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Research Article

A Detailed Analysis of World Convergence in Income Inequalities with its all Dimensions

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ABSTRACT

Widening income inequality as a defining challenge indicates that world is diverging into twin peaks, rich and relatively poor. This paper investigates the convergence hypothesis as a dominant narrative of world income inequality to depict whether the current development process of inequalities is satisfactory for world economic growth. The empirical methods of absolute and conditional convergence for multiple indicators of income inequality with its impact on economic growth have been employed on a large panel of 200 countries from 1980 to 2018. The data is collected from the websites of World Income Inequality Database and World Development indicators of World Bank. Such results overwhelmingly support the convergence in income inequalities for the rich while the divergence for the poor. The analysis also concludes that rise in top class income shares cause to decrease the world GDP growth on average over the ten-year period, while increase the shares of low income holders enhance economic growth. Thus policies focusing on the poor and the middle class can mitigate, not only inequality and poverty, but can also boost world GDP growth. These policies should be according to country-specific characteristics and institutional settings by raising average living standards, encouraging the circulation of income and more inclusive prosperity for which countries will have to work together.

Keywords: Convergence, World countries, Income Inequality, Economic Growth Panel data analysis

JEL Classification: C23, D31, O15, O40, O5

1. INTRODUCTION

Increase in income inequality has become the crucial political issue and social debate in the world. There is definitely no greater policy challenge for the leaders in the world than that of minimizing increasing inequality and making growth wide-ranging. High inequality levels not only hinder the

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economic growth but also affect the scope of social outcomes such as trust, social mobility, wellbeing and educational accomplishment (Chambers and Dhondge, 2016). Convergence in income inequalities refers to the emergence of income gap between rich and poor countries. It can be defined as "the tendency for richer countries to grow faster than slower ones and for their incomes to diverge." It occurs if low-income countries fail to grow economically. Homer-Dixon (2010) calls it "the dirty little secret of developed economies" Once the larger the gap, the more difficult it is to make the jump.

An attractive growing research to analyze the issue of income inequality convergence or divergence, led us to the back of hundreds of years' industrial revolution. In this regard a more critical view at Maddison's data shows that the minimum and maximum per capita income regarding world countries in 1000AD were $400 and $650 (Maddison, 2005). One thousand years later, these income levels are at $409 and $110467, thus elaborates how comparative income levels over world economies has changed. The countries with very different degrees of development and growth converged to larger level of inequality, registering an overall upsurge in market Gini's of five to ten percentage points. Moreover, the growth in the share of the world's top ten percent, which today have approximately thirty percent of the world's income, is at the expense of falling bottom ten % and fifth deciles shares, proves the extension of imbalanced characteristics within nations in all over the world (Hickel, 2017).

The issue of world inequality arrived the widespread talk later, in 2014, when Oxfam related to the data from Credit Suisse, distributed a report, drawing on expressing that the mostly eighty-five individuals in the world possessed more treasure than the poorest countries. This statement attracted the well-formed attention. After three years, in mid-2017, Oxfam informed the statistics to demonstrate that wealth inequality had turned out to be poorer still: the richest sixty-two individuals possessed more than the lowliest portion of the world. Oxfam additionally noticed that the wealth of one percent had been expanding since 2008, with the more amazing statement that at the end of 2016, for the first time, the one % had more than half of world wealth (Lane, 2018). These statements additionally strengthened popular sadness over distributional patterns and sustained rising inequality.

The significance of the proposed study is manifest from certain aspects as it combines the tools of econometrics to analyze an economic phenomenon: convergence in income inequalities, at different levels of incomes as percent of population in absolute and conditional terms by connecting its impact on economic growth. The World inequality convergence needs further research as it explains the current trajectory of income inequality to understand whether the trends have changed and the information is thus useful to policy makers. Some unique aspects of this study are consist on comparison of seven measures of inequality for the first time Among which for low income countries with a specific focus is the main rationale of this paper. So it is the first in depth study that empirically examines the nature of relationship between different types of indicators of inequalities and then its relationship with Lagged GDP and GDP per capita.

