RELATIONSHIP BETWEEN FREE TRADE AND INCOME INEQUALITY IN SOUTH AMERICA (1990-2010)

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ABSTRACT

Latin American societies have experienced excessive income inequality. Several reasons explain this disparity from cultural and economic factors.

This research attempts to analyse whether free trade has contributed to increase economic inequality on the region, and whether this relationship is linked with how much countries have liberalised their international trade. For that, quantitative data was analysed using correlation and linear regression for the period 1990-2010 in South America. It was found that pro-market policies have different effects of inequality, according to the country.

Keywords: Inequality, South America, free trade.

RESUMEN

Las sociedades latinoamericanas han experimentado altos índices de inequidad económica, explicados por factores culturales y económicos.

Esta investigación intenta analizar si el libre comercio ha contribuido a incrementar la inequidad económica en Suramérica para el periodo 1990-2010. Para ello, se analizaron datos cuantitativos usando correlaciones y regresión linear. Se encontró que las políticas de liberalización comercial presentan efectos diferentes sobre la inequidad dependiendo de cada país.

Palabras claves: Inequidad, Suramérica, libre comercio.

JEL Classification: F1

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Introduction

In the first decade of the current century Latin America has experienced steady economic growth (IMF, 2012), largely due to continual increase in prices of commodities (food, minerals, metals and fuel), especially since 2003, becoming one of the Commodity Dependent Developing Country (CDDC)[1] regions, with more of 75% of its exports in raw materials and fuel (UNCTAD, 2013). At the same time, Latin America has the highest level of income inequality in the world (The World Bank, 2008). Some reasons come from colonial age (Coatsworth, 2008), but some facts in the recently history such as political structures during the Cold War, determined this economic disparity. But now that these countries generate revenues that can improve their development level, the phenomenon of inequality needs to be discussed from several perspectives and one of them is from their economic model used.

This research is aimed to test the following hypothesis: There is a positive relationship between free trade policies and economic inequality in South America in the period 1990-2010**.**

To achieve this, three groups of countries were compared. The first is shaped by countries, which move to implement pro-free trade policies, they are named as Liberal; the second is shaped by countries which have moved in the same way but they have reduced trade restriction in lesser level than the first group. They are named Moderated; and countries, which have moved away from free-trade policies, shape the third group and are identified as State.

This paper is structured as follow: First, it describes the problem origin and major political facts relevant to understand economic inequality in South America. Secondly, a literature review concerning theoretical frameworks about free trade and economic inequality is provided, followed by recent empirical research on the field. Subsequently, the methodology used is expounded. Next, model results are discussed, and finally further research, conclusions and recommendations are stated.

Background

Origin of Inequality in Latin America

Economy inequality in Latin America has been assessed from many perspectives, because it is not just an economic issue. But this research evaluates the phenomenon from an economic view. It is important to contextualize the reader how others factors such as colonial process also have affected economic disparity on the region. Three historical approaches are identified across the eighteenth and nineteenth centuries. The first theory states that differences in exploitation factors such as labour supply and natural resources generated concentration of land ownership in the Portuguese and Spanish colonies. That structure concentrated wealth in the European colonies and as a consequence, small elites exploited the majority of the population. As a result, the Iberian (Spanish and Portuguese) governments established institutions that protected the property of the elites but denied protection to the lower classes (Coatsworth, 2008).

The second theory argues that small colonial elites implemented an extracted model where the majorities were excluded from power and denied the protection of their rights. Following this theory, a negative correlation between GDP (Gross Domestic Production) and the rate of population growth was postulated for this period. Small populations discouraged European

1. The United Nations Conference of Trade and Development (UNCTAD) names those countries whose total commodity exports account for more than 60% of total merchandise exports as Commodity Dependent Developing Country (CDDC)

people to go to this area, which yielded slow GDP growth. In contrast, areas with high population growth were more attractive for European immigrants, and as a result the European population outgrew the native and established more egalitarian institutions, as was the case in United States. The third theory postulates that property rights for elites and subordinates were not improved by the Iberian government, as it was in the Britain and the Dutch empires, which fostered a commercial, and later industrial revolution (Coatsworth, 2008).

After Latin-American countries independence (1810 -1820), where small elites dominated vast numbers of native and slave people, the structures mentioned above remained, and backwardness persisted. A theory that explains that, it is related to incentives to de-industrialization. Anglo-American countries offered an attractive stimulus to the Latin American elite to leave manufacturing industry and concentrate their production in raw materials assuring a low cost in the supply chain for Europe. Europe then, exported specialized products at higher prices, helping their industrial revolution (Williamson, 2004).

At the end of the nineteenth century there was more political stability, which allowed modernization of the institutions, through policies such as the abolition of the slave and caste system and changes in property rights, which stimulated economic growth. Furthermore, an export-orientated economy encouraged economic growth. Nevertheless, economic inequality increased due to control of government by few elites, marginalization of competing interests and lack of institutions to protect human rights and the property of majorities (Coatsworth, 2008). For the period 1950-1980 import-substituting industrialization provided an alternative model for growth (Pérez, 1996), but the small size of the markets and lack of international support brought its collapse.

For that reason, in the 1980s, several developing countries were advised to remove restrictions such as import quotas and tariffs. As a consequence in the 1990s deep free trade liberalisation policies were implemented, much of them summarised in the Washington Consensus, a set of policies suggested by International Monetary Fund (IMF), the World Bank (WB) and the US Treasury Department in order to recover Latin America from the external debt crises.

This liberalization sought to increase the volume of exports and changed the nature of trade; countries had the opportunity to export more manufactured products and fewer agricultural and mining products (Krugman, Obstfeld, & Melitz, 2012). Nonetheless, this liberalization increased inequality in several countries, most of them developing countries. This has happened for several reasons. Firstly, commodities prices have been volatile and high. Since 2000 the commodities prices index has increased by a factor of three (International Monetary Fund, 2013), with a short fall in 2008 followed by a further sharp increase until 2014. This implied an advantage for those countries that export commodities because governments can use fiscal income in redistribution policies. However, high prices have a negative effect on domestic inequality, because most of the natural resources are concentrated in a few regions. The importing developing countries have to deal with high prices, especially in food and fuel, which reduces their capacity to import capital goods for their development, and generates food security concerns (UNCTAD, 2012).

As a consequence of the high prices of commodities, foreign capital and some food-importing countries have acquired (or leased) vast areas of land in commodity-exporting countries with the expectation that these prices would continue rise due to demographic growth, as well as to exploit the high demand for biofuels. This type of investment in the host country served as a possible threat for land distribution, food security and sovereignty (UNCTAD, 2012).

Furthermore, high prices of minerals and fuel commodities were an incentive stimulus for countries that are rich in raw materials to move the economy towards extractive model. However, this kind of sector has to deal with social problems such as intergenerational distribution, because non-renewable resources, after exploitation, do not yield benefits for future generations. Also these sectors provide little direct employment, promote geographical infrastructure concentration, limiting the use of those structures for other exporting sectors, and exacerbate regional asymmetries (UNCTAD, 2012). These are factors that affect income inequality. Additionally, in some countries with extractive economy model, a small elite o single person, extracts resources as much as can, without relative competitive improvements as technology that foster in the long run success (Acemoglu & Robinson, 2012).

