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Does Financial Development Increase Rural-Urban Income Inequality? Cointegration Analysis in the Case of Indian Economy

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Abstract:

The aim of paper is to investigate the affect of financial development on rural-urban income inequality in India over the period of 1960-2008. In doing so, ARDL bounds testing approach was applied to examine cointegration and Ng-Perron unit root test to check the order of integration of the variables.

The results confirmed the existence of cointegration showing long run relationship among the test variables. Furthermore, empirical evidence indicated that financial development, economic growth and consumer prices increase gap between rural-urban earnings. The present study has opened new sights for policy making authorities to implement appropriate economic policies to reduce the rural-urban income inequality in India.

Keywords: Financial development, Rural-urban inequality, India, ARDL.
JEL classification: G00, O11, O15, O16.

1. Introduction

India is one of the fastest growing economy of the world and the double digit growth rate achieved and maintained by India is definitely the outcome of long back,- i.e., 1990s adopted policy of economic reforms which is comprised of reforms in trade, fiscal, financial sectors among others, deregulation of market and divestment of public sector. The basic objectives of all these steps were to eradicate poverty, unemployment and inequality (gender inequality of all types, wage inequality-skilled and unskilled, and last but not least rural-urban income inequality). However, over the years it is observed that these measures have increased the severity of these problems in spite of decreasing (Tiwari, 2009, 2010; Tiwari, in press; Tiwari and Aruna, in press)

The linkage between financial development, inequality and poverty is likely to be complex and multi-dimensional. There is argument in the literature that financial development, at least up to a certain level, is likely to enhance growth potentials and development of an economy and which in turn leads to poverty reduction. There are basically two views on this ground one is “trickle-down” mechanism and another one is the Kuznets’ inverted “U” hypothesis.¹

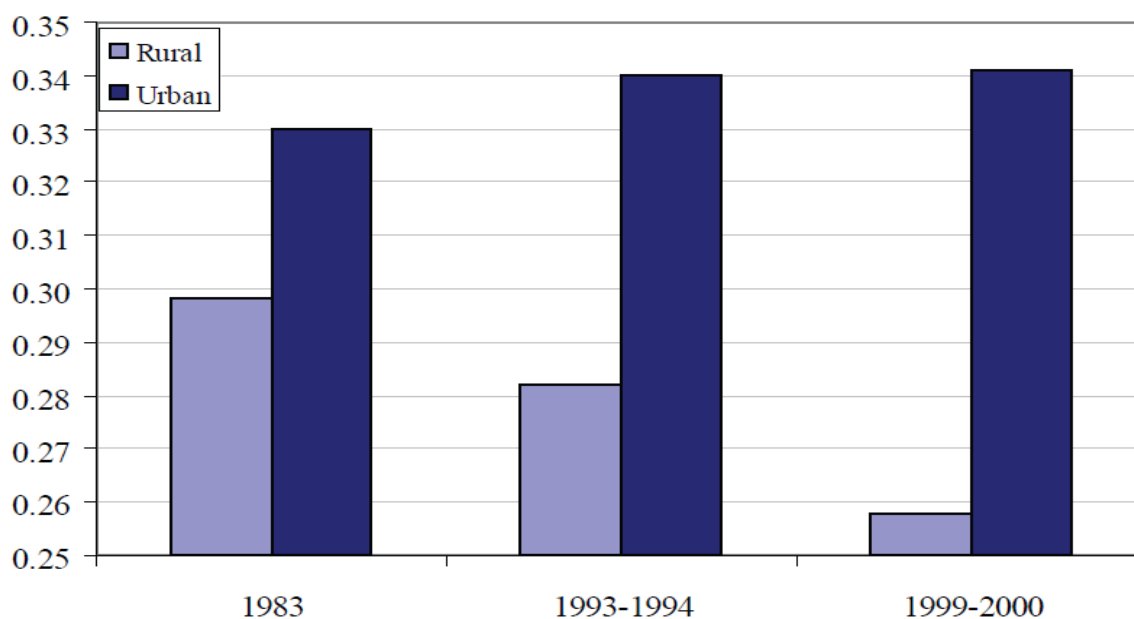
Kuznets (1955) was the first to recognize the relationship between income distribution and economic development. Frankema (2006) has divided the Kuznets’ hypothesis into a within-sector and a between-sector inequality following the decomposition of income inequality along a spatial dimension into a within group and a between groups components. Whereas the former is associated with the rural-urban income inequality and the latter is to intra-urban and intra-rural inequalities. While the relationship between regional inequalities and development has been matter of an increasing interest, little empirical evidence is also available on the rural-urban (income) inequality. In this paper our focus is to test the role of financial development in the decline of rural-urban income inequality.