The proposed study not only conduct cross sectional but also dynamic panel data modeling by taking into consideration 200 countries data from 1980 to 2018 for the first time. Some of the exclusive aspects of this study on income convergence are consist on evaluation of eight measures of for nine clusters analysis. In case of rest of studies, either has explored the convergence in income inequalities for Gini only for a specific set if developed and developing economies or impact of Gini on lagged values or the growth rates of incomes per capita in their analysis. The results confirm that world is dividing into two groups of rich and poor where rich are becoming super rich. In addition, Overall world economic growth can be enhanced by uplifting the poor class.

The rest of study is organized as; Section 2 consists on literature review of both theoretical studies and empirical studies. Section 3 depicts estimation techniques. Section 4 presents empirical analysis and conclusion is in the end

2. LITERATURE REVIEW

2.1. Theoretical literature

The theoretical reasons are consists on the growth-inequality relationship, better incorporation of inequality in economic theory and the connection between inequality and political economy. Both the classical and neoclassical thoughts consist on beneficial effects of inequality on growth while modern thoughts on other side highlight potential adverse effects of inequality. In classical and neoclassical models of growth, the urge and ability for more savings among the rich class leads to an increase in inequality levels, resultantly higher aggregate savings cause to higher the levels of investment and growth in more, the economies are closed ones (Kaldor 1956). In capital market imperfections approach that is based on modern perspectives, relies on investment indivisibilities and the existence of large set-up costs. The higher inequality again allows for greater aggregate investments.

Furthermore, a growth-enhancing effect of inequality, acknowledged by both classical and modern perspectives, is by differentiating inequality outcomes from inequality of opportunities (Fallah and Partridge 2007). This growth-enhancing effect gives rise to investment and for innovation, taking risks to accumulation economies of scale, through incentives to work hard. Higher redistributive pressure is caused by high inequality which in turn leads to economic disincentives and distortions, is explained by the political economy approach (Koczan, 2016). It prevents rich to lobby to implement efficient redistribution policies. In such situation, corruption and rent seeking activities waste the resources which adversely affect global crises and efficiently become the fundamental adverse role players in inequality (Bénabou 2002; Acemoglu and Robinson 2008).

Higher inequality reduces the capacity of individuals to invest in capital markets, if are imperfect, on one side, by reducing average investment and on other side by increasing macroeconomic volatility, especially in human capital which resultantly reduces long run growth (Stiglitz 2013). The relevance of the middle class risks of lower aggregate demand, with lower purchasing power, derived from a higher proportion of population are emphasized and explained through market size approach and relates the higher propensity of demand for local products for lower income groups. Finally, higher fertility rates and high inequality rates the link between endogenous fertility approaches which resultantly reduce growth. In particular, this happens as the average investment in education decreases with the increase in number of children per family (Krugman 2012). The latter ones, while investigating the negative role uses several variables for social unrest, such as the political economy approach, loan-to-value payment for mortgages as variable, capital-market imperfections approach and the share of government transfers in GDP as a proxy for redistribution.

The modern and classical perspectives, suggest an altering relationship between growth and inequality depends on the different stages of development. Enhancing is the inequality to growth in early stages of development while adverse afterwards and irrelevant in developed economies in that process after that. Its Castells-Quintana and Royuela Mora (2011) who saw both negative and positive effects, depend on the economic situations of the country. In contrast, García-Peñalosa and Orgiazzi (2013) empirically analysed the evidence of structural inequality, indicating no attempt for capturing market inequality and connecting it to economic development. In brief, although through different channels, the relationship theoretically works between inequality and growth, but it is acknowledged,

although scarce is empirical evidence still in this sense is that different types of inequalities provide different impacts on economic growth (Canuto et al., 2019).

2.2. Empirical Literature Review

The literature describes and explains a limited number of studies in relationship between convergence and world inequality. The seminal paper of Kuznets (1955) provided empirically an Inverted-U relationship between an economy's development level and the degree of its income inequality as the first piece of evidence. After that the review of literature specifies mixture of results for different time periods. In this regard, the attempts of Schultz (1998), Quah (1999, Acemogh and Robinson (2000), Milanovic (2003, 2016), Park (2001), Sala-i- Martin (2002, 2006), Gasper (2012), Kane (2015) and Alderson and Pandian (2018) prove in their studies through different techniques that inequality is falling gradually.