According to report by UNCTAD, Transnational Corporations (TNCs) are another threat. The distribution of benefits that came from high prices of commodities in this century in developing countries that export raw materials are limited due to the ownership of natural resources being less evenly distributed than other properties. Large TNCs and trading companies dominate the international trade of commodities (UNCTAD, 2009). As a consequence, most of the benefits of the high prices are concentrated in TCNs, and fewer go to workers and producers in the sector. Moreover, TCNs enjoy better access to credits, investment, technology and expansion, increasing the gap between TCNs and small farmers and workers (UNCTAD, 2012).

The last reason to be considered is related to asymmetric negotiations between developing countries and economic powers such as the US or the EU. Agricultural goods are one of the most common tradable products for developing countries, but some international trade negotiations creates distortions by allowing the use of subsidies as credits, guarantees of credits or credit insurance, as well as impeding the inclusion of developing countries terms to offset the distortion generated by those subsidies. These asymmetries have two main effects: firstly, it allows subsidized producers to be more competitive and as a consequence, developing countries lose domestic markets to subsidized foreign exporters. Secondly, producers in developing countries find more difficult to export their products to subsidized countries, because their prices tend to be higher (Garay, Barberi, & Cardona, 2009).

Currently Political Issues in South America

Nowadays, South America is experiencing two economic and political trends. The first is more inclined towards free trade to increase and diversify their exports and to attract foreign direct investment flows. Chile, Colombia and Peru are countries that today implement neoliberal policies although most of the countries in South America have opted to boost international trade by using complementary goods and services, and to foster trade between countries of the region such as Southern Common Market (Mercosur) composed of Argentina, Brazil, Paraguay, Uruguay, Venezuela and Bolivia. The second trend, follow by countries such as Venezuela, Bolivia and Ecuador, where stronger anti-market positions have been applied. Countries such as Argentina, Brazil and Uruguay although they have softer postures, are also moving away from some free trade policies (Hemphill, 2008).

Literature review

Some research argue that trade liberalization is an instrument to stimulate economy growth and also is a way to reduce gaps and moves the world economy toward more convergence. Those arguments are based on the assumptions that world market allows that innovation and technologies flow (Baumol, 1986), (Olsun, 1982), (Rostow, 1960). Korzeniewicz & Moran quote "International product and factor markets unobstructed by either cartelization or governmental

intervention will bring irrepressible and rapid growth to any poor country" (2003). However, in this side of argumentation most of literature found, rather than postulate that free trade reduces inequality, argue that trade liberalization is a cause of economic inequality through pushing down relative wages of less skilled workers as an effect of foreign competition. The main theory that backs this statement, come from the theorem derived from the Heckscher-Ohlin model of international trade. This theorem named the Factor Price Equalization argued that prices of the factor of production (capital and labour wages) will be equalized among trading partners (Samuelson, 1948). Also, Krugman stated that when transport cost falls until critical value in a core-periphery model, where the core produces manufactured and semi manufactured goods while the raw material come from the periphery, there will be a convergence in the real income (Krugman & Venable, 1995).

On the other hand, in Latin America a strong economic school of thought, named "the dependency school" linked international trade and development. This theory is in opposite direction to the neoclassical growth theory that states, that despite productivity in manufacturing output in the center (industrialized countries) is higher than productivity growth in the production of primary products in the periphery (less industrialized countries), international trade bring a convergence in the prices. That means a higher reduction of manufacturing prices than in the prices of primary products. Nevertheless, according to "the dependency school", the effect was the opposite. Using the scheme of international division of the work, Less Developing Countries (LDCs) did not receive benefits from technological advance; these benefits tended to remain in industrialised economies, while wages in periphery countries (LDCs) tended to be low, with most of the profits accruing to developed countries (Guillén, 2004).

Similarly, Latin American authors postulated that deterioration or in other words, unfair trade terms between developed and developing countries increase inequalities between them (Prebisch, 1950), (Economic Commission for Latin America, 1969), (Furtado, 1971).

Furthermore, other studies suggest that, where markets work perfectly, free trade allows workers to pass from protected sectors towards the more efficient (unprotected) export sector, therefore increasing GDP. Nevertheless, markets are not perfect. Most workers displaced by imports cannot find another job in the short term.

Additionally some empirical research explains why international flows do not reduce inequality. These states that exchange of goods induces countries to specialize in those goods that they are more efficient in producing. Latin American countries are rich in raw materials and labour, so they attempt to export goods intensive in these areas. However, most of the commodities that they export are intensive in capital but not in labour. These types of sectors, such as oil and mining industries, offer few jobs with premium wages, but they cannot employ a vast number of the population. As a consequence, Latin American countries through international trade can not take advantage of one of their main resources: the labour force (Ramos, 2010). That situation increases the inequality through wage differences.

Other research identified that globalisation effects are not the same in all regions, because each region has different conditions in terms of natural resources, human resources, institutions and socio-political dynamics. Therefore, the effects of globalisation largely explain the poverty in sub-Saharan Africa, while liberalisation has benefited most of the poor Asian countries. Latin America is in an intermediate position (Nissanke & Thorbecke, 2010). However, studies about inequality found that income distribution tends to be worse for countries with labour–intensive diversification than those that apply import substitution policies (Francois & Rojas-Romagosa, 2004).

For the region, an analysis of income inequality in three Latin American countries, Argentina, Brazil and Mexico during the period 2000-2010, evidenced that inequality has declined significantly (Lustig, Lopez-Calva, Ortiz-Juarez, & Cases, 2012) the Gini coefficient declined in 13 of 17 Latin American countries. The decline was statistically significant and robust to changes in the time interval, inequality measures and data sources. In depth country studies for Argentina, Brazil and Mexico suggest two main phenomena underlie this trend: a fall in the premium to skilled labor and more progressive government transfers. The fall in the premium to skills resulted from a combination of supply, demand, and institutional factors. Their relative importance depends on the country. The study showed that skilled premium wage has declined, reducing the inequality gap as a result of the revival of pro-union and pro-worker activism that declined in the 1990s following neoliberal reforms.

One study made for the period 1992-2006 says that, in general, inequality has been reduced in Latin America in the first decade of this century. However, the reduction has not been the same in all countries (Gasparini, Cruces, Tornarolli, & Mejia, 2011). If sub-regions are considered, then it can be observed that in southern and Andean countries the Gini coefficient (inequality index, when the index is high means the society has a high economic inequality) increased in the 1990s and fell after 2000, while in Central American countries as Mexico the coefficient has slowly decreased.

Nevertheless, other authors have shown a greater balance in the effects of liberalization on markets in Latin America. Through a Computable General Equilibrium (CGE) model (Ganuza, Morley, Robinson, Piñeiro, & Vos, 2006) capturing part of the distribution effects of free trade, they found that trade liberalization increased output in most of the countries on the region. However, the increase was stronger in countries with foreign capital inflows and real exchange appreciation. Their model also found that labour inequality between skilled and unskilled workers increased. Nonetheless, this gap was not translated into more inequality per capita because it was offset by an increase of employment. The effect of inequality tends to be stronger in natural resource abundant economies.

Using the same model and assuming that Latin American countries move to free trade under World Trade Organization (WTO) rules, they found that in most of the countries poverty and inequality was reduced, but the effect was negative in Costa Rica, Venezuela, Paraguay and Ecuador due to the negative impact on agriculture when employment was not compensated. Also, they found that in Argentina and Brazil export subsidies reduced poverty, in contradiction with WTO rules.

After this literature review it was not found a convergence within results. The debate is still open and an approach to this problem using groups of countries shaped according to their trade liberalization level, would add a new step to this discussion.

