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Abstract

The dynamic, globally integrated and increasingly complex socio-economic landscape prevalent around the world today gives rise to intriguing questions about the relationships between disparities in human and economic development and factors that affect their magnitude. It is well acknowledged that circulation of wealth and its equitable distribution is necessary for the proper realization of public policy objectives of socio-economic welfare. Nonetheless, the growing complexities and instabilities in regimes around the world, seem to aggravate the poverty gap and pose challenges in policy reforms for effective redressal of income inequalities. Thus it is imperative to analyse the indicators of economic disparities such as income inequality and past trend of poverty reduction and aggravation, so as to better appreciate whether it is the quantum of 'growth' or quality of sustainable development that would chart the way towards greater socio-economic equity. This paper is a humble attempt at using econometric techniques for investigating a causal nexus between income inequality and financial indicators, with special reference to India, an economy with several endemic challenges.

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Introduction

The dynamic, globally integrated and increasingly complex socio-economic landscape prevalent around the world today gives rise to intriguing questions about the relationships between disparities in human and economic development and factors that affect their magnitude. Income inequality vis-à-vis economic growth and development of the financial sector, is a subject that represents significant policy concerns and has been subject to many research analyses. Interestingly, the many such analyses have been presenting results which may often be in contrast to the realities of a given economy, especially in terms of not being able to fully capture the specificities of its population distribution.

There have been numerous contentions and observations made in prior literature about the suggested relationship between the income inequality and financial development, yet the theoretical underpinnings of the causal relationship between financial development and income inequality remain largely unresolved. While, on the one hand, there has been tremendous growth in the development of financial markets operating with sophisticated products and possibilities for development, on the other, there have beens reports of increasing disparity in income levels and access to financial services.

The case of India presents unique challenges to policymakers and researchers alike, as the giant economy treads the path of strong economic growth and development, all the while suffering from increasing disparities in wealth distribution. For instance, while India hosts some of the wealthiest people in the world, it is also a nation that has a considerable proportion of its population living in substandard conditions and this has given rise to inexplicably complex policy concerns. The Indian economy has witnesses many financial reforms since the 1990s, many of which have strengthened the intermediation process. The total number of public sector banks was merely 8,262 in 1969 and increased to 62,607 in 2011. During this period the deposits have increased from 3,896 crore to 4,014,743 crore and bank credit has increased from 3,036 crore to 2,996,655 crore. These growths indicate the existence of a vibrant bank based financial system in India. (Sehrawat, 2015)

In common economic parlance, it is well acknowledged that circulation of wealth and its equitable distribution is necessary for the proper realization of public policy objectives of socio-economic welfare. Nonetheless, the growing complexities and instabilities in regimes around the world, seem to aggravate the poverty gap and pose challenges in policy reforms for effective redressal of income inequalities. Thus it is imperative to analyse the indicators of economic disparities such as income inequality and past trend of poverty reduction and aggravation, so as to better appreciate whether it is the quantum of 'growth' or quality of sustainable development that would chart the way towards greater socio-economic equity.

The scope of this paper is limited to a simple model, albeit incorporating a rare and new dataset for measuring income inequality. The analysis is based on empirical

investigation of the effects of select indicators of financial development on income inequality. It seeks to identify long-run relationships among variables that indicate inequalities in income distribution and those that represent financial development, with special reference to the Indian economy.

Literature review

As regards the discourse about economic growth and its relationship with financial development, there have been plenty of empirical and academic works since the nineteenth century onwards, that can be used as important references for further research. Among these are works such as those of Patrick (1966) and Jung (1986) that discuss the causal relationship between real sector growth and financial development.

In a significant study focusing on Latin America by Gregorio and Guidotti (1995), it was found that the main channel of transmission from financial development to growth is the efficiency, rather than the volume, of investment. Also, based on a study of income distribution impact of financial markets, Westley (2001) concluded that easy access to financial resources through micro finance policies can reduce income inequality.