However, all these studies pointed that the development of China, India and some countries of Asia are the main reason for this decline. The attempts of Fireburg (1999), Milanovic (2005), Milanovic and Yotzhaki (2001), Capau and Decoster (2003), Ravallion (2003) and Gallop (2012) supported the notion of increase in world income inequalities while the effort of Hickel (2017) demonstrated that world income inequality has tripled. The idea of twin peaks was first introduced by Dikhanov and Ward (2001) and afterwards was maintained by the studies of Castellacci (2006) and Gadea Rivas and Villarroye (2017). The endeavor of Doller at al. (2015) concluded that inefficient macroeconomic policies for bottom 20% and 40% of the world are responsible for their poor circumstances. All these studies also decided that gaps in innovative capabilities and debt burdens of developing economies are among main reasons.
In nutshell, from the present sources it can be seen that there is no such study which has focused on income shares held by different income groups (indicators of income inequality) along with the most popular index of income inequality (Gini) for 200 countries with special focus on low level income groups at world level. Such study is a move in this direction.

Table.1: Selected studies on Literature of Convergence in Income Inequalities

Author	Data Source	Region	Inequality variable	Other variables	Type of convergence	Methodology	Estimation	Main finding
Anderson and Curtis (2015)	World Bank	N/A	Gini coefficient	Govt. responsibility measured by surveys	Regression Analysis	Linear models	N/A	Income inequality and Govt. responsibility relationship supported

Apergis et al. (2018)	N/A	US States	Top 10%, Gini	N/A	Income inequality	Phillips and Sull (2007)	Log t-test	Both Convergencediverg ence found in different phases
Artelaris et al. (2010)	European Regional Database (2008)	EUNMS	GDP Per Capita Gap	N/A	Income Convergence/divergence	Sigma convergence	Regression method	Regional inequalities have increased over time
Batog (2008)	Total economy database	Europe	GDP per capita	ITC Expenditure, No. of patents per 1 million population	Regression analysis	Double log model	N/A	Level of innovations affect convergence inequality
Das (2008)	Global Trade Analysis Project (GTAP) and WDI	World	Gini, Skilled Gini, Unskilled Gini	Trade openness, GDP	Income inequality	Regression analysis	Log linear	Transfer of technology supported convergence in inequality.
Demertzis et al. (2019)	Penn World Tables (PWT) and summers and Heston data (HDI)	OECD countries	Per capita income	Openness, Govt. expenditure, Investment	Trends in Theil	Geographic methods	N/A	Convergence supported
El Ouardighi and Somun (2009)	Statistical Database GGDC	Europe	GDP per capita	Theil Index	Income and inequality convergence	Regression analysis	OLS	Convergence of income and inequality supported

Ezcurra and Pascual (2005)	US Census Bureau	US States	Gini	N/A	Income inequality	Nonparametric Kernel Techniques	Density function	Convergence in inequality supported
Ezcurra and Pascual (2009)	European Community Household Panel (ECHP)	Europe	Gini	N/A	Income inequality	Graphics	Density and polarization	N/A
Galbraith and Garcilazo (2005)	Pay Roll data	Europe	Theil	Exchange rate	Income convergence	Trends in Theil	N/A	Convergence supported
Galbraith and Garcilazo (2010)	Eurostat	Europe	Theil Index	Unemployment rate, Real wages, Population, GDP	Regional Income Inequality	Regression analysis	Fixed Affect Model	Inequality supported
Hickel (2017)	World development indicators	World	Gini	GDP Per Capita, top1, top10 decile	Income inequality	Graphics	Trends in variables	Global inequality tripled since 1960
Kakamu and Fukushige (2005)	Account Book on Inhabitants	Japan	Atkinson index	Population, Incomes	Divergence/ Convergence	Trends in Atkinson	N/A	Interregional inequality decreases.
Lin (2011)	Statistics of income	US States	Gini coefficient	Top1, Atkin5, Gini, Mean dev, Theil	OLS estimator and GMM	Panel data	N/A	Convergence in income inequality highly supported
Lin and Huang (2012)	Statistics of income by IRS	US States	Top1, Top10, Gini, Mean dev,	N/A	Income convergence, Income inequality	Panel stationarity tests	KPSS Test	inequality convergence supported