Methodology

To test the hypothesis: There is a positive relationship between free trade policies and economic inequality in South America in the period 1990-2010, firstly, variables analysis was made in order to select the most accurate, through correlation analysis to avoid multicolinearity, and then it was tested which Dependent Variable (DV) was better adjusted.

After this analysis, a regression model for period 1990-2010 with all countries was run. However, this model shows contradictory results. Therefore, new models were running for groups of

countries whose have a similar trend in trade liberalization polices. Nevertheless, the finds were ambiguous. As a consequence new models for all countries were run for each decade of analysis 1990s and 2000s.

Data

Countries to analyse

Although this investigation is about the relationship between liberalisation policies and the behavior of inequality in South American countries, Trinidad and Tobago, Guyana and Suriname were not considered due to a lack of data for most of the period to be analysed.

Period of analysis

The period of analysis is from 1990, when the main policy changes of the second half of twentieth century occurred: The end of the Cold War, with the fall of Berlin Wall and the end of Soviet Union. These milestones brought the beginning of a great globalisation. Latin America was not indifferent to these changes: military dictatorship came to an end, and the economic crisis of the 1980s affected most of the countries in the region. As a consequence, the Washington Consensus, endorsed by the World Bank, the International Monetary Fund (IMF), and the US treasury, was applied in order to tackle the crisis through the implementation of macroeconomic measures such as trade liberalisation and Foreign Direct Investment (FDI). This research analyses until 2010, when most of the data was collectible.

The time frame is panel data. That means several time-series for South American countries were collected. This is a suitable technique in order to correlate specifics variables and design a lineal regression model, the technique used. The period of analysis is 20 years (data comes by years).

Variables

Income inequality is treated as a Dependent Variable (DV) within a regression model. Variables that will explain economic inequality were treated as independent variables and were named Explanatory Variables (EV), and for each of them was tasted their significance. These EV are related in theoretical terms with measures that evaluate whether an economy is more or less liberalised.

After having collected a wide range of data series, the next step was to select the most suitable variables to design a model. Several factors determine this classification: firstly, quality of data. This criterion is based on the number of observations for the period of analysis. Each data series has observations for each of the ten countries analysed and for each decade 1990s and 2000s. Additionally, the minimum number of observations for each dataset variable had to be at least 65%. Secondly, reliability of the sources; fortunately all the sources used are highly academically trusted due to having come from multilateral organisations, universities or renowned think tanks and thirdly theoretical relevance of the variables into this research.

When it was not possible to collect 100% of the observations, an adjustment was made. In this case the same adjustment methodology used in previous inequality across countries researches was followed. For each pair (country/year) that observation was not available, the nearest previous data to the year in question for each country was used (Isagiller, 2011).

Statistical technic

Correlation analysis is the first step to find relationships between variables. It allows the assessment of linear association between phenomena (Montgomery & Runger, 1996), but do not necessarily determine causality.

Variables were analysed in a first step through scatter plots, when correlations were identified. Subsequently, statistical analysis such as correlation was made in order to avoid multi-colinearity. Later a linear regression model based on the least square method was run, using a level of significance of 5%. The dependent variable was the Gini Coefficient and independent variables were poverty, education, GDP per Worker, income share of highest 10% and lowest 10%, tax burden, FDI, tariff rate, restriction trade index and openness.

Logarithms were used in order to fit the model when residuals are not normally distributed, when using a linear model thevariables have multiplicative or nonlinear relationship, and interpret the results as elasticity. The software used for that statistic analysis was Microsoft Excel.

Quality of variables

In the former step the variables used were: Gini (Index) which is broadly used to analyse the size of distribution of income and wealth (moves in the range 0 to 100, where 100 is the most income inequality and 0 the least), versus variables that could explain inequality such as poverty, education, GDP per worker, income share by the richest 10%, income share by the poorest 10%, tax burden, FDI, tariff rate, restriction trade index and openness. These variables are broadly explained on the Appendix 1.

Gini (in this case DV) versus EV were plotted by scatter graphs in order to identify outlier observations, and at the first stage which variables have a stronger association with the variable to be studied (See Appendix 2). As was expected, education, and GDP per worker showed a negative correlation and the strongest positive correlation was described by poverty. FDI Inward indicates a positive correlation with income inequality, while FDI Outward does not show a strong one. Income share held by highest 10% and lowest 10% describe the same trajectory; therefore, if both were used on linear regression model, they would create multicolinearity. Openness and Gini suggest a slightly negative correlation, while political globalisation, trade restriction and tariffs rate describe a great dispersion.

Analysis of correlation is made to identify which variables are highly correlated in order not to consider them in the subsequent linear models, because this strong relationship has a major impact on the coefficients of the explanatory variables in the multiple regression equation (Newbold, Carlson, & Thorne, 2012). Results of this correlation analysis are on Appendix 3.

After this correlation analysis EV defined were: poverty headcount ratio at $2 a day, tertiary education, income share by highest 10%, unemployment, GDP per worker, taxation, FDI stock inward, openness, tariff rate and trade restriction.

Two variables describe Gini coefficient:

- Gini Net: Gini Index of inequality by household disposable income (Post-Tax and Post Transfer);

- Gini Market: Gini Index of inequality by household disposable market (Pre-Tax and Pre-Transfer).

Hence, a model for each variable (Gini Market and Gini Net) was run in order to compare the difference between results (Appendix 4).

Although both models were significant, the lineal regression using Gini Market describes a more accurate model. The coefficient of determination R and the coefficient of multiple correlations R-square were higher than the Gini net model. Additionally, the standard error was higher regarding Gini net variable.

Next table summarized variables for the model used (Table 1).

Table 1. Model Variables

Independent Variable (IV)	
Economic Inequality	Gini Coefficient Market
Explenation Variables (EV)	
Poverty	Poverty headcount ratio at $2 a day
Education	Enrolment ratio tertiary education
Income	Income share held by highest 10%
Unemployment	Unemployment, total
GDP	GDP per Worker
Tax	Taxation (%)
FDI	ln FDI Stock Inward
Explenation Variables (EV)	
Trade Liberalization	Openness
	Tariff rate, all products (%)
	Trade Restriction

For this model is expected that poverty, income (as a concentration of revenue), unemployment, FDI and trade liberalization measures increase the economic inequality, while education, GDP per worker and taxation foster its reduction.

Economic inequality:

Poverty – education + income share + unemployment – GDP per worker – tax + FDI + trade liberalization

Classification of countries

The objective of this research is to evaluate whether income inequality is related to free trade liberalization in South America. For that, with regard to the political environment in the region, and using freedom indexes as measure of trade liberalization elaborated by the Heritage Foundation (An American conservative think tank), countries were classified into three groups: Liberal, Moderate and State.

This indicator ranges between 0 and 100, where 100 represents complete freedom to trade. It assesses the trade-weighted average tariff and non-tariff barriers.

For the period of analysis, for all countries, the average variation in the trade freedom index is 9%. For this research countries are classified according to individual variation. If this has been over the average (10% or more), those countries are classified as a group of them that have moved toward more trade liberalization model and they are named "liberal": Brazil, Peru, Chile

and Uruguay. Countries with a positive variation but less than 10% are classified as "moderate" in the evolution to liberalization policies. These are Argentina, Bolivia, Colombia, Ecuador and Paraguay. And those with negative variation mean that they are moved towards more protective model. They are named "State", in this case Venezuela (Table 2).

