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Regional economic Integration and income inequality in Latin America: the case of the Andean Community of Nations

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Abstract

Countries in Latin America have created many regional integration groups in order to boost economic growth, trade, and sustainable development. Income inequality has reduced in Latin America and especially in Andean region, one of the oldest regional group on the continent. There is a need to verify whether this decline is imputable to an intensified regional integration.

Using the data for the Andean Community of Nations (CAN) from 2000 to 2013, we carry a panel analysis to inquire about the effect of regional economic integration on income inequality.

We found that, regional trade has influenced the decline of income inequality in the region. The results discovered that intraregional trade increases income and, later, decreases it as countries become fully integrated; as predicted by the inverted U-shape theory.

Our results do not provide evidence to support that economic growth affects income inequality. It, however, provides evidence of a higher degree of integration among the countries.

Keywords: Regional integration, income inequality, Andean region

1. Introduction

Latin America is one of the most unequal regions in the world. However, in the recent decade, there was a large decrease in its trend. (Cord et al., 2013).

In 2014, the middle class, roughly 34.3 percent of the population is becoming the largest economic group in Latin America and Caribbean region (LAC) by 2016 (World Bank, 2014). To reduce its inequality, ‘‘the region must, therefore, deepen its economic integration, strengthen intraregional trade and support production and export diversification’’ (Latin America and the Caribbean in the World Economy, 2015).

The Andean Community of Nations is a custom union in Latin America formed in 1967. At first, it had six members: Bolivia, Colombia, Ecuador, Peru, Chile and Venezuela. Chile withdrew in 1974, and Venezuela left the agreement in 2006.

Beckfield (2006) states that regional integration is more powerful than globalization when it comes to trends in income inequality.

Income inequality is declining in Latin America and especially in Andean region. Lustig, Lopez-Calva and Ortiz Juarez (2013) claimed the decline in inequality in Latin America is not sustainable, because of causes such as the distribution of the quality of education and the favorable terms of trade.

Whether regional integration can reduce or raise the country income inequalities in the members’ countries is a polemic topic in the literature. Is the decline of inequality imputable to an intensified regional integration in CAN?

The globalization and intratrade have brought increasing opportunities for developing countries to take part actively in the global economy (Brülhart 2008).

The aim of this paper is to shift the attention towards the effects of regional economic integration on income inequality. It debates the characteristics of the CAN integration, estimates empirically their impact on income inequality from 2000 to 2013. The arguments are the following.

First, Latin America faces a plethora of agreements. Some are bilateral agreements, and others are multilateral; some are intraregional agreements (agreement between countries from the same region), and others are interregional ones (their members belong to different groups or regions). Second, there is a need to quantify the social benefits of CAN. Regional integration might be good on average for growth does not mean it is pleasant for social development.

The outline of the paper is as follows. Section 2 provides an outline of the literature review. Section 3 discusses trends in regional integration and income inequality in CAN countries. Section 4 describes the data. Section 5 discusses the method. Section 6 reports the results. Section 7 closes.

2. Literature review

Regionalization has multiple sides. It covers institutions and regional trade agreements (RTAs).

Regional economic integration can increase income inequality, as workers faces regional competition.

In international trade, when poor countries take on more in global trade, they specialize in production of goods in which they have a comparative advantage, which are low-skill goods. According to the Heckscher-Ohlin-Samuelson theorem, this will result in the increase demand for low-skilled labor in the country, and the rise of the wages of low-skilled workers relative to that of skilled workers. Wage inequality and income inequality should decline. The reverse should happen in rich countries: as they export more high-skilled goods, inequality would rise.

For Viner (1950), economic integration produces two results: trade creation and trade diversion. When two or more countries enter a trade agreement, trade creation effect shifts trade from a high-cost supplier member country to a low-cost supplier member country in the union. Trade diversion occurs when imports shifts from a low-cost supplier of a nonmember country of the union to a high-cost supplier member country inside the union. Viner pointed out that trade creation raises the home country's welfare, while trade diversion lowers it.

Johnson (1975) states that trade-diversion may be welfare-increasing if we consider both production and substitution effects. The welfare losses resulting from the diversion to a high-cost supplier country may be more than outweighed by the gains following the reduced prices to consumers.

There is not much literature that refers on regional integration as a direct determinant on inequality.

The “race to bottom” approach predicts that regionalization can aggravate the economic burdens placed on states by greater economic interdependence. This approach supports that as regional integration rises, especially in terms of trade and capital openness, social spending is likely to decrease. Regional integration could lead to cuts in social spending when countries, within regional organizations, strive to attract (or keep) capital. By decreasing expenditures, governments may be able to lower corporate tax rates, making their country a more attractive place to do business.