Monfort et al.(2018)	Eurostat and Ameco Database	Europe	Gini	Unemployment rate, absolute redistribution	Real Income convergence	Phillips and sull (2007)	Panel data analysis	Inequality in the form of unemployment supported
Park (2001)	Penn World Tables	World	Theil index	Population, Per capita income	Income convergence	Trends in Theil Index	Graphical	Convergence in inequality supported
Rey and Janikas (2005)	US Census beauro	US States	Theils t test	N/A	Income Inequality	Graphics	Kernal densities, polarization	convergence supported
Tian et al. (2016)	China Statistic Book	China	Provincial real GDP per capita	Population growth rate, fixed capital per c apita	Income convergence	Phillips and Sul (2007)	t test	N/A
Tselios (2009)	European Community Household panel (ECHP)	Europe	Gini coefficient	Income per capita, Education, Industry Services	Income convergence, income inequality	Conditional convergence	panel data regression with pooled OLS	Income inequality decreased over time
Zhang and Li (2002)	N/A	World	Gini	Education attainment	Income convergence	Kernal density, polarization	Beta and Sigma	Development gap and gender gap of Education determined world inequality.

3. ESTIMATION TECHNIQUES

3.1 Absolute Convergence

Absolute convergence occurs when countries with a little early inequality practice a larger rise (or smaller decline) in inequality while with great early inequality practice lesser increases (or larger drops) in inequality. Among panel data models, cross-sectional and dynamic panel data models can be applied for absolute convergence while for conditional convergence, fixed affect, random affect and system GMM can be used. Thus estimation is made to test convergence using the ordinary least squares method (OLS) in the cross-section background first and then afterwards on Panel data setting. As country specific effects and the estimates in the cross-section model are not consistent so estimation of a dynamic panel model to treat explicitly the country effects also made. The dynamic panel model by using both one-step and two-step Generalized Method of Moments (GMM) developed by Arellano and Bond, (1991) is used as estimated estimator.

3.1.1 OLS Cross-Sectional Regression

It is the negative relation between the initial inequality level and the change in inequality indicator of that indicator that determines the convergence in inequality. If let assume that among different indicator of inequality if firstly absolute convergence is checked. Then $Indi_{iT}$ is the inequality indicator of country i (i =1,2,…,N) at time T. Equation (1) represents successive average annual growth rate of the models where the inequality indicator are regressed as a function of the in the initial year for every five year turn of its own inequality indicator.

Thus estimated results of convergence constraints, as denoted by β, and u_i is a mean zero error term. The method of Ordinary Least Squares (OLS) estimates for Equation (1) provides beta convergence over the time horizon (t =35) with interval of 5 years, in any final or particular initial year in order to reduce the impact of possible measurement errors. Assume that, the initial Gini index $Gini_{i,T-t}$ is set equal to the worth from 1985, then convergence estimation ended t=37 years (1980-2017).

$$\frac{1}{t}\, In\left(\frac{Gini_{i,T}}{Gini_{i,T-t}}\right) = \alpha + \beta\, In\left(Gini_{i,T-\tau}\right) + u_i \qquad (3.1)$$

A negative value for time horizons and all country groups for convergence parameter β in Equation (3.1) confirm both for short and long-run absolute convergence for inequality levels. The steady-state level of per-capita income at a rate of approximately 2% per year is the “iron law of convergence” for countries to converge. The speed of convergence is thus estimated by

$$\left(\rho = \frac{1}{\tau} In\,(1+\beta\tau)\right) \qquad (3.2)$$

In Gini values determines the speed of countries to similar per capita income levels converging to and an indication of countries to converge towards similar inequality levels. Similar to this is finding the absolute value of beta convergence for all other inequality indicators on by one.

3.1.2 Panel Regression Model

Since differences in technology or tastes does not control by the cross-section model for country specific representing affects so Caselli et. al. (1996) argues that the cross-section regression estimates in equation (3.1) are susceptible to omitted variable bias and are not consistent. The cross-sectional model in Equation (3.1) assumes that countries which are not structurally similar of countries will likely make them to converge to different steady states within a sample.