Table 2. Trade freedom variation

Country	Trade freedom 1990s (Average)	Trade freedom 2000s (average)	Absolute difference	% variation
Argentina	59,92	62,70	2,78	5%
Bolivia	69,16	73,95	4,79	7%
Brazil	57,12	63,95	6,83	12%
Chile	69,40	77,33	7,93	11%
Colombia	63,04	67,86	4,82	8%
Ecuador	65,00	65,78	0,78	1%
Paraguay	66,36	70,25	3,89	6%
Peru	59,16	68,35	9,19	16%
Uruguay	67,80	74,40	6,60	10%
Venezuela	65,48	60,00	-5,48	-8%

Results and discussion

Analysis for all countries (1990-2010)

Results presented for the whole model using as a dependent variable Gini market (Table 3), describes as was expected, that poverty and income held by highest 10% have a positive relationship with inequality, and education has A negative one (enrolment ratio in tertiary education). However, taxation showed a different behavior according to the theory that postulates that tax burden is a way to boost development (Gomez-Sabaini & Jimenez, 2012). Furthermore, some studies found a negative relationship between tax burden and income distribution (Pessino & Fenochietto, 2010), but in this model the relation is positive. This behavior could be explained for two reasons: firstly, the variable used could be a not an accurate measure of the taxation system, despite its significance. Secondly, level of taxation in Latin America is low (18.3% of the GDP) compared with developed countries (average 35.5%), hence it does not impact on the reduction of inequality as was expected.

Unemployment is here not significant, contrary to the findings of previous research that suggests that labour share has a statistically and economically significant impact on income inequality (Bertoli & Farina, 2007).

Liberalisation variables such as FDI are regarded as a significant variable with a positive relation. Openness is a significant variable with a negative relation. Means that a reduction in the openness index will increase income inequality. However, trade restriction, which is a variable that assesses mean tariff rate, hiding import barriers, taxes on international trade (percentage of current revenue) and capital account restrictions, (moves in the range 0 to 100, where 0 means the least

globalised and 100 the most) is a significant variable with a positive correlation (Dreher, Gaston, & Martens, 2008). However, tariff rate even if it has a positive relation is not a significance variable.

Table 3. Linear regression all countries (1990-2010)

Dependent Variable:	Gini Market			
R	0,92168			
R Square	0,84949			
Adjusted R Square	0,84193			
Standard Error	0,0408			
Total Number Of Cases	210			
	SS	MS	F	p-level
Regression	1,86982	0,18698	112,31666	0,E+0
Residual	0,33129	0,00166		
Total	2,20111			
Independent Variables		t Stat	p-level	H0 (5%) rejected?
Intercept	2,485592162	14,25302	0,E+0	Yes
Poverty headcount ratio at $2 a day	0,017201809	3,2811	0,00122	Yes
Enrolment ratio tertiary education	-0,036569314	-3,94006	0,00011	Yes
Income share held by highest 10%	0,439418076	15,0132	0,E+0	Yes
Unemployment, total	-0,015690853	-1,77634	0,07721	No
GDP per Worker	-0,044558887	-4,04098	0,00008	Yes
Taxation (%)	0,048800479	4,27613	0,00003	Yes
ln FDI Stock Inward	0,021254717	3,24065	0,0014	Yes
Openness	-0,021792522	-3,41953	0,00076	Yes
Tariff rate, all products (%)	0,009201043	1,02251	0,30778	No
Trade Restriction	0,047257185	3,28698	0,0012	Yes

At this stage, the model presents contradictory results. While openness has a negative relation with inequality, trade restriction has a positive. As a consequence it is important to analyse if the relationships between inequality and free trade in different South American countries have different behaviors. Then, countries were classified in three groups regarding the change on their liberalisation policies, and for each group a model was run in order to avoid the previous contradictions.

Analysis for groups of countries

The linear model was run for each group (Table 4). The three models were significant. For the Liberal model, tariff rate was the unique variable that describes free trade liberalisation with a significant inverse relationship with Gini. For Moderate model, trade restriction and tariff rates were significant, with a direct influence over inequality. In the State model, although it showed the highest R and R-square coefficients and the lowest standard error, had no significant variables. Shortage of data could be a reason (Table 5).

Table 4. Linear regressions by type of country

Group of country	Liberal				Moderate				State			
R	0,9575				0,89541				0,97417			
R Square	0,91681				0,80176				0,94901			
Adjusted R Square	0,90541				0,78067				0,89801			
Standard Error	0,0343				0,03826				0,01777			
Total Number of Cases	84				105				21			
	SS	*MS*	*F*	*p-level*	*SS*	*MS*	*F*	*p-level*	*SS*	*MS*	*F*	*p-level*
Regression	0,94629	0,09463	80,44985	0,E+0	0,55642	0,05564	38,01817	0,E+0	0,05877	0,00588	18,60993	0,00004
Residual	0,08587	0,00118			0,13758	0,00146			0,00316	0,00032		
Total	1,03216				0,694				0,06193			
Independent Variables	*Coefficients*	*t Stat*	*p-level*	*H0 (5%) rejected?*	*Coefficients*	*t Stat*	*p-level*	*H0 (5%) rejected?*	*Coefficients*	*t Stat*	*p-level*	*H0 (5%) rejected?*
Intercept	3,02146	8,29009	4,01257E-12	Yes	2,41796	8,54131	2,30815E-13	Yes	2,30195	1,2073	0,2551	No
Poverty headcount ratio at $2 a day	0,02704	2,12676	0,03682	Yes	0,01105	1,23512	0,21987	No	0,02343	0,51609	0,61701	No
Enrolment ratio tertiary education	-0,07727	-3,11463	0,00263	Yes	-0,00887	-0,46447	0,64339	No	-0,06628	-1,82333	0,09824	No
Income share held by highest 10%	0,34709	6,24202	0,	Yes	0,38161	9,55987	1,55431E-15	Yes	0,3554	1,48313	0,16886	No
Unemployment, total	-0,015	-0,84279	0,4021	No	-0,00377	-0,26981	0,7879	No	0,02508	0,28376	0,78238	No
GDP per Worker	0,01069	0,27532	0,78385	No	-0,04564	-1,87904	0,06334	No	0,02182	0,12405	0,90374	No
Taxation (%)	-0,03298	-1,60783	0,11219	No	0,02864	0,89429	0,37345	No	-0,07091	-1,43839	0,18088	No
ln FDI Stock Inward	0,03097	2,31906	0,02319	Yes	0,01377	1,08304	0,28156	No	0,00259	0,13578	0,89469	No
Openness	-0,01365	-1,48778	0,14112	No	-0,00603	-0,69954	0,48594	No	0,01286	0,83699	0,42215	No
Tariff rate, all products (%)	-0,02532	-2,19467	0,03137	Yes	0,03201	2,09023	0,0393	Yes	-0,0051	-0,05015	0,96099	No
Trade Restriction	-0,03867	-1,01338	0,31422	No	0,08919	3,80045	0,00026	Yes	0,06572	0,83923	0,42095	No

Table 5. Liberalisation variables significance by group of countries (1990-2010)

Group of countries	Liberal		Moderate		State	
Liberalization variable	Significance	Gini Relation	Significance	Gini Relation	Significance	Gini Relation
Openness	No		No		No	
Tarif rate	Yes	Inverse	Yes	Direct	No	
Trade restriction	No		Yes	Direct	No	

The relationship between income inequality and pro-market policies such as reductions in tariffs is not clear from the first exploratory analysis. It was expected that countries which highest reduction in tariffs would experience an increase in their Gini coefficient. However, this effect was not the same for all countries. Argentina, Bolivia, Ecuador, Paraguay and Peru experienced an increase in Gini coefficient when tariffs were reduced, but the impact was different within these countries. In Peru tariffs were reduced by 42% but the Gini index only increased by 1.33%. In Ecuador, however, the Gini coefficient was increased by 3.91%, while tariffs were reduced just by 1.57%. On the other hand, Colombia and Uruguay, despite an increase to their tariffs, also

increased their Gini index. In countries such as Chile, Brazil and Venezuela both tariffs and Gini coefficient were reduced for the period of analysis (Table 6).

