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TRADE OPENNESS, INEQUALITY AND POVERTY IN LATIN AMERICAN COUNTRIES

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Abstract. Globalization has quickened, especially during the past three decades, due to technological, institutional, legal and political developments in the world. During this process, many countries reduced or removed the barriers on the cross-country flows of goods, services and capital, and the global trade volume increased substantially. Therefore, openness-oriented policies have led many social and economic implications for the national economies. In this regard, this study investigates the interaction among trade openness, poverty alleviation and inequality in 11 Latin American countries by employing a panel data analysis. We revealed that trade openness and financial development affected inequality and poverty negatively in the long term, while inequality affected poverty positively.

Keywords: trade openness, financial development, poverty, income inequality, Latin American countries.

1. Introduction

Trade liberalization is an important implication of the globalization process. During the course of globalization, the constraints on flows of goods, services and capital were lifted among the countries that considered the positive implications of globalization for economic growth and economic development through increasing effectiveness and competitiveness, technology transfer and provision of funds in better conditions, especially as of the mid-1980s. However, some costs generally result from the process of trade liberalization, such as decreases in output, job losses and balance of payment problems and income inequality. One of the mostly discussed topics in the literature of trade liberalization is about the interplay among trade openness, income inequality and poverty. Poverty and income inequality are closely related, because poverty and inequality depend on income. However, poverty refers to individuals that live below a minimum living standard, while inequality related to income distribution (United Nations, 2012).

Trade has the potential to affect poverty through changes in prices of commodity and factors, factors income, government revenues and expenditures. However, these chan-

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nels are also interrelated and the net impact on poverty depends on the relative strength of negative and positive forces (McCulloch et al., 2010). On the other side, trade openness also may influence intranational and international inequality. The biggest effect of trade openness on inequality results from economic growth. Kuznets (1955) proposed that the growth-inequality relationship follows an inverted U curve. Furthermore, Kaldor (1957) suggested that inequality is essential for economic growth, because wealthy individuals save more when compared to the poor; in turn, a redistribution in favor of the rich fosters more savings for investment and economic growth.

Latin America and Africa have been the most unequal and poor regions in the globalized world (World Bank, 2016a). However, Latin American countries have experienced decreases both in income inequality and poverty during the recent past decades. This study researches the role of trade openness and financial development on decreases in inequality and poverty alleviation in 11 Latin American countries (Argentina, Brazil, Colombia, Costa Rica, Dominican Republic, El Salvador, Honduras, Panama, Paraguay, Peru and Uruguay) during the 2001-2013 period by employing second generation econometric tests regarding structural breaks and cross-sectional dependency. So, our paper will differ from most of the empirical studies in the empirical literature by taking account of structural breaks and cross-sectional dependency.

Central and Eastern European (CEE) countries experienced a political and economic transformation during the past three decades from the fall of Communist regimes in 1989. During the transformation process, they transited from planned economies to market economies and liberalized their economies. In this way, the findings of the study will be meaningful for CEE countries with highly open economies. The literature on the interaction among trade openness, financial development, inequality and poverty is summarized in the next section. Section No. 3 provides the data and method of our study; empirical analysis and major findings are given in Section No. 4. Lastly, the paper finishes with concluding remarks.

2. Review of Empirical Literature

Increasing openness in the world has led researchers to conduct the studies about the social and economic impacts of trade and financial openness. As a result, some researchers have focused on the interaction among trade openness, inequality and poverty. Some empirical studies revealed that trade openness has influenced income inequality or poverty negatively (Bucciferro, 2010; Castilho et al., 2012), while other studies revealed that trade openness affected income inequality or poverty positively (Khan and Bashir, 2013; Wahiba, 2013; Székely and Samano, 2012). Furthermore, relatively few studies have reached a conclusion that there has been no statistical relationship among trade openness, income inequality and poverty (Khan and Bashir, 2013; Trabelsi and Liouane, 2013).

