, T. W. (1973): "The Effects of Macroeconomic Fluctuations in the Size Distribution of Income". *Review of Income and Wealth*. (19): 385-405.

Mundell, RRA, 1957. International Trade and Factor Mobility. *The American Economic Review* 47, 321-335.

Ortiz. L. & Cummins. M. (2011). Global Inequality: Beyond The Bottom Billion. *UNICEF Social and Economic Policy.*

Pissarides, C. (1997). Learning by trading and the returns to human capital in developing countries. *World Bank. Economic Review*, 11, 17-32.

Pritchett L. (1996). Measuring outward Orientation in the LDCs: Can It Be Done. *Journal of Development Economics* (49): 30-55.

Regional Human Development Report For Latin America and Caribbean (2010). Reuveny, R., Li, Q., 2003. Economic Openness Democracy and Income Inequality: an empirical analysis. *Comparative Political Studies* 36, 575-601.

Rivera-Batiz, L., & Romer, P. (1991a). Economic integration and endogenous growth. *Quarterly Journal of Economics*, 106, 531–555.

Rivera-Batiz, L., & Romer, P. (1991b). International trade with endogenous technological change. *European Economic Review*, 35, 715–721.

Romer, P. (1990). Endogenous technological change. *Journal of Political Economy*, 98, 71–102.

Shiozawa x. (2009). Samuelson's Implicit Criticism Against Staffa and Sraffians and Two other Questions. *The Kyoto Economic Review* 78(1): 19-37.

Singh, R., Huanga, Y., 2011. Financial Depending, Property Rights and Poverty: Evidence from Sub-Saharan Africa. *IMF Working Paper, WP/11/196 Washington.* International Monetary Fund.

Spilimbergo A., Juan L., Miguel S. (1999). Income distribution, Factor Endowments and Trade Openness. *Journal of Development Economics* (59): 77-101.

Stefan v. Stefanescu (2009). Measurement of the Bipolarization Events. *World Academy of Science, Engineering and Technology* 57: 929-936.

Stewart. F. (1989). Recent Theories of International trade: Some Implications for the South. *Oxford Clarendon Press*. 84-108. ISBN 0-19-82872607.

Vicente   Navarro   (2007).   Neoliberalism,   Globalization,   and   Inequalities: Consequences For Health and Quality of Life. *Baywood Publishing Company*. ISBN 0895033380. PP: 1-6.

http://databank.worldbank.org/