Table 6. Variation in tariff and variation in Gini index

Reduction in tariffs and Increase in Gini

	Tariffs				GINI			
	Average 1990s	Average 2000s	Absolute differences	% Differences	Average 1990s	Average 2000s	Absolute differences	% Differences
Argentina	14,323	12,385	-1,937	-13,53%	45,543	46,689	1,146	2,52%
Bolivia	9,646	8,092	-1,555	-16,12%	53,482	55,811	2,329	4,35%
Ecuador	11,259	11,083	-0,176	-1,57%	48,852	50,761	1,909	3,91%
Paraguay	12,715	10,085	-2,630	-20,68%	49,038	51,500	2,462	5,02%
Peru	15,882	9,204	-6,678	-42,05%	48,013	48,653	0,640	1,33%

Reduction in tariffs and reduction in Gini

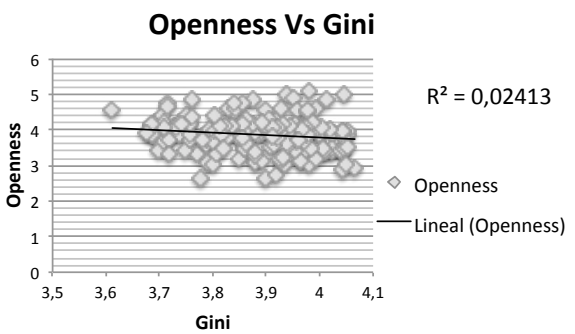
	Tariffs				GINI			
	Average 1990s	Average 2000s	Absolute differences	% Differences	Average 1990s	Average 2000s	Absolute differences	% Differences
Brazil	18,815	13,674	-5,141	-27,32%	57,246	53,414	-3,832	-6,69%
Chile	10,689	5,194	-5,495	-51,41%	52,188	51,202	-0,986	-1,89%
Venezuela	14,876	12,776	-2,100	-14,12%	43,714	42,919	-0,795	-1,82%

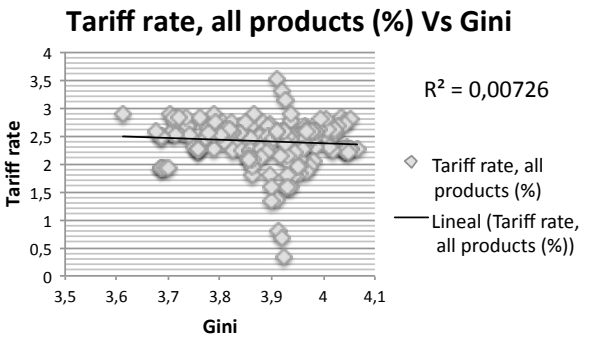
Reduction in tariffs and increase in Gini

	Tariffs				GINI			
	Average 1990s	Average 2000s	Absolute differences	% Differences	Average 1990s	Average 2000s	Absolute differences	% Differences
Colombia	11,285	11,631	0,346	3,07%	51,280	52,279	0,999	1,95%
Uruguay	10,675	11,214	0,538	5,04%	40,493	42,419	1,926	4,76%

This lack of relation was found in the scatter diagrams (Graph. 1). Variables that in this research attempt to describe trade liberalisation showed either a slight or no relationship with the Gini coefficient or none at all. In general, income inequality has a big dispersion with free trade variables. Openness is the variable with the highest correlation index, but this value is so low (R-square = 0.0243) that means, there is a weak link between income inequality and openness.

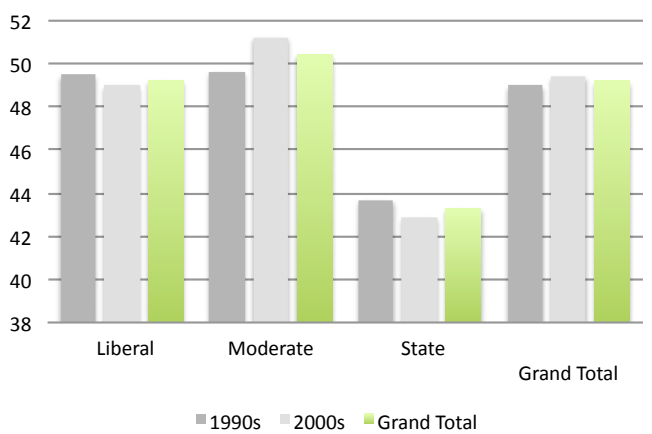
Graph 1. Scatter graphs Gini Vs free trade variables





For the liberal and moderate groups of countries openness is not a significant variable, while tariff is a significant variable but with a different effect: for liberal countries the linkage is negative, while for moderate countries the effect is positive. Additionally, whether Gini market is analysed by group of countries (Graph. 2), it is not conclusive that there is a linear relationship between inequality and how pro-market the countries are. In Graph 2 State Countries (Venezuela), which are characterised by the deployment of anti-market policies, has the lowest Gini Market index. However, Liberal Countries (Brazil, Peru, Chile and Uruguay) have the second lowest rather than Moderate Countries (Argentina, Bolivia, Colombia, Ecuador and Paraguay).

Graph. 2. Gini Market by group of countries



These first ambiguous results are coherent with the vast range of theoretical and empirical research presented in the introductory and literature sessions. Some authors have found that trade liberalisation reduces inequality or is not a cause of it, such as (Warf & Stutz, 2007), (Baumol, 1986), (Olsun, 1982), (Rostow, 1960), (Korzeniewicz & Moran, 2003), (Samuelson, 1948). Other investigations postulate that inequality could be in part explained by pro-market policies: (UNCTAD, 2012), (International Monetary Fund, 2013), (Coatsworth, 2008), (Stiglitz, 2012) (Krugman et al., 2012).

In brief, although the three models are significant, contradictions persist. For Moderate countries, variables that represent free trade and were significant (tariff rate and trade restriction) when there were an increase, this generates increase on inequality indexes, while for liberal countries the significant variable that describes free trade (the tariff rate) had a negative effect on inequality. This means reduction in the tariff rate increases income inequality.

In addition the model failed to produce any significant variables regarding countries that have moved away from pro-market policies - in this case just Venezuela. Here a lack of data could be an explanation. This is one of the countries with a greater shortage of data, especially for the last period of analysis, where the government has neglected to publish several kind of statistics (AFP, 2013).

Analysis for decades

Considering that in the 1990s deep free trade liberalisation policies were implemented, much of them summarised in the Washington Consensus, and that in the 2000s a large number of countries have moderated some of these measures, it is convenient to analyse these relationships from another perspective. For that, two models were run: for the 1990s and for the 2000s (Table 7). In the 1990s results were ambiguous: openness and trade restriction are significant, but describing different effects. Openness shows a negative effect on inequality, while trade restriction shows a positive behaviour. In that sense it is not possible draw a conclusion.

The model for the 2000s shows the highest R and R-square coefficient and the lowest standard error. For the 1990s openness is a significant variable with a negative relationship to inequality, while trade restriction describe a positive relation. For the 2000s openness and trade restriction are not significant, but tariff rate tracks a significant negative relationship with the Gini index (Table 8).