One of the most oft-cited arguments in the income inequality discourse is that of Simon Kuznets (1955), who put forth his famous "inverted U" hypothesis, primarily arguing that while inequality could rise in the early stages of industrialization, in the later stages it should be expected to decline. Many researchers have felt compelled to try to validate this hypothesis by often looking at past trends in search of any evidence that development truly hurts the poor.

An interesting assertion was made by Demtriades and Hussein (1996) that there can be no 'wholesale' acceptance of the view that 'finance leads growth' as there can be no 'wholesale' acceptance of the view that 'finance follows growth'. There study reports that causality patterns vary across countries.(Demetriades, 1996)

Li et al. (1998) found a strong relationship beween performance of financial markets and lower income inequalities, based on an examination of 40 developed and developing countries from 1947-1994. Other empirical studies have found that a country's rate of economic growth is negatively correlated with its initial level of inequality (Ahluwalia, 1976; Deininger and Squire, 1998)

Sehrawat and Giri (2015) have done a much needed analysis of the relationship between income inequality and financial development in India, including a study of financial indicators, which shows that since the 1970s, the total credit to GDP ratio has been higher than the market capitalization to GDP ratio, suggesting that India's financial system is biased toward bank-based financing which is largely credit-based.

Kristensen (2015) suggests that the impact that credit supply has on income inequality goes in opposite directions depending on if the financial market is developed or non-developed. Nonetheless, this remains a research area that still demands much deliberation.

In a paper addressing the dichotomy between the quantum and quality of financing, Koetter and Wedow ask the question about which matters more in a bank-based economy. Our focus country, India has a largely bank-based economy as observed by

Sehrawat and Giri (2015). Their paper contends with evidence for a one-way causality running from indicators of financial development viz. Credit, Financial Development (Domestic Credit and Market Capitalization to GDP, CPI and Trade to GINI, implying that bank-based financial deepening, inflation, trade and economic growth indicators leads to income inequality, and not the vice-versa.

These findings are not only intuitively appealing for India, considering it being a developing economy, but also raises the issue of whether the current economic order is adequate to address policy concerns around income inequality or do they perhaps suggest the need to look at alternative models for optimality as opposed to maximization approaches.

In this regard, faith-based and Socially Responsible Investment financing, may be interesting alternatives to look at, for the purpose of identifying the potential of value-based financing. Interestingly, faith-based economic and finance seem to provide a promising alternative to credit based financing, such as in the case of Islamic economics. For instance, the system of participatory commercial contracts and vitalization of real production possibilites, which form the basis of Islamic economics, presents an archetypal model for holistic socio-economic development along with distributive and redistributive mechanisms for wealth and prosperity sharing. (Mirakhor, 2010)

For instance, Islamic finance is a fast growing segment of international financial markets. Deriving its core principles from the Quran and the Sharia, the objective of Islamic finance is to install a more equitable financial and economic order that at the same time is transaction-friendly. Thus, Islam could be seen as a foundation for the inclusion of the ethical and moral dimensions of economics and markets. (Rethel, 2011)

Limitations and challenges

There are two major challenges in the empirical literature on development economics which seeks to address the issue of income inequality lies with the choice of an appropriate definition of global inequality. Another problem with the previous literature is the issue of the reliability of the underlying data used for distributional analysis.

This study is a humble attempt to identify a long term relationship between indicators of economic development viz. trade, price levels, interest rates offered in the economy and levels of income inequality as represented by the Gini coefficient. The findings interestly suggest a long term relationship between unequal distribution of incomes and the movements in price levels, which are themselves influenced by many variables and may therefore assist in the deduction of macroprudential policy implications.

Nonetheless, the paper is limited in scope and has, due to consideration of time and other commitments, relied on a rather simplistic model with very few and select variables. The findings therefore, must be left subject to further research and improvement.

Methodology and data description

Most empirical works on income inequality have relied on the more popular Gini indicators based on the D&S datasets, but this paper has abstained from using the same for reasons such as comparability issues arising from variation in data sourcing across geographies and differences in data collection methods. The Ginis for some countries were based on income-based reporting while for some they were consumption-based.