From the empirical studies, geographically neighboring countries display high economic cooperation.

Studies, using the European experience, point out that regional integration supports a significant decrease in income inequality between countries (Armstrong 1995; Ben-David 2001). Some, conversely, suggested a pattern of divergence (Arestis and Paliginis 1995; Slaughter 2001).

Beckfield (2006) used two measures of regional integration (regional political and economic integration) for 12 Western European countries between 1973 and 1997. With a random and a fixed effects’ analysis, he discovered that economic and political integration increases income inequality.

On the issue of East Asia integration, Ezaki and Nguyen (2008) studied the link between regional economic integration, growth, income distribution and poverty in four countries (China, Indonesia, Thailand and Vietnam). The study modeled a global computable general equilibrium model based on the data of the Global Trade Analysis Project model. They found that East Asian Free trade agreements have positive results on growth and increase income distribution.

To our knowledge, no other study has tried panel data to inquire into the impact of intratrade on income

inequality in the Andean community.

3. Regional integration and income inequality trend in Andean Community

3.1 Economic regional integration

Commonly, regional integration involves one or more written arrangements that define the areas of cooperation in detail, as well as some coordinating bodies representing the countries involved. It usually begins with economic integration and can move to include a political integration.

Economic regional integration is a "dynamic process that entails a country's willingness to share or unify into a larger whole" (Soomer, 2003).

Intraregional trade in Latin America and the Caribbean remains at low levels. In 2013, only a fifth (19.2%) of exports is destined for other countries in the region. In the intra-exports in the CAN, Colombia trades more with the three other members. Its share of intra-exports in 2013 was 34%, followed by Ecuador (29%), Peru (24%) and Bolivia (13%).

In CAN, Peru and Colombia are the main exporters of textiles and clothing (both intermediate and end-use goods). Their export was evaluated around US$ 2.2 billion and US$ 1.2 billion, respectively, in 2012.

Although the value of these exports has risen sharply over the past decade, they represent a small percentage of the respective countries' total exports (4.7% and 2% in 2012). The Andean Community, itself, is also a major destination for the textiles and clothing goods. The main importers of these inputs are Colombia and Peru in the Andean Community (Latin America and the Caribbean in the World Economy, 2014).

The Andean Community and Mercosur are the major regional economic integration blocks in the zone. Figure 1 shows the intratrade between Mercosur, CAN and the Latin American Integration Association (LAIA). Intratrade has increased since 2000 revealing a better integration in the Latin America Zone. Mercosur with its five members has a greater trade integration than CAN.

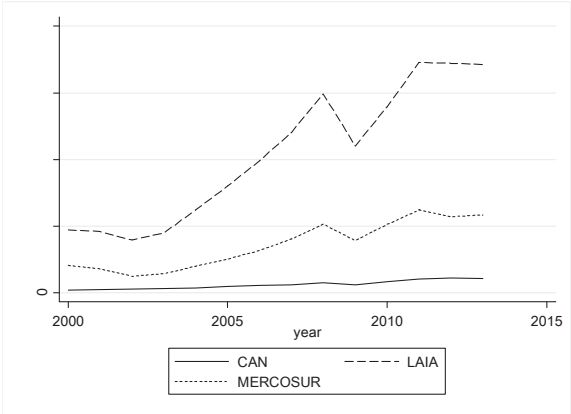

Figure 1 Intra trade of the major blocks in Latin America, millions of USD dollars
Source: UNCTAD statistics http://unctadstat.unctad.org/.

3.2 Inequality in Andean Community

The Andean region has met economic difficulties and governance complications that have created poverty and inequality.

As depicted by Figure 2, for more than a decade (2000–2013), the Andean region has experienced a significant decline in income inequality, with the region's Gini coefficient falling from 56.02 to 49.15. Income inequality is still high in the Latin American and Caribbean zone and in Central America. Across countries in the Andean community, inequality levels are higher in Bolivia and lower in Peru. From 2000-2013, on average, Columbia has registered the highest level (0.554) during the period compared to 0.48in Peru. (Table 1)

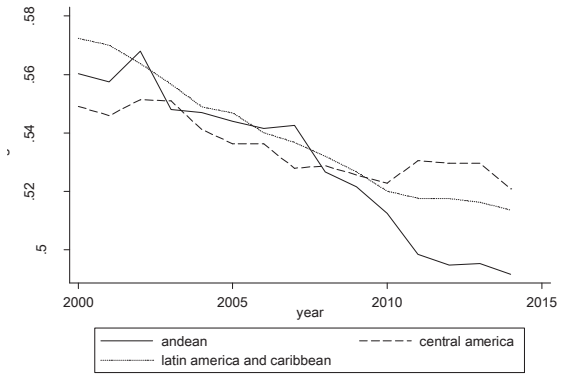

Figure 2 Gini coefficient in Latin America region, 2003-2012
Source: World Data Bank LAC Equity Lab http://databank.worldbank.org/

4. Data

We use a panel data set of the four countries in CAN over 2000-2013.