Table 7. Linear regressions by decade

Decade	1990s				2000s			
R	0,91446				0,96865			
R Square	0,83623				0,93829			
Adjusted R Square	0,81783				0,93206			
Standard Error	0,04797				0,02422			
Total Number Of Cases	100				110			
	SS	*MS*	*F*	*p-level*	*SS*	*MS*	*F*	*p-level*
Regression	1,04569	0,10457	45,44475	0,E+0	0,88269	0,08827	150,53123	0,E+0
Residual	0,20479	0,0023			0,05805	0,00059		
Total	1,25048				0,94074			
Independent Variables	*Coefficients*	*t Stat*	*p-level*	*H0 (5%) rejected?*	*Coefficients*	*t Stat*	*p-level*	*H0 (5%) rejected?*
Intercept	2,36585	9,26078	1,08802E-14	Yes	2,62865	12,47132	0,E+0	Yes
Poverty headcount ratio at $2 a day	0,02829	3,27035	0,00153	Yes	0,00945	1,7322	0,08635	No
Enrolment ratio tertiary education	-0,01585	-0,83873	0,40387	No	-0,02117	-2,22357	0,02845	Yes
Income share held by highest 10%	0,46487	10,91445	0,E+0	Yes	0,49624	13,87074	0,E+0	Yes
Unemployment, total	0,00462	0,30626	0,76012	No	-0,00441	-0,45423	0,65066	No
GDP per Worker	-0,06858	-3,75722	0,00031	Yes	-0,06439	-4,92523	0,	Yes
Taxation (%)	0,06085	2,41653	0,01771	Yes	0,04914	5,09506	0,	Yes
ln FDI Stock Inward	0,00983	0,87615	0,38331	No	0,04616	6,46117	0,	Yes
Openness	-0,02576	-2,41881	0,01761	Yes	-0,00854	-1,55895	0,1222	No
Tariff rate, all products (%)	0,02863	1,43364	0,15518	No	-0,02265	-2,80905	0,00599	Yes
Trade Restriction	0,07109	2,48878	0,01468	Yes	-0,02598	-1,80729	0,07375	No

Table 8. Liberalisation variables significance by decade (all countries)

Decade	1990		2000	
Liberalization variable	Significance	Gini Relation	Significance	Gini Relation
Openness	Yes	Inverse	No	
Tarif rate	No		Yes	Inverse
Trade restriction	Yes	Direct	No	

For the 2000s, just one variable of the three that describe free trade (openness, tariff rate and trade restriction) was significant (tariff rate), with a negative effect. In this case the main hypothesis could be partially tested. For the last decade reduction on tariffs have described a negative effect over income inequality.

A main consideration during this study was the data set. Although sources are reliable, some observations were missing and an adjustment must be done. This lack of data reduces the quality of the model. Furthermore, although the indexes used are a good alternative to assess economic behavior, they have some problems. Gini coefficient is criticised because it does not show a clear mapping through aggregation from individual preferences to an aggregate social welfare function (Francois & Rojas-Romagosa, 2004). Moreover, indexes elaborated by the Heritage Foundation - used in this research to classify countries between Liberal, Moderate or State - has been considered subjective and to suffer from judgment biases (Rodriguez & Rodrik, 2001).

Conclusions, recommendations and further research

Conclusions

Initially an exploratory analysis was made and no linear relationship between free trade policies and income inequality was found for the whole region for the 1990-2010 period. Then, countries were classified in three groups, according their variation of pro-market policies for the same period of time. Countries with less market orientation (Venezuela) have the lowest income inequality, but Liberal countries (Brazil, Peru, Chile and Uruguay) do not have the highest. Moderate countries (Argentina, Bolivia, Colombia, Ecuador and Paraguay), which are in the middle of the pro-market policies, hold the highest.

Additionally, it was found that for moderate countries an increase in both tariffs and trade restriction created more inequality. These results are coherent with previous researches that postulate that trade liberalisation reduces inequality or at least is not its cause, such as (Warf & Stutz, 2007), (Baumol, 1986), (Olsun, 1982), (Rostow, 1960), (Korzeniewicz & Moran, 2003), (Samuelson, 1948).

However, for liberal countries reductions in tariffs generated more inequality. This finding, although contradictory to the results for moderate countries, is consistent with previous research that states that inequality could be in part explained by pro-market policies, such as UNCTAD (2012), International Monetary Fund (2013), Coatsworth (2008), Stiglitz (2012).

Considering the contradictory results for each group of countries it is not possible to test the main hypothesis: There is a positive relationship between free trade policies and economic inequality in South America in the period 1990–2010. However, it is conclusive that for liberal countries (Brazil, Peru, Chile, Uruguay) reduction in tariff rate generates increase in economic inequality in the period 1990 - 2010 and for moderate countries (Argentina, Bolivia, Colombia, Ecuador, Paraguay) augmentation in tariff rate and trade restriction increases economic inequality in the period 1990 - 2010. Findings in this research are coherent with the results of Francois & Rojas-Romagosa who found that in relatively low-income countries high import protection, such as tariffs, is associated with greater inequality, but in relatively high-income countries high levels of protection improve income distribution (Francois & Rojas-Romagosa, 2004).

For the period 2000-2010 for the whole region the main hypothesis can be tested: reduction in tariffs generates an increase in the inequality income.

Recommendations

Regarding previous results, public policies should be aimed at tailoring policies according to the characteristics of each country. For liberal countries, governments may attempt to determine whether the level of liberalisation is optimal or whether complementary policies need to be deployed in order to reduce inequality. On the other hand, governments from moderate countries may reduce tariffs and restrictions to enjoy the benefits from free trade such as technology and knowledge transfer, reduction in prices by imports from more efficient countries and market expansion.

Further research

It is highly recommend that the analysis of the income inequality problem in South America continues, but regarding the specifics of each country in order to avoid several contradictions that were found in this investigation. Additionally, analysis of why liberalisation policies do not have a stronger relationship on income inequality for South American countries is an important research now that the world has become one market. Additionally, further research for Venezuela with good quality data is highly recommend in order to get the whole picture about inequality in South America and test whether their economic measures have shown benefits that could be implemented across the rest of the region.

In the linear regression for the 1990s and 2000s an increase in taxation produced an increase in income inequality, results that are in contradiction with previous research, which found a negative relationship between tax burden and income distribution (Pessino & Fenochietto, 2010). An interpretation of this result is that the tax burden in Latin America is not high enough to generate a reduction in inequality. However, before stating this assumption more in-depth research with other variables that explain taxation system must be done.

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APPENDICES

Appendix 1.Variables definitions

Poverty: Giovannoni in his study postulated that poverty and inequality describe a similar pattern (Gionvannoni, 2010). In addition others remark that any country that attempts to efficiently reduce poverty must choose its minimum level of inequality (Cornia & Court, 2004), (The World Bank, 2008).

The variable used is the poverty headcount ratio at $2 a day (PPP) (% of population) collected from the World Bank. This dataset held 66% of the observations.

Education: In most of the studies when income inequality is the variable to analyse, education is one of the explanatory variables. Some examples are the research made by Haughton & Khandker, Baltzer and Gasparini (Haughton J & Khandker SR, 2009), (Baltzer & Baten, 2008) especially during the 1980s. Moreover, inequality could play a role, either in favor of \"opening\", as Stolper-Samuelson models would predict, or in favor of closing, as recent empirical studies found that open periods were associated with higher inequality. Using anthropometric indicators, we find that inequality in general tended to motivate \"closing\", whereas inequality did not stimulate opening". Bourguignon and Verdier in Hsu studied the relationship between economic development, democracy and inequality in a model where political participation is given by education level (Hsu, 2008). Also in the investigation made about trade liberalisation and self-employment in Mexico it was found that education is an important contribution to the increase in inequality, when as an effect of liberalisation the demand for skilled labour is increased (Popli, 2010).