One important dimension of the globalization phenomenon is financial globalization. Financial globalization and the widespread consensus on the positive interplay between growth and development of the financial sector incited scholars to research the influence that improvements within the financial sector have on inequality and poverty. Positions in academic literature have generally suggested that improvements in the financial sector contribute to poverty alleviation (Beck et al., 2004; Jalilian and Kirkpatrick, 2005; Perez-Moreno, 2011; Sehrawat and Giri, 2016). However, the findings on finance-inequality have remained inconclusive. Some empirical studies (Beck et. al., 2007; Shahbaz and Islam, 2011) revealed that financial development had affected income inequality negatively, while some recent studies (Batabyal and Chowdhury, 2015; Denk and Cournède, 2015) have found that financial development affected income inequality positively. Furthermore, some studies suggested that the finance-inequality relationship follows a U or an inverted U curve (Greenwood and Jovanovic, 1990).

3. Data and Method

In this paper, we researched the interplay among trade openness, financial development, income inequality and poverty in selected Latin American countries by employing the cointegration test of Basher and Westerlund (2009).

3.1. Data

Two econometric models were established in the study and the variables were summarized in Table No. 1. Income inequality was represented by the Gini coefficient and poverty in represented by the ratio of population below $1.25 (PPP) per day. On the other side, we employed the sum of export and import (% of GDP) for trade openness and domestic credit to the private sector (% of GDP) for improvements in the financial sector. The period and sample of our dataset were determined by data availability.

TABLE No. 1. **Data description**

Variables	Symbol	Source
Inequality (Gini coefficient)	GINI	World Bank (2016a)
Poverty headcount ratio at $1.25 (PPP) per day	HECO	United Nations (2016)
Trade openness (sum of exports and imports (% of GDP))	OPEN	World Bank (2016b)
Financial sector development (domestic credit to private sector (% of GDP))	DCRD	World Bank (2016c)

Source: elaborated by the authors.

We utilized the statistical packages of E-views 9.0, Stata 14.0, Gauss 11.0, WinRATS Pro. 8.0 to conduct the econometric analysis.

3.2. Method

In the econometric analysis, first we tested the cross-sectional dependency by CD_{LM1} test of Breusch and Pagan (1980) and LM adj. test of Pesaran et al. (2008), then analyzed the homogeneity of cointegrating coefficients using the delta test of Pesaran and Yamagata (2008). The stationarity of the series was tested with the PANKPSS (Panel Kwiatkowski, Phillips, Schmidt and Shin) test of Carrion-i-Silvestre et al. (2005), while taking notice of cross-sectional dependency and structural breaks. Finally, we analyzed the cointegrating relationship within both models with the cointegration test of Basher and Westerlund (2009), while considering structural breaks and cross-sectional dependency. The cointegrating coefficients were estimated by the panel AMG (Augmented Mean Group) estimator of Eberhardt and Bond (2009). We also analyzed the short-run relationship among the series by an error correction term.

The PANKPSS unit root test takes notice of structural breaks and cross-sectional dependency in the dataset. The test model is as follows:

$$Y_{it} = \alpha_{it} + \beta_{it} + \varepsilon_{it} \qquad i = 1,2,\dots,N \; and \; t = 1,2,\dots,T \tag{1}$$

$$\alpha_{it} = \sum_{k=1}^{m} (\theta_{ik} K1_{it}) + \sum_{k=1}^{m} (\gamma_{ik} K2_{it}) + \alpha_{it-1} + u_{it}$$

$$\beta_{it} = \sum_{k=1}^{n} (\varphi_{ik} K1_{it}) + \sum_{k=1}^{n} (\delta_{ik} K2_{it}) + \beta_{it-1} + v_{it}$$

The dummy variables *K*1 and *K*2 are described as follows:

$$K1 = \begin{cases} 1 & t = T_B + 1 \\ 0 & other\ cases \end{cases} \qquad K2 = \begin{cases} 1 & t > T_B + 1 \\ 0 & other\ cases \end{cases} \tag{2}$$

T_B indicates the structural breaks in equation (2) and enables the *m* structural breaks in constant term and *n* structural breaks in trend. The PANKPSS unit root test enables a maximum of 5 structural breaks.