Table 2 and 3 in the appendix report the summary statistics, and the sources to the data used within this paper. The average Gini's coefficient during the sample period for all countries is 52.33%.

4.1 Dependent variable

To experiment with the impact of regional integration on income inequality, we choose the Gini index as the dependent variable. The Gini varies between zero and one, with zero accounting for perfect equality and one being perfectly unequal. The Gini coefficient is good at picking up increasing or decreasing income inequality. This is, because, it compares distinct income distributions of distinct groups of populations, from different countries, regions or any geographical area. In addition, with the Gini index, we can evaluate its value for the same unit of analysis and different time periods. This allows us to evaluate the dynamic evolution of the income distribution, to see if it has improved or worsened. Our data set is from the SEDLAC database in the LAC Equity Lab, a data-sharing platform featuring the latest micro data and indicators on inequality and equity in Latin America and the Caribbean.

The data presents some missing values. In such case, we replaced them by the mean value of the variable.

4.2 Exogenous variables

We use two variables to capture the regional economic integration in CAN.

- Country Intra-trade ratio (Ratio): as the percentage of a country's total trade that goes to the CAN countries. A higher percentage means that the member country trades more and more with the other members within the community.
- Intraregional trade share (ITS is the percentage share of the region's total trade (regional total imports plus regional total exports) :

$$ITS_{j,t} = \frac{IT_{j,t}}{T_{j,t}} \times 100 \qquad (1)$$

Where $IT_{j,t}$ denotes region j's intra-regional trade in year t, $T_{j,t}$ denotes region j's total trade in year t (i's total imports plus total exports).

The Intra-regional trade share reveals the importance of the intra-regional trade of a regional arrangement in its overall trade. It describes the interdependence among the members of the CAN from the perspective of international trade.

4.3 Control variables

The analysis adds the following control variables:

- Foreign direct investments are the net inflows of investment to gain a lasting management interest in an enterprise operating within an economy other than that of the investor. The FDI variable measures international financial flows which are not registered in the export of imports. Many empirical studies

associate that FDI with greater inequality. (Aitken et al. 1996; Feenstra and Hanson 1997; Hanson 2003).

- Education level: measured by the Secondary school net enrollment. This is the ratio of children of official school age who are enrolled in secondary school compared to the population of the corresponding official school age.

Secondary education completes the provision of basic education that began at the primary level and offering more subject- or skill-oriented instruction using more specialized teachers.

Becker and Chiswick (1966); Hausmann and Székely (1999) prove that income inequality is negatively correlated with the schooling level.

- Growth: is the annual percentage growth rate of GDP at market prices based on constant 2005 U.S. dollars. We assume that economic growth has a negative impact on income inequality. As its growth rate increases, the country experiences bigger investments, resulting in higher employment, therefore, giving better access to jobs and higher income to a bigger proportion of citizens. This will decrease income inequality.

5. Methodology

Using the data described in the previous section, we estimate the impact of the regional integration on income inequalities. For this estimation, we use a panel data set of the four countries in CAN over 2000-2013.

$$I_{i,t}=\alpha_0+ \alpha_1 R_{i,t}+ \alpha_2(R^2)_{i,t} +\alpha_3 Y_{i,t}+ X'_{i,t}\beta+\varepsilon_{i,t} \quad (2)$$

where I is the income inequality; R, the regional integration index; R^2 , the square of the regional integration index; Y, the economic growth, $X'_{i,t}$the matrix of control variables t is the year, i the country, and ε_{it} is the error term.

More specifically,

$$Gini_{i,t}=\alpha_0+\alpha_1 ITS_{i,t}+ \alpha_2 Ratio_{i,t} +\alpha_3 ITS^2_{i,t} +\alpha_4 Ratio^2_{i,t} +\alpha_5 Growth_{i,t}\ \alpha_6+ Educ+ \varepsilon_{i,t} \quad (3)$$

We include the squared values of ITS and Ratio because we suspect an inverted U-shaped association between intratrade and income inequality. A first, regional trade increases inequality in the member countries.