Therefore, with fixed effects the following dynamic panel model is estimated for if Gini is and vice versa for rest of variables:

$$\frac{1}{t}\, In\left(\frac{Gini_{i,T}}{Gini_{i,T-t}}\right) = \beta\, In\left(Gini_{i,T-t}\right) + \eta_i + \xi_i + u_{i,t} \qquad (3.3)$$

In Equation (3.3), the time horizon is fixed at ten years (t=10), nations are indexed by i (i = 1,...,N) and time periods by t (t =1990). Let η_i signify the differences in technology and preferences between countries with unobserved country specific effects, including, $\mu_{i,t}$ is a mean zero error term and ξ_t signify time specific effects that are serially uncorrelated across countries.

We obtain by rearranging the terms in Equation (3.3):

$$InG_{it} = \alpha In(Gini_{i,t-\tau}) + \eta_i + \xi_t + \mu_{it} \qquad (3.4)$$

In equation (3.4), α=$\beta\tau$+1, ηi=$\tau\eta\acute{i}$ and ξt=$\tau\xi t\,\acute{}$. The deviations from period means for all variables in equation (3.4) are taken to eliminate ξt, the time-specific constant.

So it thus

$$g_{it} = \alpha g_{it-t} + \eta_i + \xi_t + \mu_{it} \quad (3.5)$$

In Equation (3.5), g_{it} means the deviations of $In\ (Gini_{it})\ \alpha = \beta t + 1, \eta_i = t\eta_i$ and $\xi_t = t\xi_t$.

3.1.3 Dynamic Panel GMM Regression

Equation (3.5) with a lagged dependent variable is a dynamic panel model, therefore, the fixed-effect least squares within-group and dummy variable estimators remain no more consistent (Nickell, 1981). So the resulting τ-order (5-year) transformation difference of Equation (3.5):

$$\Delta g_{it} = \alpha \Delta g_{it-\tau} + \Delta\xi_t + \Delta\mu_{it} \quad (3.6)$$

Where $\Delta g_{it} = g_{it} - g_{it-\tau}, \Delta\xi_t = \xi_t - \xi_{t-\tau}\ and\ \Delta\mu_{it} = \mu_{it} - \mu_{it-\tau}$

In Equation (3.6) the lagged dependent variable (Δg_{it}) is correlated with the differenced error term ($\Delta\mu_{it}$) as the OLS estimate of α is biased. Following Caselli et al. (1996), that assumes that there is no τ – order serial correlation,

i.e. ($\mu_{it}, \mu_{it-\tau}$) = 0,

the GMM estimator of Arellano and Bond (1991) is used.

The assumptions as being true, then all the lagged values of the Gini index $g_{i0}, g_{i\tau}, \ldots. g_{it} - g_{it-2\tau}$ are uncorrelated with$\Delta\mu_{it}$, and the instruments are valid. Following Sargan (1958) by way of a test of over-identifying restrictions as offered by Arellano and Bond (1991), tests the validity of the instruments by the assumption of no τ –order serial correlation.

The Sargan test use the GMM estimator to check the validity of the instruments and thus confirms to reject the null hypothesis of instruments as being valid. The Equation (3.6) is then the two-step (GMM2) estimation method estimated by using of Arellano and Bond (1991).

3.1.4 System GMM Method

The following regression equation is used to test the absolute convergence.

$$Y_{i.t,t+T} = \alpha + \log(Y_{i.T}) + e_{i,t} \qquad (1)$$

Where, $Y_{i.t,t+T}$ be economy i's average of yearly annual growth rates of respective inequality indicator variable between t and t+T (dependent variable) and $\log(Y_{i.T})$ is the natural log of the respective variable at time t (independent variable). If b < 0 and is significantly different from 0, then that data set exhibits absolute beta convergence and the null hypothesis (Ho) of b=0 is rejected. So it concludes that income inequalities of poor countries and rich countries are converging to the same level.

For conditional convergence, the System Generalized Method of Moments (GMM) is most widely used methodology in the growth literature as being permits the researchers to solve the problems of serial correlation, heteroskedasticity and endogeneity of some explanatory variables (Leitao, 2010) and to resolve the econometric problems by Arellano and Bond (1991) and Blundell and Bond (1998, 2000) to estimate the dynamic models. It's highly plausible that economic growth and inequality are endogenous to each other as inequality determines economic growth and economic growth determines inequality as described and explained in detail in literature review. Moreover, highly likely that there exists a third variable per capita income that potentially influences both economic growth and inequality.