Two series of data about education were collected. One is public spending on education, total (% of GDP) taken from the World Bank with 57% of the observations. However, this data could have two problems: the shortage of observations and the period of time analysed. This is only 20 years, and the effects of education policies can take more than two decades to be realised. For this, another source of data was searched. Unesco, the agency for education of United Nations, provides a wide dataset of variables relating to this topic. Gross enrolment ratio ISCED 5 and 6[2] was the variable chosen. It records the percentage of people of the official school-age population corresponding to the same level of education that are enrolled in tertiary education (university level). The aim in selecting this variable was to capture the effect of education on inequality faster. The percentage of observation is 67%.

Income share: Economic inequality is defined by the distribution of wealth. The Lorenz curve is an illustration of the cumulative income distribution by percentage of population (Lubrano, 2012). The Gini coefficient is a derivation of this curve, and the percentage of wealth held by the 10% richest and 10% poorest of the population is a picture about how homogeneous the distribution of wealth is.

The variables used are income share held by highest 10% and income share held by lowest 10%. This data is collected from the World Bank with 66% of the observations.

Unemployment: Some authors such as Grilli (Grilli, 2005) and Gasparini (Gasparini et al., 2011) state that as a consequence of several market-orientation reforms in the 1990s in Latin America,

2. ISCED (International Standard Classification of Education) is statistical framework maintained by Unesco in order to compile data about education within any country and across countries. In this classification level 5 and 6 make reference to tertiary education.

which included privatisation, financial and trade liberalisation, labour market reforms and de-regulation, technical upgrades and capital accumulation were incentivised but accompanied by increasing unemployment levels. Furthermore, Cornia & Court (2004) remark that technological changes, which are one of the advantages of liberalisation, bring a bigger challenge for a growth strategy that hopes to keep inequality at an efficient level when demand for skill increases the potential dispersion of wages.

The variable used records the percentage of the total labour force available to work, but without a job and seeking employment. This data came from the World Bank with 95% of observations.

GDP per worker: Trade between industrialised countries which are abundant in skills and developing countries which are rich in unskilled labour reduces the wages of less-skilled workers and increase the salaries of highly skilled employees. Additionally, most of the commodities that are exported from Latin America are intensive in capital but not in labour, such as the mining and oil sectors (Ramos, 2010). These industries offer a few jobs with premium wages but they cannot employ a wide range of the population. Those factors affect income inequality in the region.

The variable used was real GDP per worker, which is based on an economically active population and was collected from the University of Pennsylvania and holds 100% of observations (Heston, Summers, & Ate, 2012).

Tax burden: Low levels of tax burden characterise Latin America (18.3% of the GDP) compared with other countries such as members of the Organization for Economic Co-operation and Development (OECD), whose average tax is 35.5%. Tax burden is a way to foster development because it allows countries to increase their spending on infrastructure and education, amongst other things (Gomez-Sabaini & Jimenez, 2012). Another study made by Pessino & Fenochietto (2010) using a stochastic tax frontier for 96 countries, found a positive relationship between levels of development, trade, education and tax burden. It also found a negative relationship between tax burden and income distribution (GINI index), price levels, corruption and the ease of collecting taxes.

Tax burden (three years average as %GDP) was the variable analysed. Data was collected from the research made by United Nations about tax structure and evasion for Latin America (Gomez-Sabaini & Jimenez, 2012) (Cepal , 2013).

Foreign Direct Investment (FDI): Several benefits have been attributed to FDI, such as the transfer of knowledge and stronger backward and forward relationships with customers of intermediate inputs produced by foreign companies and domestic suppliers. In that sense empirical research for a panel of 85 countries shows that countries that promote liberalised polices gain notably from the presence of multinational companies (Azman-Saini, Baharumshah, & Law, 2010). On the other hand, a recent study about globalisation, poverty and inequality in Latin America states that numerous facts associated with the current stage of globalisation have inflicted negative effects on the poor; one of them is FDI flows, which have not led to enough access to potential benefits from technology and management transfer in the host countries (in this case developing countries) (Nissanke & Thorbecke, 2010).

Variables used to analyse the effect of FDI over inequality are foreign direct investment, net inflows (% of GDP) and foreign direct investment, net outflows (% of GDP). These datasets were collected from the UNCTAD with 100% of the observations.

Openness: Montalbano, in his research about vulnerability of developing countries as a consequence of openness, shows several researches with contradictory results (Montalbano, 2011). He highlights the studies made by Frankel & Romer (1999), Sach & Warner (1997), Dollar & Kraay (1992), among others, which state that openness has a significant positive correlation between trade liberalisation, poverty reduction and growth. However, Montalbano also notices that research made by other authors explain the undesirable effects of trade openness on inequality and poverty.

One of most straightforward measures of openness is simple trade share, which is represented by exports plus imports divided by the real GDP[3]. This is one of the variables used in this research to describe how pro-market a country is. Data was collected from Pennsylvania University (Heston et al., 2012), with 100% of the observations.

Tariffs: This is a measure that captures differences in trade share by countries (Skipton, 2003). Empirical research has tested the relationship between tariffs and inequality, finding that in relatively low-income countries high import protection, such as tariffs, is associated with greater inequality while for relatively high-income countries high levels of protection improve income distribution (Francois & Rojas-Romagosa, 2004). On the other hand, Rodríguez found that tariff restriction is negatively associated with growth (2006).

This research attempts to analyse the effect of tariffs as liberalised measures on inequality. For that it used the variable simple mean applied tariff for all products (%). 'This is unweighted average of effectively applied rates for all products subject to tariffs calculated for all trade goods' (The World Bank, 2013). The dataset held 79% of the observations.

Restriction trade index: This indicator makes a part of the KOF indexes designed by the University of Zurich. It attempts to assess globalisation in three dimensions: economic, social and political. Restriction trade index is one of the measures that evaluate economic globalisation regarding hiding import barriers, mean tariff rate, taxes on international trade (percentage of current revenue) and capital account restrictions. This moves in the range 0 to 100, where 0 means the least globalised and 100 the most (Dreher et al., 2008).

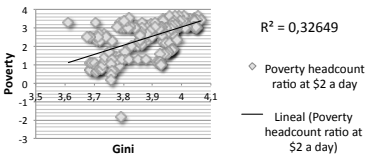
Political globalisation: In order to evaluate if government style, in terms of greater or lesser globalisation, has a correlation with pro-market policies and hence has a relationship with inequality, it is used the variable political globalisation, one of the KOF indexes' measures, that assesses the number of embassies in countries, membership of international organisations, participation in U.N. security council missions, and number of international treaties signed. The indicator range is between 0 to 100, where 0 means the least globalised and 100 the most (Dreher et al., 2008).

3. Real GDP makes reference to GDP plus consumption, investment, government and exports, and subtracting imports in any given year (Heston et al., 2012).