Our sample size is little and, therefore, brings out challenges with the methodology. To cope with the problem of the small N (countries), we follow Beckfield (2006) by using the following approach: the original model (model 1) only includes the two regional integration variables. In model 2, the estimation takes account of the control variables, and adds the squared-values of the integration variables.

We test the fixed effects and the random effects' methods.

5.1 Fixed effects

$$I_{i,t}=\alpha_0+ \alpha_1 R_{i,t}+ \alpha_2(R^2)_{i,t} +\alpha_3 Y_{i,t}+ X'_{i,t}\beta+\delta_i+\varepsilon_{i,t} \quad (4)$$

where parameter δ_i picks up the fixed effects that differ among individuals but constant over time.

The Fixed Effects' method finds every between-country variation in deducting each observation from the within-country mean. It assumes that something within the country entity may bias the outcome variables, and we need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables.

5.2 Random effects

$$I_{i,t}=\alpha_0+ \alpha_1 R_{i,t}+ \alpha_2(R^2)_{i,t} +\alpha_3 Y_{i,t}+ X'_{i,t}\beta+\delta_i+ \mu+\varepsilon_{i,t} \quad (5)$$

where δ_i are individual specific random errors

The random effects' estimator essentially transforms the data by "partially demeaning" each variable. It adjusts for the within-panel error correlation by including a normally-distributed panel-specific error term; this method is normally a better choice if the data reflects a random sample. Besides, the Random Effects Method, conserves both between-country and within-country variation. Random effects' method is unappealing for small N (number of countries). We estimated our regression with a fixed effect. However, we run both regressions.

6. Results

6.1 Descriptive results

As depicted in Table 3, the income inequality of the countries varies from a low of 0.4472 to a high of 0.63 which shows a pronounced variability in income distribution among countries. Intra-trade ratio across countries fluctuates from 0.79 to 76.45; revealing a great disparity in the exchange. Intraregional trade share has a minimum of 7.739788% and a maximum of 10.65698%. The mean, standard deviation, minimum and maximum of other variables are in the Table 3.

6.2 Regression Results

6.2.1 Correlation

The results from the correlation matrix are reported in Table 4. Intratrade intensity and intratrade ratio are positively correlated with income inequality. Regional integration increases the income gap in the Andean community. As predicted by the theory, the secondary school enrollment ratio and income inequality are negatively correlated.

6.2.2 Random effects estimation results.

Two types of estimation are performed: We run a random effects' and a fixed effects' method analysis. The results are in Table 5. The model one shows the impact of intraregional trade share and intratrade ratio on income inequality.

Only the intratrade share is significant and positive. The average effect of intraregional trade share over when the intratrade share increases of one percent (1%) across time and between countries, income inequality increases by 1.65 percent (1.65%). The rationale behind the Model 2 is the quadratic relationship between regional trade integration and income inequality. This hypothesis is true for the intraregional trade share. At first, it increases income inequality and then decreases it. The effect of growth on income distribution is not significant.

Table 5. Results of regression for the random and the fixed effects

	Random effects		Fixed effects [a]	
	Model 1	Model2	Model 1	Model 2
Its	0.0165* (0.005)	0.3507* (0.147)	0.0167* (0.0051)	0.2801* (0.0871)
Ratio	0.0001 (0.0003)	0.0003 (0.001)	0.0001 (0.0003)	0.0012** (0.0004)
Its^2	-	-.01846* (0.008)		-0.0146* (0.0046)
Ratio ^{2}	-	0.0001 (0.0001)		-0.00001** (0. 0003)
Edu	-	-0.0009 (0 .0006)	-	-0.0008** (0.0002)
Growth	-	-0.0001 (0.0026)	-	-0.0036 (0.0016)
Constant	0.375* (0.046)	-1.059 (0.6723)	* ()	-0.7325 (0.4077)

Notes: Standard errors in parentheses. *p ≤0 .05 ; ** p ≤0 .1

[a] we tested for heteroskedascity in the fixed effects regressions. The values reported in this table are corrected

from heteroskedascity (if detected by the Wald test).

