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Globalization and Income Inequality

A Panel Data Analysis of 68 Countries

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ABSTRACT

The causal effect of globalisation on income inequality is an issue of significant academic interest. On the one hand globalisation is considered to promote global economic growth and social progress, while on the other; it is blamed for growing income inequality and environmental degradation, causing social degeneration and difficulty of competition.

The objective of the study is to determine the direction of impact of globalization on income distribution. This study hypothesises that increased globalisation worsens income inequality, and vice versa. This hypothesis is investigated using panel data econometric techniques to examine income inequality index and the index of globalization for panel data of 68 developing countries over the period of 1990-2010.

The analysis shows that an increase in globalisation (represented by an increase in the KOF coefficient) leads to an increase in the level of income inequality. It is worth noting, however, that this analysis also suffers from several limitations. It is possible perhaps a simple, overarching relationship does not exist. Rather it is possible that the impact of globalisation on income distribution varies between nations, depending on the structures and institutions that are in place in each country.

1. Introduction

The causal effect of globalisation on income inequality is an issue of significant academic interest. On one hand globalisation is considered to promote global economic growth and social progress, while on the other; it is blamed for growing income inequality and environmental degradation, causing social degeneration and difficulty of competition. 'Globalisation refers to a comprehensive process of economic integration which enhances international mobility of national resources and increases interdependency of national economies' (OECD 2005, p. 11).

There are social, political, cultural origins of globalization, but most concerns are related to economic globalization and its consequences. Bhagwati (2004, p. 3) distinguishes economic globalization as:

integration of national economies into the international economy through trade, direct foreign investment (by corporations and multinationals), short-term capital flows, international flows of workers and humanity generally, and flows of technology.

The main concern of economists in this subject is the impact of globalization on economy and society, particularly of developing countries. It is argued that integration into the global economy promotes economic growth, which in turn helps to solve problems of poverty, inequality, lack of democracy and pollution, and empirics suggest a considerable reduction in poverty amid globalization, especially in the case of India and China (Bhagwati 2004), Zhou et al. 2011). However, this view is not universally accepted and the opposing school of thought argues that globalization causes economic insecurity and contributes to the growing inequality in both developed and less developed countries (Stiglitz 2002; Borjas & Ramey 1994; Cornia 2004; Marjit et al. 2004; Bergh & Nilsson 2011). Stiglitz (2006, p. 8) argues:

59 per cent of the world's people are living in countries with growing inequality, with only 5 per cent in countries with declining inequality.' Even in most of the developed countries, the rich are getting richer while the poor are often not even holding their own.

Table 1
HDI, KOF and Gini Index

Country	Year	KOF	Change (%)	Gini	Change (%)	HDI	Change (%)
China	1990	34.09	74%	32.43	31%	0.490	39%
	2010	59.36		42.48		0.682	
Sri Lanka	1990	49.22	2%	32.48	24%	0.583	18%
	2010	50.14		40.26		0.686	
Bangladesh	1990	21.55	89%	28.85	11%	0.352	41%
	2010	40.72		32.12		0.496	
India	1990	31.26	66%	31.88	5%	0.410	32%
	2010	51.88		33.38		0.542	
South Africa	1990	39.06	65%	59.33	6%	0.615	0%
	2010	64.41		63.14		0.615	
Malaysia	1990	59.63	30%	46.17	0%	0.631	20%
	2010	77.43		46.21		0.758	
Uganda	1990	20.97	127%	44.36	0%	0.299	48%
	2010	47.62		44.3		0.442	
Ecuador	1990	36.15	50%	50.49	-2%	0.636	13%
	2010	54.16		49.26		0.718	
Pakistan	1990	34.82	50%	33.23	-10%	0.399	26%
	2010	52.17		30.02		0.503	
Brazil	1990	45.32	31%	61.04	-10%	0.600	19%
	2010	59.35		54.69		0.715	

Sources: **KOF**: Dreher (2006), Updated in Dreher et al. (2008); **Gini**: World Development Indicators; **HDI**: Human Development Report (UNDP, 2011)

Table 1 gives an insight into the dynamics of globalization, inequality and well-being for some countries. Income inequality shows a positive trend with globalization in most of the countries. For instance, Globalization Index (*KOF*) in China increased by 74% between 1990 and 2010 accompanied by 31% increase in Income Inequality Index (*Gini*) during the same period. Only few countries demonstrate absence of change in income distribution (Malaysia and Uganda) and reduction in inequality (Pakistan, Brazil, Ecuador).