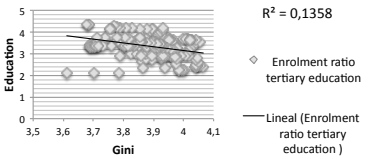
APPENDIX 2

Graph 3. Scatter graphs Gini Vs Explanatory variables

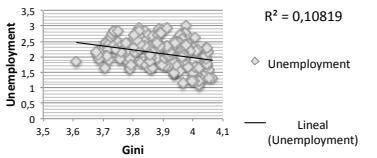
Poverty headcount ratio at $2 a day (% of population) Vs Gini



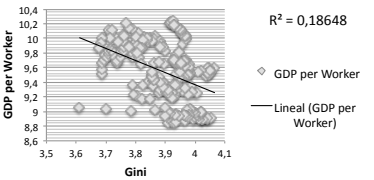
Enrolment ratio tertiary education Vs Gini



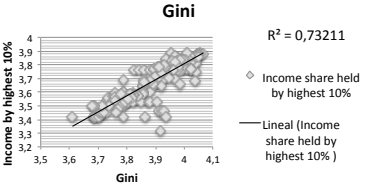
Unemployment, total (% of total labor force) Vs Gini



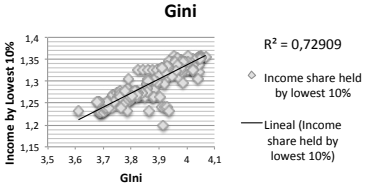
GDP per Worker Vs Gini



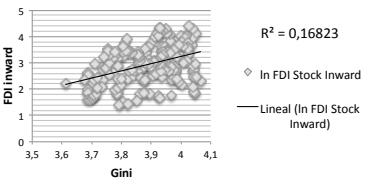
Income share held by highest 10% Vs Gini



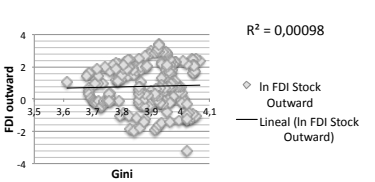
Income share held by lowest 10% Vs Gini



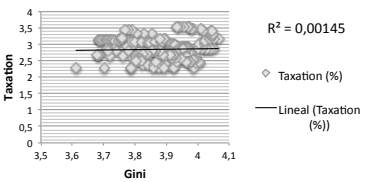
FDI Stock inward Vs Gini



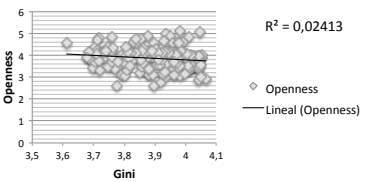
FDI Stock outward Vs Gini



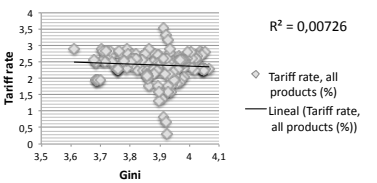
Taxation (%) Vs Gini



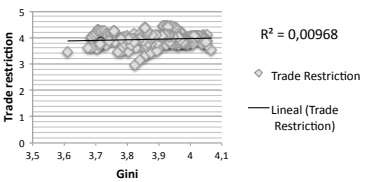
Openness Vs Gini



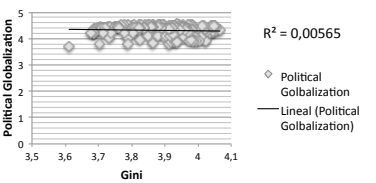
Tariff rate, all products (%) Vs Gini



Trade Restriction Vs Gini



Political Golbalization index Vs Gini



APPENDIX 3

Table 9. Correlations

	Correlation Coefficients Matrix												
	Poverty headcount ratio at $2 a day	*Enrolment ratio tertiary education*	*Income share held by highest 10%*	*Income share held by lowest 10%*	*Unemployment, total (% of total labor force)*	*GDP per Worker*	*Taxation (%)*	*ln FDI Stock Inward*	*ln FDI Stock Outward*	*Openness*	*Tariff rate, all products (%)*	*Trade Restriction*	*Political Golbalization*
Poverty headcount ratio at $2 a day (% of population	1,												
Enrolment ratio tertiary education	-0,48426	1,											
Income share held by highest 10%	0,47015	-0,26445	1,										
Income share held by lowest 10%	0,46811	-0,25827	0,99986	1,									
Unemployment, total (% of total labor force)	-0,15705	0,27829	-0,20304	-0,20067	1,								
GDP per Worker	-0,54914	0,48282	-0,24581	-0,2435	0,46616	1,							
Taxation (%)	-0,39499	0,36086	0,06416	0,06192	0,08606	0,44098	1,						
ln FDI Stock Inward	0,21464	0,38799	0,43298	0,43597	-0,09077	0,06408	0,10208	1,					
ln FDI Stock Outward	-0,10123	0,19618	0,10761	0,10693	0,30689	0,62289	0,42386	0,24571	1,				
Openness	-0,03577	-0,00546	-0,06601	-0,06592	-0,00122	0,02714	-0,08048	-0,03889	-0,06393	1,			
Tariff rate, all products (%)	0,25643	-0,19265	-0,22841	-0,2311	0,04391	-0,29626	-0,27237	-0,20818	-0,34339	-0,09614	1,		
Trade Restriction	-0,31422	0,31473	0,07759	0,07816	0,04258	0,1826	0,35271	0,30897	0,17335	0,09632	-0,3549	1,	
Political Golbalization	-0,39338	0,53487	0,04447	0,04902	0,268	0,59359	0,6643	0,18678	0,43668	-0,03287	-0,38949	0,35125	1,

APPENDIX 4

Table 10. Linear regression Gini Net and Gini Market models (1990-2010)

Dependent Variable:	Gini Net				Gini Market			
R	0,86528				0,92168			
R Square	0,74872				0,84949			
Adjusted R Square	0,73609				0,84193			
Standard Error	0,04906				0,0408			
Total Number of Cases	210				210			
	SS	***MS***	***F***	***p-level***	***SS***	***MS***	***F***	***p-level***
Regression	1,42711	0,14271	59,29381	0,E+0	1,86982	0,18698	112,31666	0,E+0
Residual	0,47896	0,00241			0,33129	0,00166		
Total	1,90608				2,20111			
Independent Variables		***t Stat***	***p-level***	***H0 (5%) rejected?***		***t Stat***	***p-level***	***H0 (5%) rejected?***
Intercept	2,926258093	13,95542	0,E+0	Yes	2,485592162	14,25302	0,E+0	Yes
Poverty headcount ratio at $2 a day	-0,002456745	-0,38972	0,69716	No	0,017201809	3,2811	0,00122	Yes
Enrolment ratio tertiary education	-0,00119233	-0,10684	0,91502	No	-0,036569314	-3,94006	0,00011	Yes
Income share held by highest 10%	0,447803444	12,72436	0,E+0	Yes	0,439418076	15,0132	0,E+0	Yes
Unemployment, total	-0,010453381	-0,98421	0,32621	No	-0,015690853	-1,77634	0,07721	No
GDP per Worker	-0,081036517	-6,11204	0,	Yes	-0,044558887	-4,04098	0,00008	Yes
Taxation (%)	-0,042495868	-3,0969	0,00224	Yes	0,048800479	4,27613	0,00003	Yes
ln FDI Stock Inward	0,003781144	0,47946	0,63214	No	0,021254717	3,24065	0,0014	Yes
Openness	-0,013316807	-1,73785	0,08378	No	-0,021792522	-3,41953	0,00076	Yes
Tariff rate, all products (%)	0,00406744	0,37593	0,70737	No	0,009201043	1,02251	0,30778	No
Trade Restriction	0,06543623	3,78531	0,0002	Yes	0,047257185	3,28698	0,0012	Yes