To address the potential endogeneity issue on inequality, we estimate our core model using the system GMM estimator. The system GMM estimator uses internal time lags as instruments for each endogenous regressors and treat all explanatory variables (including control variables) as being endogenous (Blundell-Bond, 1998). The observations are taken on ten years averages to smooth business cycle fluctuations and to get the medium term results. The countries with too little observations are dropped out of the dataset, resulting in the removal of 40 countries. They use annual data, which is unusual given that most papers For the system GMM regressions with fixed effects, we estimate the following equation:

$$GDPGT_{i,t} = \alpha_1 + \alpha_2 GDPGT_{i,t-1} + \alpha_3 GDPPC_{i,t} + inequality\ indicators_{i,t} + b_t + u_{i,t}$$

Where GDPGT is the growth rate of gross domestic product, $GDPGT_{i,t-1}$ is the lagged value of GDP growth rate, inequality indicators are gini, and share of incomes held by each quintile, country dummies are not included because System GMM already includes country fixed effect. In system GMM regressions, all inequality indicators are treated as endogenous. In all system GMM regressions, we collapsed the instrument sets using the default option: create only one instrument for each variable and lag distance, rather than one for each time period, variable and lag distance. By doing so, we have ensured that the number of instruments is less than the number of countries. As pointed out by Roodman (2009), too many instruments tend to overfit the instrumented variables and bias the results.

3.2 Data and Definition of Variables

The key data sources for 200 nations are of the data set from the Penn World Tables (PWT); the data of World Development Indicators by the World Bank and World Income Inequality Indicators (WIID-2020). Nearly a balanced panel of inequality indicators for 160 countries is achieved for the time period of 1980 to 2018. The estimates are calculated in computer software package (STATA) 14.0. This analysis uses the Gini index, share of incomes held by top 10 percent, share of incomes held by top20 percent, mid 20-40 percent, mid 40-60 percent, bottom 60-80 percent, bottom 80-100 percent and the poorest 10 percent. The quintile group shares express the share of total income going to each fifth of the population ordered according to the size of their incomes. In WIID, these shares are as percentages of total income and are weighted by population means. The first quintile group includes the poorest 20% of the population, while the fifth quintile includes the richest 20%. Deciles divide the population into ten groups and percentiles into one hundred groups.

4. EMPIRICAL ANALYIS

4.1 Absolute Beta Convergence Tests

Table 2: Absolute Convergence for World Income Inequality Indicators

Region World	**Cross-sectional OLS**		**Dynamic Panel OLS**		**Dynamic Panel GMM**	
	Coef.	**Std.err.**	**Coef.**	**P-Value**	**Coef.**	**Std.err**
Gini	-0.041***	(-0.003)	-0.1..***	0.87	-0.107***	0.023
			Saragan Test	1.92	Saragan Test	3.02
Top10% (d10)	-0.055***	(-0.007)	-0.156***	(0.011)	-0.198***	(0.012)
			Saragan test	8.03	Saragan Test	9,08
Top20% (q5)	-0..064***	(-0.008)	-0.153***	3.96	0.231***	(0.014)
			Sargan test	4.44	Saragan Test	7,99
Top 20% -	-0.051	(0.005)	-0.121***	(0.025)	-0.278***	(0.034)

40% (q4)						
			Sargan test	5,12	Saragan Test	8.12
Middle 40% - 60% (q3)	-0.068***	(0.009)	-0.134***	0.012	-0.151**	0.153)
			Sargan test	6,67	Saragan Test	3.48
Lower60% - 80% (q2)	-0.020	(0.004)	-0.095***	0.030	-0.113**	(0.123)
			Sargan test	2.86	Saragan Test	4.67
Lower 20% (q1)	-0.0236	(-0.006)	0.045	0.013	-0.098	(0.31)
			Sargan test	1.45	Saragan Test	2.9
Lower 10% (d1)	-0.018	(-0.023)	0.02	0.65	0.024	(0.135)
			Sargan test	3.45	Saragan Test	0.12

Source: Author's own estimations based upon data. Notes 1) For cross sectional data, standard errors with White's Heteroskedasticity-consistent are given in parentheses. 2) Significance levels at: *10%, **5%, ***1%. For GMM2 estimates, White's Period Heteroskedasticity consistent standard errors are reported.