On the other side, cointegration test of Basher and Westerlund (2009) takes notice of multiple structural breaks and cross-sectional dependency during test of cointegrating relationship between the series. The test statistics formula of the model is given as follows:

$$Z(M) = \frac{1}{N} \sum_{i=1}^{N} \sum_{j=1}^{M_i+1} \sum_{t=T_{ij-1}+1}^{T_{ij}} \left(\frac{S_{it}^2}{\left(T_{ij} - T_{ij-1}\right)^2 \hat{\sigma}_i^2} \right) \tag{3}$$

$S_{it} = \sum_{s=T_{ij-1}+1}^{t} \widehat{W}_{st}$ and $\widehat{W}_{it}$ is a residual vector obtained from an efficient estimator, such as fully modified least squares. $\hat{\sigma}_i^2$ is a variance estimator based on $\widehat{W}_{it}$. The test statistic exhibits a standard normal distribution. The null hypothesis of the test is that there is a cointegrating relationship among the series for all the cross-sections, while the alternative hypothesis is that there is no cointegrating relationship among the series for some cross-sections.

The panel AMG method estimates the cointegration of coefficients by taking into account the cross-sectional dependency and calculates the average group effect by weighing the overall panel results and individual coefficients. Therefore, it is a more reliable method than the common correlated effects method developed by Pesaran (2006) in its estimation of cointegrating coefficients (Eberhardt and Bond, 2009). So, we estimated the cointegrating coefficients with the panel AMG of Eberhardt and Bond (2009). The variables are decomposed in the following way in this estimation method:

$$y_{it} = \beta_i' x_{it} + u_{it}; \qquad u_{it} = u_{it} + \lambda_t' f_t + \varepsilon_{it} \tag{4}$$

$$x_{mit} = \pi_{mi} + \delta_{mi}' g_{mt} + \rho_{1mi} f_{1mt} + \cdots + \rho_{nmi} f_{nmt} + v_{mit} \tag{5}$$

$$f_t = \varphi' f_{t-1} + \epsilon_{it} \; and \; g_t = \aleph' g_{t-1} + w_t \tag{6}$$

f_t represents unobservable common factors, while g_t represents country-specific factors.

4. Empirical Analysis

4.1. Results of the Cross-sectional Dependency and Homogeneity Tests

Homogeneity and cross-sectional independency are important in selecting the econometric tests used in the further stages of our study. In this paper, the LM test of Breusch and Pagan (1980) and the $LM_{adj.}$ test of Pesaran et al. (2008) were employed to see whether there is cross-sectional dependency, because the time dimension of the datasets are found to be higher than the cross-section dimension of the datasets. On the other hand, we tested the homogeneity with the delta tilde and adjusted the delta tilde test of Pesaran and Yamagata (2008). The results of both tests were presented in Table No. 2. The results revealed that there were both heterogeneity and cross-sectional dependencies among the series.

TABLE No. 2. **Results of the cross-sectional dependency and homogeneity tests**

Model 1	**Cross-Sectional Dependency Test**				
		test		LM adj. test	
		Test statistic	P value	Test statistic	P value
	GINI	8.632	0.001	11.997	0.000
	OPEN	7.044	0.015	9.147	0.028
	DCRD	8.291	0.009	8.668	0.001
	Homogeneity Test				
	Test	Test statistic	P value		
	$\tilde{\Delta}$	13.71	0.013		
	$\tilde{\Delta}_{adj.}$	19.45	0.001		
Model 2	**Cross-Sectional Dependency Test**				
		test		LM adj. test	
		Test statistic	P value	Test statistic	P value
	HECO	12.643	0.001	0.001	0.000
	OPEN	9.046	0.016	0.016	0.025
	DCRD	8.225	0.002	0.002	0.008
	GINI	11.346	9.705	0.025	0.013
	Homogeneity Test				
	Test	Test statistic	P value		
	$\tilde{\Delta}$	21.67	0.000		
	$\tilde{\Delta}_{adj.}$	25.62	0.004		

Source: own elaboration based on cross-sectional dependency and homogeneity test.

4.2. Results of the Panel Unit Root Test

The PANKPSS unit root test was employed to examine the integration levels of the variables in our paper considering cross-sectional dependency among the variables and the crises in the study period. The version that enables structural breaks to occur within both the constant and trend was selected when implementing the test. The results of the test showed that the variables were not stationary at their level, but became stationary after the first differencing. The results of the test with the first-differenced variables and the dates of structural breaks were given in Tables Nos. 3 and 4. Among the dates of structural breaks, we encountered the Paraguay Economic Crisis of 2000, the Uruguay Economic Crisis of 2002, the Argentina Economic Crisis of 2002, the Global Financial Crisis of 2008 and the Eurozone Sovereign Debt Crisis during the study period.