The EHII developed Ginis provide greater intuitive value since they are developed using multiple datasets to address discrepancies that may impede in presenting the truer picture of inequality across geographies.[3]

The study applies a unique and improvised dataset to examine the presence of a long run relationship between unequal income distribution and development of the financial sector in India, using time series data for a period of around 45 years from 1963-2007.

The method selected for the purpose is the ARDL (Auto Regressive Distributive Lag) co-integration procedure developed by Mohammad H. Pesaran et al. (2001). It is considered to be a relatively more efficient model in testing for a small sample data size, as in the case of this paper. It also applies ECM for short-run dynamics and VDC for estimating forecasted cointegration movements. The justifications for using the selected methodology as being the most appropriate, have been discussed in a later section.

Model Specification and Data

The model incorporates a new measure for income inequality, namely the EHII- The Estimated Household Income Inequality Data Set (EHII), developed under the University of Texas Inequality Project, which has generously made the datasets available online. It is a global dataset derived from the econometric relationship between UTIP-UNIDO, other conditioning variables, and the World Bank's Deininger & Squire data set.

Following is the general specification that has been used in this study to empirically examine the long run relationship between income inequality and economic indicators viz., trade, price levels and bank driven financial development.

$$LINQ = \alpha_0 + \alpha_1 LTRADE + \alpha_2 LCPI + \alpha_3 LINT + \varepsilon_t$$

INQ is the focus variable representing income inequality and is sourced from the EHII dataset. Trade represents the quantum of trade in the economy as a percentage of the GDP and is a proxy for financial development and commercialization. CPI is the

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[3] For more information, kindly see: http://utip.gov.utexas.edu/data.html

Consumer Price Index reflective of the price levels in the economy while INT represents the bank interest rates offered in India and also proxies for the deepening of banking intermediation.

The datasets were culled from different sources, including the UTIP, World Bank, Reserve Bank of India and other research tools viz. Datastream and Quandl.

We begin our empirical testing by determining the stationarity of the variables used. In order to make the mean of the variance stationary, the variables are differenced and then checked for stationarity.Ideally, our variables should be I(1), in their original level form and non-stationary and in the first differenced form. This is generated for each variable by differencing its log form, in order to achieve constant mean and variance. For testing for stationarity, we ran the Augmented Dickey-Fuller, Philip-Perron and KPSS tests.

The following tables illustrate the results of the ADF test on each variable (in both log and differenced forms)

	VARIABLE	ADF	T-STAT.	C.V.	RESULT
LOG FORM	LINQ	ADF(2)=SBC	-2.094	-3.440	Non-Stationary
		ADF(1)=AIC	-2.167	-3.487	Non-Stationary
	LTRADE	ADF(2)=AIC	-2.743	-3.440	Non-Stationary
		ADF(1)=SBC	-2.290	-3.487	Non-Stationary
	LCPI	ADF(1)=SBC	-2.737	-3.487	Non-Stationary
		ADF(1)=AIC	-2.737	-3.487	Non-Stationary
	LINT	ADF(1)=SBC	-1.358	-3.487	Non-Stationary
		ADF(2)=AIC	-1.778	-3.440	Non-Stationary

	VARIABLE	ADF	T-STAT.	C.V.	RESULT
1ST DIFF. FORM	DINQ	ADF(1)=SBC	-13.282	-2.874	Stationary
		ADF(2)=AIC	-8.872	-2.874	Stationary
	DTRADE	ADF(1)=SBC	-3.992	-2.860	Stationary
		ADF(1)=AIC	-3.992	-2.860	Stationary
	DCPI	ADF(1)=SBC	-5.083	-2.861	Stationary
		ADF(1)=AIC	-5.083	-2.861	Stationary
	DINT	ADF(1)=SBC	-3.024	-2.874	Stationary
		ADF(1)=AIC	-3.024	-2.874	Stationary

Both the results were anticipated to be true, considering the nature of real world economic data. The variables would usually display a trend (non-stationarity) in the log or level form. We also conducted the KPSS Tests to check for stationarity. The results are presented below:

KPSS Test for Variables in Level Form			
LINQ	0.1151	0.18961	Variable is stationary
LTRADE	0.16085	0.18961	Variable is stationary
LCPI	0.11757	0.18967	Variable is stationary
LINT	0.1462	0.18961	Variable is stationary
KPSS Test for Variables in Differenced Form			
DINQ	0.18878	0.37085	Variable is stationary
DTRADE	0.43128	0.37085	Variable is non-stationary
DCPI	0.2409	0.37085	Variable is stationary
DINT	0.35968	0.37085	Variable is stationary

Based on observing the stationarity test results, not all of our variables become stationary at I(1). Many cointegration techniques such as Engle-Granger require that all variables be in the I(1) form but since our variables are both in the form of I(0) and I(1), we shall consider a technique that would accommodate for this characteristic. The method selected for the purpose is the ARDL (Auto Regressive Distributive Lag) co-integration procedure developed by Mohammad H. Pesaran et al. (2001).

This method is chosen for multiple reasons. Firstly, unlike techniques such as Engle and Granger (1987) or Johansen (1992), the ARDL approach form as it does not require the pre-testing of of the model's variables for unit root and so there is no absolute necessity for all variables to be in the I(1) form. ARDL is applicable irrespective of whether regressor in the model is I (0) or I (1) form. In case of the the former techniques, the results may lose their predictive power if all variables are not integrated in the same order. (Kim et al., 2004; Perron, 1989, 1997)

Secondly, the long run information (theoretical underpinnings) are not compromised

when applying the VECM technique, as the error correction method integrates short run dynamics with long run equilibrium.

Masih &Hamdan (2008) state that the ARDL analysis is used first for testing the presence of a long-term relationship with the lagged levels of the variables. They state that it helps in identifying the dependent variables (endogenous) and the independent variables (exogenous). Moreover, if there is a long term relationship among the variables, then the ARDL analysis generates the ECM equation for every variable, which provides information through the estimated coefficient of the error correction term about the speed at which the dependent variable returns back to equilibrium once shocked.

Before we proceed to run the ARDL model, the causality tests were conducted, namely, Engle-Granger and Johansen Tests, the results of which are as follows;

Engle –Granger (E-G) Test

		T-statistics	Critical value
Order of the ADF test	5	-3.149	5.163

Johansen cointegration

Criteria	Number of co-integrating vectors
Maximal Eigenvalue	3
Trace	3
AIC	4
SBC	4
HQC	4

(The author was unable to accurately interpret the causality and unsure of its direction from the results generated; however, based on the review of literature and in accordance with intuitive expectations from the analysis, financial deepening and intermediation granger cause income inequality).

For the purpose of testing for the presence of a long-run relationship among the selected variables, the F-test was conducted, producing the following result for each of the variables:

Variables	F statistics	Critical Value	Critical Value upper
LINQ	4.073	2.85	4.049
LTRADE	3.179	2.85	4.049
LCPI	0.48865	2.85	4.049
LINT	1.6811	2.85	4.049

The estimated F-statistics were compared against the critical values taken from from Pesaran et al. (2001), unrestricted intercept and no trend with four regressors viz. LINQ, LTRADE, LCPI and LINT. The bounds of the critical value at 1 percent and 10 percent are 3.817-5.122 and 2.425-3.574 respectively.

The null hypothesis is the lack of a cointegrating relationship, which we could reject at the 5% significance level, since the F-statistic for LINQ is higher than the upper bound critical value of 4.049. This signifies the existence of a long-run relationship between Income Inequality and the selected economic variables representing trade, prices and interest rates. Thus, the test supports our hypothesis of the presence of cointegration, thereby confirming the theoretical intuition and clarifying that the relationship is not in fact spurious, but a realistic one.

