Threshold and Interaction Effects in the Trade, Growth and Inequality Relationship

Vincent Leyaro
Department of Economics, University of Dar es Salaam

Context

Rising income inequality within countries is a widespread concern that poses one of the greatest challenges to economic policy makers in many countries

'Income inequality is defining challenge of our time.'
-Barack Obama, December 4, 2013

'We are the 99% slogans'
-Occupy Wall Street Movement

Not just in rich/advanced economies, rising income inequality is also experienced in emerging and developing countries in Eastern Europe, Asia, Latin America and Africa

IMF is today embracing redistribution policies as pro-growth, arguing that rising income inequality is damaging to economic growth (*Ostry, et al, 2014*).

World Bank's goal of promoting "shared prosperity", i.e. growth in average incomes of those in bottom 40% (*Dollar, et al, 2014*)

This has occurred at the time that, with entry of China and the former Soviet bloc into the global economy, most countries have unprecedentedly integrated into the global trading system, hoping to advance their economic growth, raising their real per capita income and reduce poverty. While the channels through which trade(exports) affect economic growth and the empirical evidence behind them are well established, what is less clear and still fiercely debated is their distributional effects.

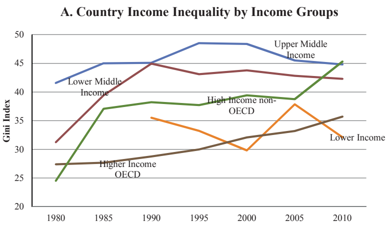
Objectives, Data and Approach

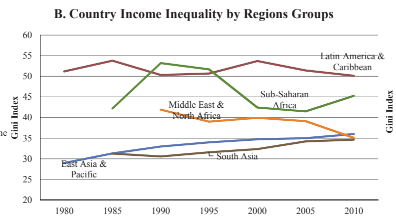
The main purpose of this paper is to examine the relationship between trade (exports), economic growth and income inequality, with the focus of establishing the latest evidence of a link between growth, exports and inequality, using a panel of 100 countries over 30 years (1980 to 2010). As there is no clear theoretical relationship between trade (exports) and inequality and as inequality can be considered a proxy for 'governance quality' the paper also tests for a threshold in inequality for the effect of trade (exports) on growth.

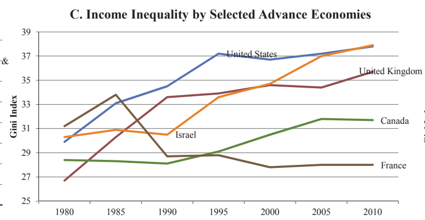
Based on endogenous growth model that control for: initial per capita GDP, physical capital, human capital and population growth, most of the data for these variables come from World Bank World Development Indicators (2013), with the income inequality and poverty for developing and emerging economies from World Bank *PovCal* database and for advanced economies from *Luxembourg Income Study (LIS)* database.

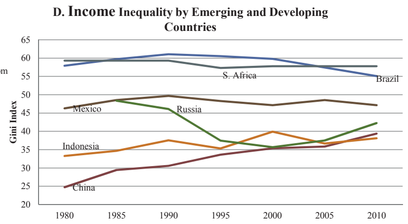
To explore heterogeneity in the trade-inequality-growth relationship we estimate the baseline model, linear interaction (contingent) model and non-linear interaction (thresholds) model. This require addressing a number econometric difficulties that include measurement errors in variables, omitted variable biases, simultaneity biases, and the potential endogeneity due to any factor. To allow for most of these econometrics difficulties, the base model and linear interaction (contingent) model are estimated using pooled OLS, Random Effects and system GMM estimators. The non-linear interaction (threshold) model is then estimated by applying the Hansen (2000) endogenous threshold regression technique that locates the thresholds, tests for their significance and constructs their confidence intervals.