The objective of the study is to determine the nature of impact of globalization on income distribution. It is hypothesised that increased globalisation worsens income distribution in developing countries. This hypothesis is investigated using panel data econometric

techniques to examine income inequality index and the index of globalization for panel data of 68 developing countries over the period of 1990-2010.

The paper is organised as follows: section 2 briefly summarises the existing literature, section 3 provides data analysis, methodology and results and section 4 includes conclusion and limitations.

2. Literature Review

The causal effect of globalisation on income inequality is an issue of significant academic interest. It is interesting to note that various academic literature investigating this effect have often arrived at vastly different conclusions. This section provides some relative strengths and weaknesses of already existing literature on the subject matter.

Borjas and Ramey (1994) use cointegration techniques to investigate causal effects between various explanatory variables and income inequality for the United States. It is concluded that the only explanatory variable that follows a significant long term trend to income inequality is the durable goods trade deficit as a percentage of GDP. Using trade as a proxy to globalization, the study suggests a positive relationship between inequality and globalization.

A particular strength of this paper is the rigor of the econometric time series analysis. Robust statistical inference tests are presented that demonstrate the validity of the models employed. However, the primary limitation of this analysis is that the source data relates only to the USA. It is therefore not appropriate to apply conclusions obtained from this analysis to other economies, particularly those of developing nations.

Edwards (1997) investigates the relationship between trade policy and income distribution by regressing Gini coefficient over six different indicators of trade openness. The paper concludes that there is no evidence to suggest that trade liberalisation, or increased globalisation, has any significant impact on income inequality (Edwards 1997, p209).

The discussion regarding measurement issues of the trade indicators is a relative strength of this paper. By using more than one measure of trade liberalisation, the analysis shows that while some indicators of increased trade improve income distribution, others have opposite effect. Therefore, the analysis concludes absence of any clear link between increased trade and income inequality. A limitation of the analysis, however, is that the final Ordinary Least Squares regression model is not statistically significant (Edwards 1997, p. 209) ($R^2 = 0.28$).

Marjit, Beladi and Chakrabarti (2004) provide a theoretical analysis of the possible impact of trade on income inequality. In particular, the analysis focuses on the gap between skilled and unskilled labour in a small developing economy. The analysis suggests a strong decline in the relative income of unskilled labour following an improvement in the terms of trade.

This paper particularly highlights that an overwhelming majority of the research on the impact of globalisation and trade on income inequality has been carried out on data from the North which can be regarded as a definite strength of this paper. However, as the discussion is predominantly theoretical, a limitation of this paper is the lack of econometric modelling to support the conclusions presented.

Bergh and Nilsson (2011) examine the link between globalisation and within country income inequality, after adding several control variables and controlling for potential endogeneity using GMM. They conclude that reforms towards *economic freedom* seem to increase inequality mainly in the North; whereas *social globalisation* is more important in the South. It is also found that monetary, legal and political globalisation do not tend to increase inequality.

This paper has the distinct advantage of making a distinction between different forms of globalisation. In addition, this paper presents robust econometric analysis with a large sample of panel data (80 countries, 1970-2005). In particular, the KOF index is used as a measure of

Globalisation, and the Economic Freedom Index of the Fraser Institute is used to measure within country income inequality.

Zhou et al. (2011) investigate the impact of globalization on income inequality distribution in 60 developed, transitional and developing countries in 2000. It is stated that globalisation can either alleviate or worsen the income inequality, and most empirical evidence is controversial and inconclusive. The objective of this paper is to provide strong empirical evidence on this important issue in international trade.

Two globalization indices are used; (1) the equally weighted index (Kearney index) and (2) principal component (PC) index, using Kearney's (2002, 2003, and 2004) data and PC analysis. This database contains derivations on all four aspects of globalization: economic integration, personal contact, technological connections, and political engagement. The Gini coefficient is used to measure income inequality and data were obtained from the UNU/WIDER-UNDP World Income Inequality Database (WIID) adjusting to make the data more consistent and comparable across countries. Education and urbanization data are taken from the Human Development Report [UNDP (1999-2003)].

The following empirical model is developed and the Gini coefficient of a country is regressed on both Kearney and PC indices for all 60 countries:

$$Gini_i = \beta_0 + \beta_1 \text{Globalization index} + \beta_2 \text{Education} + \beta_3 \text{Urbanization} + u_i$$

The primary empirical contribution of this paper is to alleviate the flaws in Kearney data (scaling issues in variables and arbitrary weights for variables) by forming two new global indices, the Kearney index, and the PC index. Next, contrary most empirical findings, it is concluded that globalization decreases income inequality. Therefore, this paper provides empirical support for the assertion that the Washington consensus (i.e. policies designed liberate trade and capital flows) promote greater income equality.