Having established a cointegrating relationship, we proceed to the ECM (Error Correction Model) for estimating the short run dynamics.

ecm1(-1)	Coefficient	Standard Error	T-Ratio [Prob.]	C.V.	Result
dLCPI	-.020073	.022501	-.89212[.378]	5%	Exogenous
dLINQ	-.11566	.075564	-1.5306[.134]	5%	Exogenous
dLINT	-.13137	.055522	-2.3662[.023]	5%	Endogenous
dLTRADE	-.17289	.079202	-2.1829[.035]	5%	Endogenous

Additionally, we conducted the variance decomposition in order to get a clearer and more intuitively appealing estimation of the causal nexus that this work seeks to estimate. The VDC results are as follows:

GENERALIZED APPROACH

Horizon	Variable	LCPI	LINQ	LINT	LTRADE
12 months	LCPI	15.84%	3.23%	23.48%	57.45%
	LINQ	33.70%	37.92%	9.00%	19.38%
	LINT	36.78%	3.06%	43.16%	16.99%
	LTRADE	26.66%	11.08%	11.03%	51.22%
	Exogeneity	15.84%	37.92%	43.16%	51.22%
	Ranking	4	3	2	1

Horizon	Variable	LCPI	LINQ	LINT	LTRADE
24 months	LCPI	-196.04%	-5.41%	-80.54%	381.99%
	LINQ	35.54%	36.46%	9.17%	18.83%
	LINT	0.36319923	0.0378138	0.4238221	0.1751649
	LTRADE	31.64%	12.78%	10.99%	44.60%
	Exogeneity	-196.04%	36.46%	9.13%	44.60%
	Ranking	4	2	3	1

Horizon	Variable	LCPI	LINQ	LINT	LTRADE
36 months	LCPI	70.89%	20.35%	85.55%	-76.79%
	LINQ	36.00%	36.22%	9.13%	18.65%
	LINT	36.38%	3.87%	42.27%	17.47%
	LTRADE	32.55%	12.94%	10.94%	43.56%
	Exogeneity	70.89%	36.22%	42.27%	43.56%
	Ranking	1	4	3	2

Horizon	Variable	LCPI	LINQ	LINT	LTRADE
48 months	LCPI	-26.00%	22.40%	-19.26%	122.86%
	LINQ	36.18%	36.13%	9.10%	18.60%
	LINT	36.39%	3.89%	42.24%	17.47%
	LTRADE	32.72%	13.10%	10.90%	43.27%
	Exogeneity	-26.00%	36.13%	42.24%	43.27%
	Ranking	4	3	2	1

Our estimations report a causal nexus between income inequality and financial variables. Considering that the VECM was restricted to estimations within the sample size, the VDC results give more intuitive inferences.

The most exogenous parameter from the estimation is Trade, which is theoretically plausible as trade would lead to greater exercise of production possibilities, employment and growth in the real sector. Income inequality is the second most exogenous (see 24 month horizon) meaning that policy for affecting income disparities would have positive or negative effect on other parameters. (conclusions subject to further research).

Policy Implications

The findings of the study may prove to be useful in terms of policy for financial inclusion and holistic development of the population in India. Our research objective was to reaffirm the findings of Sehrawat and Giri (2015) that the present financial development hurts the poor and benefits the rich, results in widening the gap between poor and rich, albeit by using an alternative dataset for measuring inequality. As they suggest, policies that help provide greater access to financial growth to the low-income groups must be exercised. The availability of banking facilities, strong bank branch network and financial inclusion of the poor are the major facilitators of developmental and expansionary activities. In turn, the economic agents will facilitate in growth, development, investment, employment generation and infrastructure development (Kumar, 2013).

Additionally, policy makers should consider alternative systems of financing that could reduce the over-reliance on bank intermediation services and ensure that policy would provide impetus to real sector growth.

The financial sector reforms should be taken carefully to avoid financial instability & crisis. Financial institution should be allowed to operate without much regulation and political control. Economic decisions should be taken based on economic principle to attain inclusive growth in India.

It would be a prudent step to deliberate on the development of a framework for introducing Islamic finance in India, not seeing it as simply a religious indictment but as a possible solution to redress issues pertaining to sustainable financial inclusion and equitable distribution of wealth across the population.

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