Trends and Patterns in Income Inequality









Results

Table 1: Baseline and Linear Interaction (Contingent) Effects Specifications

	(1)	(2)	(3)	(4)
lnGDPO	-0.700*** (-4.14)	-0.970*** (-5.36)	-1.141*** (-12.40)	-1.137*** (-15.35)
lnPOPLN	-0.834*** (-5.92)	-0.512*** (-5.05)	-0.654*** (-13.68)	-0.904*** (-18.82)
SEC	0.022*** (4.45)	0.040*** (4.59)	0.044*** (9.58)	0.033*** (10.04)
INV	0.156*** (6.33)	0.155*** (8.25)	0.089*** (6.28)	0.083*** (14.12)
GINI		-0.034** (-2.074)	-0.031*** (-3.78)	-0.111*** (-7.73)
XGDP			0.011** (2.24)	-0.062*** (-4.27)
*GINI*XGDP*				0.002*** (5.93)
CONS	3.049** (2.46)	6.471*** (4.21)	8.036*** (7.90)	7.538*** (14.63)
Period Dummies	Yes	Yes	Yes	Yes
F-test	0.000	0.000	0.000	0.000
AR(1) /Pr> z	0.000	0.000	0.000	0.000
AR(2)	0.115	0.196	0.157	0.167
N	534	528	526	526.

Note: 1=Baseline Model; 2=Baseline with Gin; 3= Baseline with Trade; 4= Linear Interaction Effects

Table 2: Non-Linear Interaction (Threshold) Effects Specifications

	GINI<=45 percentile	*GINI >45 percentile*
lnGDPO	-0.624*** (-14.09)	-0.571*** (-14.34)
lnPOPLN	-0.937*** (-25.56)	-0.897*** (-17.45)
SEC	0.003 (1.05)	0.002 (0.77)
INV	0.125*** (36.15)	0.139*** (20.78)
GINI	2.301*** (10.09)	-2.300*** (-10.19)
XGDP	0.018*** (5.92)	0.021*** (7.34)
GINImnXGDP	-0.034*** (-7.71)	0.038*** (8.31)
CONS	3.462*** (8.28)	4.863*** (12.16)
Period Dummies	Yes	Yes
F-test	0.000	0.000
AR(1) /Pr> z	0.000	0.000
AR(2)	0.360	0.336
N	574	574

Allowing for Non-Linear Interaction (Threshold) Effects

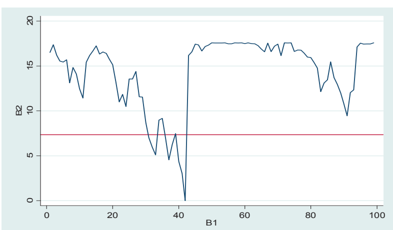


Figure 1: 95 % Confidence Interval for the Inequality as Threshold Variable: Exports

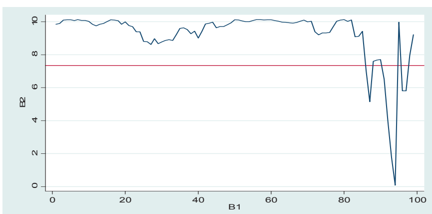


Figure 2: 95 % Confidence Interval for the Inequality as Threshold Variable: Trade

Key Findings and Implications

- Though within countries income inequality has been rising in most countries, in other countries it has remained stable or even decline slightly since the mid-20th century. Trade openness and economic growth has increased significantly for most developing countries.
- The study finds that in general trade openness advances economic growth and income inequality reduces economic growth.
- When we identify an income inequality threshold we find that inequality is positively associated with growth if below the threshold (low inequality) but negatively above the threshold whereas trade has a positive impact once the threshold is allowed for (i.e. above and below).
- Thus, trade generally promotes economic growth and relatively high inequality retards growth
- **Implications:** as what found in other studies (e.g. the IMF study) addressing income inequality both in advanced and developing countries is key to achieving sustainable and inclusive economic growth that is poverty reducing, and attaining social-cohesion and political stability.

References

Atkinson, A., T. Piketty, and E. Saez (2011), "Top Incomes in the Long Run of History", *Journal of Economic Literature*, 49(1):3-71

Jaumotte, F., S. Lall and C. Papageorgiou (2013), 'Rising Income Inequality: Technology, or Trade and Financial Globalization?, *IMF Economic Review*, Vol. 61, No. 2, *pp. 271-309*

Ostry, J. D., A. Berg, and C. G. Tsangarides (2014), 'Redistribution, Inequality and Growth', *IMF Staff Discussion Note*, SDN/14/02

Ncube, M., J. Anyanwu and K. Hausken (2013), 'Inequality, Economic Growth, and Poverty in the Middle East and North Africa (MENA)' *African Development Working Paper Series*, No 195– December 2013

Acknowledgments

I would like to thank Prof Oliver Morrissey for his constructive comments .