6.2.3 Fixed effects results

The fixed effects' methods reveal the same conclusion as the random effects' method from Model 1. Even though intratrade ratio is not significant, regional-integration increases income inequality across time and between the countries in the Andean community. The effect is slightly greater in the fixed effect (an increase of 1.67%). Model 2 presents some remarkable results. The two indices of trade are statistically significant (at 5% for intraregional share and % for the intratrade ratio). We verify the inverted U-shaped link. How strong is this link? Intraregional trade share effect is larger than the intratrade ratio. The interdependence among the members' countries of the Andean Community is stronger than the individual trade ratio to explain the decline of income distribution between countries. For a given country, as the school enrollment ratio varies across time by one unit, inequality decreases by 0.08 percent. The effect is small but significant at 10%. Economic growth failed to explain the decline of income distribution for the selected countries.

To confirm our decision to use a fixed-effects method, we run a Hausmann test where then null hypothesis is the preferred model is random effects (Green, 2008, chapter 9). It reveals that fixed effects is suitable to our analysis.

6.2.4 Robustness checks

The small sample of data can reduce the power of our results. We ran some panel post-estimation tests. A Wald-test checks for the heteroskedasticity test. According to Baltagi (2005), cross-sectional dependence is a problem in macro panels with extensive time series (over 20-30 years). In a micro-panels (few years) as in our data set, such a problem won't occur. Nevertheless, we analyze the cross-sectional dependence. A model specification error can occur when the researcher omits relevant variables or includes irrelevant ones in the model. We, thus, checked for the model specification. These tests proved the validity of our results.

7. Conclusion

Regional trade has influenced the decline of income inequality in the Andean Community. The results discovered that intraregional trade increases income and later decreases as countries become fully integrated; as predicted by the inverted U-shape hypothesis. Secondary school enrollment has negative influence on income distribution. Countries in Latin America and Caribbean zone have set up fiscal policies to promote education. The Economic Commission for Latin America and the Caribbean (2014) revealed that between 2000 and 2011, with public spending on education rising from 3.9 to five percent. The maneuver cut down the income inequality. Our data sample is small. One can try to explore the impact of regional integration at a larger scope. The conclusions will have more credence if we exhaust all the countries. As Chile, Colombia, Mexico and Peru launched the Pacific Alliance in Latin America, one could try to explore its effects on social gains for the countries. An extension for our analysis could capture a possible bi-directional link between regional integration and income inequality in the Andean Community. Future studies could further examine the impact of regional integration on growth inclusiveness through its effects on poverty and inequality.

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Table 1. Gini coefficients by country, 2000- 2013

year	country			
	Bolivia	Columbia	Ecuador	Peru
2000	0.63002174		0.56378518	
2005	0.5846821	0.55040184	0.54119187	0.51838856
2013	0.48060334	0.5348782	0.47289024	0.44726811
2000-2013	0.54084734	0.55476186	0.51363097	0.48407699

Source: authors' compilation

Table 2. Sources of the data

Variable	Indicator	source
Income inequality	Gini	LAC Equity Lab tabulations of SEDLAC (CEDLAS and the World Bank).
Regional economic integration	Ratio trade	ECLAC–CEPALSTAT derived from COMTRADE (United Nations Commodity Trade Statistics Database)
	Intra-regional trade share	Authors calculations
Education level	Secondary school net enrollment	World Development Indicators of World Bank
Economic Growth	Annual percentage growth rate of GDP at market prices based on c constant 2005 U.S. dollars	

Table 3. Summary statistics of the variables

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
gini	56	0.5233293	0.0426328	0.4472681	0.6300218
its	56	8.823911	0.9308383	7.739788	10.65698
ratio	56	15.14263	18.20184	0.7911716	76.45975
growth	56	4.58161	2.085044	0.566492	9.14314
educ	56	67.926	7.611605	48.63405	83.42998
its_sq	56	78.7124	16.94071	59.90431	113.5711
ratio_sq	56	554.6902	1324.462	0.6259524	5846.093

Table 4. The correlation matrix between the variables used

	gini	its	ratio	its_sq	ratio_sq	educ	growth
gini	1.0000						
its	0.3921	1.0000					
ratio	0.3128	0.4264	1.0000				
its_sq	0.3791	0.9992	0.4252	1.0000			
ratio_sq	0.2728	0.3543	0.9577	0.3551	1.0000		
educ	- 0.1632	0.0870	0.1213	0.0926	0.1007	1.0000	
growth	-0.1314	-0.0978	0.1101	-0.0875	0.0828	0.2278	1.0000

Source: authors' calculation

Table 6. Robust checks test for model 2

Tests	Probability	results:
cross-sectional dependence: Breusch-Pagan LM test of independence	P = 0.2667	no cross-sectional dependence
heteroskedasticity	P = 0.0000	Presence of heteroskedasticity

Source: authors' calculation