3. Methodology and Results

3.1 Data Selection and Limitations

The hypothesis of positive relationship between globalization and income inequality is investigated by observing historical variations in the economic and social indicators for a panel of 68 countries over time period 1990 to 2010. The analysis uses three explanatory variables (globalisation, education level and urbanization level) to model potential variations in income inequality using four distinct panel data modelling techniques.

The functional form of the model is given as:

$$Gini_{it} = F(G_{it}, E_{it}, U_{it}) \quad (1)$$

Where i refers to country, ranging between 1 to 68, and t refers to year. The description and source of other indicators is given below:

- $Gini_{it}$ refers to Gini coefficient for measuring income inequality. Data for Gini coefficient has been taken from World Development Indicators, issued by the World Bank. It is worth noting that data for Gini coefficient includes considerable amount of missing values. Zhou et al. (2011), in their cross sectional study, chose the nearest value of year 2000 as a proxy. However, this study replaces missing values by moving-average of 9 years. For instance a missing value in 1990 is replaced by average Gini coefficient for that country over the period 1986-1994.
- G_{it} refers to the KOF index of globalization. Data for KOF Index has been taken from Dreher (2006) updated in Dreher et al. (2008). However, this data is available until the year 2009. Therefore, in order to maintain the class limits of 5-years, the KOF Index for 2009 is used as a proxy for year 2010.
- E_{it} refers to the education index for measuring education level and U_{it} refers to urbanization index, measured as a percentage of population living in urban areas. Data

for both indicators have been collected from data library of Human Development Report (UNDP, 2011).

In contradiction to Zhou et al. (2011), this study proposes KOF index as an indicator of globalization instead of Kearney Index, on the grounds of superiority of KOF. The A.T. Kearney index categorizes globalization into four dimensions; economic integration, personal contact, technological activity and political engagement. However, it has certain drawbacks associated with it. For instance, Kearney Index, available for only 64 countries, allocates equal weights to all variables and hence creates a bias against the larger countries, meaning thereby that the smaller countries have a tendency to take higher rank. On the other hand, the KOF index allocates relative weights to 24 variables from economic, political and social dimensions of globalization, and provides data for 208 countries.

3.2 Modelling

This section provides three different models for analysis of pooled data. Results drawn from different models allow to build a more concrete and rigorous analysis by comparing same indicators under different dynamics.

3.2.1 Basic Linear Model (Pooled OLS)

The basic linear model for the study can be devised as:

$$Gini_{it} = \beta_0 + \beta_1 \cdot G_{it} + \beta_2 \cdot E_{it} + \beta_3 \cdot U_{it} + \gamma_i + \varepsilon_{it} \quad (2)$$

Where γ_i captures the effect of time invariant country-specific factors that might influence Gini coefficient, such as geographic and demographic dynamics. ε_{it} is the idiosyncratic error term that represents factors that vary across both time and country.

3.2.2 Fixed Effects Model

The Fixed Effects model for functional form given in equation (1), is derived by differencing the variable with its time-demeaned component. It can be represented as:

$$Gini_{it} - \overline{Gini}_i = \beta_1 \cdot (G_{it} - \overline{G}_i) + \beta_2 \cdot (E_{it} - \overline{E}_i) + \beta_3 \cdot (U_{it} - \overline{U}_i) + (\varepsilon_{it} - \overline{\varepsilon}_i) \quad (3)$$

Where the model is more consistent due to elimination of the country-specific time-invariant effect (γ_i).

3.2.3 Random Effects Model

This model requires quasi-demeaning of the variables, such that the unobserved effect is not completely eliminated from the model, but its impact is reduced to a certain extent, in order to get better estimates for the longitudinal data. The model is formed as:

$$(Gini_{it} - \theta \cdot \overline{Gini}_i) = (\beta_0 - \theta \cdot \beta_0) + \beta_1 \cdot (G_{it} - \theta \cdot \overline{G}_i) + \beta_2 \cdot (E_{it} - \theta \cdot \overline{E}_i) + \beta_3 \cdot (U_{it} - \theta \cdot \overline{U}_i) + (\varepsilon_{it} - \theta \cdot \overline{\varepsilon}_i) \quad (4)$$

Where θ the coefficient for quasi-demeaning estimated through GLS transformation¹.