The world sample of absolute convergence provides strong evidence in support of convergence in income inequalities for world economies as indicated by applying different panel data test results of cross sectional OLS, Dynamic Panel OLS and Dynamic Panel GMM. The coefficient value of beta for Gini coefficient in cross sectional OLS is negative at 1 percent level of significance. Thus, provide the strong support of showing inequality levels across countries converged during 1980 and 2018 for 160 worldwide countries. The results are also robust to other dynamic models such as for Dynamic Panel OLS and Dynamic Panel GMM. Here is again world income inequality is supported such as in both these results the value of Gini is negative and significant. Over time it is found that countries across the world are becoming equally unequal with the situation where inequality is decreasing in highly unequal countries and increasing in highly equal countries.

The use of Gini index is as a summary measure of inequality, tests convergence in income distributions. The other measures such as the decile shares of income and quintile share of income perform additional convergence tests of absolute convergence for each level of income group; provide deep insight of the absolute convergence. For top 10 percent of income shareholders of the world, all the three tests offer the negative significant value to support the scenario of convergence in income inequalities especially for this top income group. Similar is the result for top 20 percent means significant negative value of beta convergence.

However, as the indicators of income holders come down gradually for middle class income groups and for bottom group income holders, the results are mix and provide different results for different tests. However, for lower income levels, the convergence in income inequalities is not supported. All these results are supported by Sargan test values as being not over identified as the value is positive and not negative. Thus the phenomena of world diverging into twin peaks, is again supported by this deep analysis. The result for Gini indicator is in line with Chambers and Dhongde (2016) where the estimation was done for a set of 55 countries. For the rest of inequality indicators, the estimations are conducted for the first time.

4.2 Conditional (Sigma) Convergence Tests for World Inequality Indicators on Economic Growth

Table 3: System GMM Regression Results of Inequality Indicators on Economic Growth for World Economies

	Dependent Variable: GDP Growth					
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Lagged GDP Growth	0.166*** (0.034)	0.133*** (0.025)	0.129*** (.021)	0.112*** (0.024)	0.087*** (0.031)	0.125*** (0.032)
GPD Per Capita (in logs)	-1.450*** (0.351)	-2.197*** (0.324)	-2.342*** (0.302)	-2.234*** (0.318)	-2.123*** (0.340)	-2.234*** (0.317)
Gini	-0.0566* (0.035)					
Q5		-0.092* (0.043)				
Q4			0.060 (0.190)			
Q3				0.267* (0.153)		
Q2					0.345*** (0.145)	
Q1						0.391*** (0.167)
Constant	16.33*** (3.325)	19.89*** (2.58)	19.15*** (2.813)	18.55*** (3.068)	18.11*** (4.213)	26.33*** (3.497)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of countries	149	149	149	149	149	149

Source: Source: Author's own estimations based upon data from UNU-WIDER World

Income Inequality Database and World Bank. Standard errors in parentheses, *, significant at 10 percent level. ** significant at 5 percent, *** significant at I percent level. Estimated using system GMM, which instruments potentially endogenous right-hand-side variables using lagged values and first differences.

The results in Table 3 show the results from the system GMM regressions on ten-year horizon (on average). These results indicate that the lagged GDP growth has a significant positive impact on GDP growth. Such that for equation (1) one percent increase in lagged GDP growth significantly and positively affect GDP growth rate by 0.16 percent on average for a time period of ten years and similar is like this for all other equations. It indicates that current GDP growth rate depends on previous GDP growth rate. It thus confirms the statement that money creates money. The richer would be richer as they would gain more from their current rich position.