TABLE No. 3. **Results of the PANKPSS panel unit root test for model no. 1**

Country	DGINI		DOPEN		DDCRD	
	P value	Dates of Structural Breaks	P value	Dates of Structural Breaks	P value	Dates of Structural Breaks
Argentina	0.142*	2002, 2009	0.153*	2002, 2009	0.179*	2002, 2009
Brazil	0.191*	2003, 2009	0.185*	2003, 2009	0.123*	2003, 2009
Colombia	0.147*	2001, 2009	0.232*	2001, 2009	0.131*	2001, 2010
Costa Rica	0.127*	2001, 2009	0.219*	2001, 2008	0.156*	2001, 2008
Dominican Republic	0.179*	2003, 2010	0.217*	2003, 2009	0.115*	2003, 2009
El Salvador	0.190*	2001, 2009	0.226*	2001, 2009	0.133*	2001, 2010
Honduras	0.175*	2001, 2009	0.214*	2001, 2009	0.192*	2001, 2009
Panama	0.162*	2001, 2009	0.173*	2001, 2009	0.177*	2001, 2009
Paraguay	0.092*	2001, 2009	0.103*	2001, 2009	0.092*	2002, 2009
Peru	0.273*	2001, 2009	0.140*	2001, 2009	0.116*	2001, 2009
Uruguay	0.173*	2002, 2009	0.152*	2002, 2009	0.151*	2002, 2009
Panel	0.197*		0.184*		0.146*	

Source: elaborated by the authors on the basis of the PANKPSS test.

* Stationary at 5% significance level.

Critical values of the test were provided by Monte Carlo simulations with 1,000 simulations.

TABLE NO. 4. **Results of the PANKPSS panel unit root test for model no. 2**

Country	DHECO		DOPEN		DDCRD		DGINI	
	P value	Dates of Structural Breaks	P value	Dates of Structural Breaks	P value	Dates of Structural Breaks	P value	Dates of Structural Breaks
Argentina	0.156*	2002, 2009	0.145*	2002, 2009	0.161*	2002, 2009	0.137*	2002, 2009
Brazil	0.181*	2003, 2009	0.156*	2003, 2009	0.134*	2003, 2009	0.161*	2003, 2009
Colombia	0.186*	2001, 2009	0.193*	2001, 2009	0.137*	2001, 2010	0.129*	2001, 2009
Costa Rica	0.137*	2001, 2010	0.203*	2001, 2008	0.142*	2001, 2008	0.171*	2001, 2009
Dominican Republic	0.182*	2003, 2009	0.216*	2003, 2009	0.153*	2003, 2009	0.126*	2003, 2010
El Salvador	0.158*	2001, 2010	0.217*	2001, 2009	0.168*	2001, 2010	0.139*	2001, 2009
Panama	0.126*	2001, 2009	0.131*	2001, 2009	0.144*	2001, 2009	0.129*	2001, 2009
Paraguay	0.092*	2002, 2009	0.176*	2002, 2009	0.182*	2002, 2009	0.164*	2001, 2009
Peru	0.152*	2001, 2009	0.142*	2001, 2009	0.179*	2001, 2009	0.142*	2001, 2009
Uruguay	0.183*	2002, 2009	0.1730	2002, 2009	0.153*	2002, 2009	0.118*	2002, 2009
Panel	0.172*		0.182*		0.174*		0.167*	

Source: elaborated by the authors on the basis of the PANKPSS test.

* Stationary at 5% significance level.

Critical values of the test were provided by Monte Carlo simulations with 1,000 simulations.

4.3. Results of the Panel Cointegrating Test

We researched the cointegrating relationship among the series in two models with the cointegration test of Basher and Westerlund (2009), which considers structural breaks and cross-sectional dependency. We selected the model that enables structural breaks both in constant and trend for the cointegration test and the results are presented in Table No. 5. The findings demonstrated that the null hypothesis (that there is a cointegrating relationship among the variables) was rejected in both models in case the structural breaks were not considered. On the other side, the null hypothesis was accepted when the structural breaks were considered; based on this, we concluded that there was a cointegrating relationship among the variables in both models under the structural breaks.