3.3.4 Dynamic Model

Considering the possibility that indicators might impact Gini coefficient with a lapse of time, dynamic model is introduced to enhance the precision of the analysis. The Basic Linear Dynamic model for output function given in equation (8) is given by equation (11):

$$Gini_{it} = \lambda \cdot Gini_{it-1} + \beta_1 \cdot G_{it} + \beta_2 \cdot E_{it} + \beta_3 \cdot U_{it} + \gamma_i + \varepsilon_{it} \quad (5)$$

Where λ is the coefficient for lagged dependent variable.

3.5 Results

Table 2 presents estimation results for (2),

(3), (4) and (5), under robust standard errors.

A simultaneous analysis of results from various models helps in drawing a coherent and comprehensive analysis by comparing the dynamics of explanatory variables on the dependant variable, under each model.

Table 2
Estimation Results

Model	KOF Index	Education Index	Urbanization Index
Basic	0.0941**	-25.045**	0.191**
Linear	(0.048)	(0.000)	(0.000)
Fixed	0.193**	-6.615	-0.225
Effects	(0.002)	(0.464)	(0.112)
Random	0.1809**	-15.636**	0.030
Effects	(0.000)	(0.004)	(0.627)
Dynamic	0.140*	-24.792**	-0.080
	(0.084)	(0.015)	(0.640)

** Variable is significant at 5 percent level of significance
* Variable is significant at 10 percent level of significance

¹ $\theta = 1 - \sqrt{\frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2 + T\sigma_\alpha^2}}$

Regardless of the magnitude of coefficients, their signs provide some very surprising results. It is interesting to observe that the coefficient of KOF Index, indicator for globalization, is not only positively related to Gini coefficient in all four models, but also highly significant in each model. This result corroborates the hypothesis of this study which suggests that an increase in globalization, *ceteris paribus*, leads to a certain incline in inequality in the target group of countries. This result can be interpreted in a more instinctive way by relating the results to Table 1, which proposed that income inequality is on the rise in most countries even if there is an incline in their respective index for globalization.

Another interesting result to observe is the inverse relationship between education index and inequality. Though, education was used as a control variable, yet its estimate provides some very intuitive results. It suggests that, over the period of history for the target group of countries, there has been a negative causation between education and income inequality, meaning thereby, an increase in the level of education is bound to reduce the income gap between the rich and the poor. However, fixed effects estimator suggests that education is an insignificant indicator of income distribution.

Contrary to globalization and education, urbanization does not seem to have a considerable impact on income inequality, and is regarded insignificant in all four models, therefore the magnitudes and signs for this coefficient are irrelevant for discussion.

4. Discussion and Conclusion

The causal effect of globalisation on income inequality has been an issue of significant interest in development economics. Various studies in this issue have yielded conflicting results. This paper lays its focus on more recent literature, more specifically the results presented in Zhou et al. (2011) that suggest existence of an inverse relationship between globalization and income inequality. However, this paper has identified several limitations in

their analysis; most notably the fact that their study is based on a cross sectional data, while globalization and income inequality are matters pertaining significantly to variations over time.

This paper therefore puts forward a more coherent empirical analysis by implying various econometric techniques on a panel of 68 countries over a time period of 20 years. This analysis supports a positive relationship between globalization and income inequality, suggesting that an increase in globalisation would lead to a worsening of income distribution, a direct contradiction of the result obtained by Zhou et al. (2011).

These results are very interesting in the sense that they support the unorthodox school of globalization. There is a considerable number of trade theorists who not only argue that globalization is a rich man's game, but also regard it as a new form of colonization terming it as 'an updated, smartly packaged, reengineered version of an old product' (Sibley 1997; Pillay 2001; Dirlík 2002).

Banerjee and Linstead (2001, abstract) have gone to the extent of calling the rhetoric of 'one world, many peoples', to be connected with the development of First World countries only, and completely disassociated with the developing nations. Our study sets an empirical evidence for such claims made by these theorists by negating the positive role of globalization in reducing inequality, especially in the case of developing economies.

It is worth noting, however, that this analysis also suffers from several limitations. Firstly, there are inherent limitations in the source data, which are discussed in section 3.1. In addition, the analysis makes no distinction between North and South. Marjit et al. (2004) discovered that the impact of globalisation on income distribution is often vastly different between developed and developing nations.

Therefore, while this analysis does not provide definitive proof of the impact of globalisation and income inequality, it underscores the variety of results obtained regarding this issue. This would suggest that perhaps a simple, overarching relationship does not exist. Rather it is possible that the impact of globalisation on income distribution varies between nations, depending on the structures and institutions that are in place in each country.

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