The poorer would remain poorer as their current growth rates are not sufficient. Here it is of worth mentioning that GDP growth rate is in its original values as rate shows that values are already taken in percentage and similar is lagged GDP growth rate is. However, the GDP per capita level is in logarithmic forms to indicate results in percentage (elasticity) form. For equation (1) if GDP per capita is increased by one percent then GDP growth rate will be decreased by 1.4 percent significantly on average for ten years. However, the size of the coefficients differ greatly for the six equations estimated, for different relative inequality indicators but significantly negative in all equations. It might be the representative of Laffer curve, where it is shown that at high levels of earnings, people prefer to leisure (not to work) over work. One another cause may be that on high level of earnings diseconomies of large scale start to work.

The value of Gini significantly negatively impact GDP growth, means higher the inequality leads to lower the GDP growth. More importantly, on same grounds, negative significant relationship is found for the top 20 percent of population with its impact on economic growth. If the income shares of the rich top 20 percent are increased by 1 percent point, then GDP growth would decline by 0.092 percent points on average followed for decade term (ten years' time period). It means that benefits of growth do not shift to the poor class. Instead, by increasing the income share of lower 20 percent (the poor) can cause to increase economic growth by 0.39 percent significantly. This positive relationship between income shares and high economic growth continues till second and third quintiles (the middle income group). One explanation for this feature can be related to the differences in the effects that increased income would initiate in the different income groups. For example, concerning the lowest income group, increases in income are more likely to be directly used in consumption of necessities for the daily life, such as food, clothes and transportation. So the incomes of agriculture sector would boost the agriculture sector too by raising the incomes of such deprived nations where agriculture is backbone of the nation.

Meanwhile in the 4th income decile, increases in income might be directed in consumption that are likely to have a more substantial and far-reaching effect for the economy as a whole, for example by providing better education and health facilities for kids. It also suggests this because of by increasing social unrest and political instability to the masses, high inequality has indeed a negative effect by lowering aggregate demand for the long-run growth. High inequality in fact leads developing economies towards inflation along with the shift of assets towards developed economies. This in turn again causes to decrease the aggregate demand which discourages investment and capital formation. The analysis also confirms that

increase in the income share of the rich decrease the GDP growth over the medium term, thus suggests that the benefits do not trickle down. In contrast, an increase in the income share of the poor is associated with higher GDP growth.

Thus policies focusing on middle and poor class can alleviate not only inequality but can boost GDP growth too. Additionally, the different indicators of inequality show that economic growth can be increased by increasing the incomes of low income groups. It may be because the increased purchasing power would increase their welfare by increasing aggregate demand for domestic goods which would encourage domestic investment and capital formation. In this way world would be more peaceful with less war, better health and better education. The nature of appropriate policies depends on country-specific conditions and institutional settings. In developing economies confirming monetary and fiscal deepening together with creating incentives for lowering informality with greater financial inclusion would be important. In advanced economies, policies should focus on making tax systems more progressive along with reforms to increase human capital and skills would be appropriate.

More generally, raising policies to uplift the average living standards of a common man would stimulus the distribution of income and guarantee a more comprehensive prosperity. However, the results also support the possibility of a long-run growth-enhancing component of inequality, and allow us to see the relevance of the mechanisms that need to be controlled for that positive effect of inequality to become empirically evident. The complexity of the relationships between income inequality and economic growth is also supported by results. This complexity is more intense in developing countries where a satisfactory description about dynamic relationship of these countries is interesting to know whether inequality is harmful or beneficial for growth here.

5. CONCLUSION

The whole analysis thus confirms that word is converging in to twin peaks, rich and poor. Both of these groups are moving in their respective circles thus rich are becoming more rich and poor are unable to come out of their vicious circles of poverties. Moreover the inequality impact on economic growth is checked by taking into consideration of two more influential variables impact on income inequality (GDP growth and GDP per capita). The variables of lagged GDP growth and Per capita GDP have significant impact on economic growth. It means economic growth would remain high in those countries which are already rich. All of this study proves that inequalities are increasing gradually but this process is dissatisfactory for economic growth. For rapid world economic growth and a more peaceful world, the need is to uplift the low income people. If the same situation prevails then world income inequality would gradually but slowly will increase. Better facilities to this (bottom 40 %) neglected class in the form of human capital, the skill biased technical revolution, improving the globalization of production through earnings and skills, refining the labor market institutions to form the welfare states, considering and by educating institutional complementarities and capitalism and on raising agricultural productivity.

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