TABLE No. 5. **Results of the Basher and Westerlund (2009) cointegration test**

Model 1			
	Test Statistics	P Value	Decision
Exclusion of structural breaks in the constant term and trend	1.672	0.001	There is no cointegration
Consideration of structural breaks in the constant term and trend	23.981	0.272	There is cointegration
Model 2			
	Test Statistics	P Value	Decision
Exclusion of structural breaks in the constant term and trend	1.725	0.005	There is no cointegration
Consideration of structural breaks in the constant term and trend	21.992	0.196	There is cointegration

Source: elaborated by the authors on the basis of Basher and Westerlund's (2009) cointegration test. Critical values were provided by Monte Carlo simulations with 1,000 simulations.

4.4. An Estimation of Cointegrating Coefficients

The panel AMG estimator was evaluated for the determination of cointegrating coefficients and the findings were given in Table No. 6. Certain issues regarding autocorrelation and heteroscedasticity were dissipated with the Newey-West method. The findings revealed that trade openness and financial development affected income inequality and poverty negatively, but the effect of financial development on inequality was relatively larger. On the other side, income inequality affected poverty positively and also had the largest impact on poverty.

TABLE No. 6. **Results of the cointegrating coefficients estimation**

Model 1		
Variables	Coefficient	P value
OPEN	-0.092*	0.002*
DCRD	-0.116*	0.004*
Model 2		
Variables	Coefficient	P value
OPEN	-0.082*	0.001*
DCRD	-0.125*	0.013*
GINI	0.273*	0.000*

Source: elaborated by the authors on the basis of the panel AMG estimation.
* Stationary at 5% significance level.

4.5. Short-run Analysis

The objective of the short-run analysis was to see whether the series converge towards their long-term equilibrium values. The short run analysis was implemented among the variables by using an error correction term. The short run relationships that occur among the variables were estimated by the panel AMG in both models and the results were given in Table No. 7. The coefficients of error correction terms were found to be negative and statistically significant. The findings verified that diversions among the series in the short term were eliminated and the series went towards their long term equilibrium values. Furthermore, the small absolute values of the error correction terms indicated that the equilibrating speed of the variables was low.

TABLE No. 7. **Results of error correction model**

Model 1			
Variables	Coefficient	P Value	Coefficient of Error Correction Term
DOPEN	0.083*	0.002	-0.015*
DDCRD	0.105*	0.017	-0.036*
Model 2			
Variables	Coefficient	P Value	Coefficient of Error Correction Term
DOPEN	0.071*	0.016	-0.025*
DDCRD	0.096*	0.005	-0.036*
DGINI	0.195*	0.003	-0.014*

Source: elaborated by the authors on the basis of the panel AMG estimation.
* Stationary at 5% significance level.

5. Conclusion

The interplay among trade openness, poverty and income inequality is one of the most discussed issues in the rapidly globalizing world. However, theoretical and empirical studies have been inconclusive about the effect of trade openness on inequality and poverty. Empirical studies showed that the effect of trade openness on inequality and poverty has changed depending on the socioeconomic development of the countries, period and country specific characteristics. This study analyzed the impact of trade openness and financial development on poverty and income inequality in selected Latin American countries by employing second generation econometric tests and while taking notice of structural breaks and cross-sectional dependency. So, our paper is different from most of the other empirical studies due to its method.

The cointegrating coefficients revealed that trade openness and financial development affected inequality and poverty negatively in the long run, while inequality had a positive effect on poverty. In this way, both trade openness and financial development decreased inequality and poverty through economic growth. Our findings, together with some empirical studies, indicated that trade openness and the development of the financial sector contribute to the decreases in poverty and income inequality. But some studies also demonstrated that trade openness in particular had positive impact on poverty and income inequality. At this point, factors such as the development level and country specific characteristics exhibit importance for the interaction among trade openness, poverty and income inequality. Future studies can be conducted to reveal the determinants that are important for the interaction among trade openness, poverty and income inequality. In this way, policymakers can also foresee the possible influence that trade openness and the development of the financial sector may have on poverty and inequality. Consequently, they may be able to implement certain policies that could decrease both poverty and income inequality.

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