In India a number of studies by using National Sample Survey (NSS) estimates of household consumption expenditure have revealed mixed evidence on aggregate and regional levels. Bhalla (2003) seem to report that during 1993-1994 and 1999-2000 both urban and rural Gini coefficients have declined. Furthermore, he also documented that rural inequality decreased in 15 out of 16 major states of India, and urban inequality declined in 8 of the 17 states over this period. He, therefore, concluded that inequality had not worsened in India during the period of reform. However, Singh et al., (2003) admitted that “there are some indications of increases in regional inequality, but they are neither uniform nor overly dramatic”. Government of India in her National Human Development Report (2001) reports that among the 32 states and union territories seven states experienced an increase in rural inequality and fifteen states experienced an increase in urban inequality. There were five states where both urban and rural inequalities increased.

¹ According to trickle-down effect, as economies expand poverty is likely to be reduced but the rate of reduction is likely to be adversely affected due to the increased inequality in the short-run. Kuznets (1955) hypothesized an inverted U-shaped relationship between income and inequality: the initial stage of a country’s economic development would be associated with rising inequalities up to a point (during the middle-income stage of development), after which inequalities would decrease with income per capita.

Interestingly, these five states were located in the North-Eastern part of India.² Moreover, it could also be seen from the Figure-1 that from 1983 to 1999-2000, the rural Gini declined consistently, but there was a gradual rise in urban inequality during the same period.

Figure 1. Rural and Urban Gini Coefficients of India



Source: Government of India, National Human Development Report (2001).

Similarly, Jha (2004) has also calculated rural and urban inequality in India for the period 1993-1994 to 1999-2000 and found that both rural and urban Gini coefficients increased in the period between 1993-1994 while declined between 1997 and 1999-2000.

Therefore, it is evident that all these studies were related to intra-urban and intra-rural inequality and the issue of rural-urban inequality has been not analysed extensively in the context of India therefore, in this paper we have attempted to identify the direction of causality among financial development and inequality in the framework of time series data. This study contributes in the existing literature broadly in two ways. First, it provides a new evidence for India by analyzing the short run and long run dynamics of financial development rural-urban income inequality in Indian economy. Second, it utilizes a recent developed technique like Autoregressive Distributive Lag Model

² States and Union Territories where Rural Inequality has increased: Assam, Manipur, Mizoram, Nagaland, Sikkim, Chandigarh, Dadra and Nagar Haveli and Arunachal Pradesh. States and Union Territories where Urban Inequality has increased: Assam, Bihar, Gujarat, Haryana, Karnataka, Manipur, Mizoram, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Daman and Diu. Both urban and rural inequality has increased in Assam, Manipur, Mizoram, Nagaland and Sikkim.

(ARDL) for long run association between financial development and rural-urban inequality; of course we include some control variable in order to measure true impact of financial development of Indian economy on rural-urban inequality.

Rest of the paper is organized as follows. Second section provides review of relevant literature. Section three explains methodology adopted for analysis variables description and data source. Section fourth presents data analysis and results of empirical finding and fifth section concludes.

2. A review of literature

Though financial development, measured basically in terms of accessibility of the credit, and its relationship to economic growth and development has been a growing research area yet to the best of our knowledge there is now work in this direction in the Indian context. There are various channels through which financial systems may contribute to economic growth. For example, mobilizing and pooling of savings, diversification of risk associated with investment and investment opportunities, screening investment projects, facilitation of exchange, monitoring of managers and exercising control over corporate sector. However, theory does not offer a clear-cut hypothesis of the effect of financial development on the income of the poor. Canavire-Bacarreza and Rioja (2009) have mentioned that “given their lack of collateral and scant credit histories, poor entrepreneurs may be the most affected by financial market imperfections such as information asymmetries, contract enforcement costs, and transactions costs.” This may result that poor entrepreneurs with good projects may receive little funding from financial markets and remain in poverty perpetuating inequality in the country (Galor and Zeira 1993). It is argued that increased financial development in the country would serve to relax the funding constraint, particularly for the poor and thereby give them more access to financing. Hence, financial development would reduce poverty and inequality as well as increase growth due to the improved allocation of capital to productive projects (Shahbaz, 2009a and, Canavire-Bacarreza and Rioja, 2009). On the other another set of theories propose that financial development may not reduce poverty (for example, Bourguignon and Verdier, 2000). These theories conjecture that the poor rely more on informal networks for credit. Hence, financial development would only benefit the rich and raise inequality. Similar to this line Greenwood and Jovanovic (1990) have proposed

a non-linear effect of financial development on inequality. They stated that in the early stages of economic development only the rich strata of the people will have access to the limited financial markets, so as the economy and the financial system grow, inequality rises and once higher level of economic development is achieved larger segments of society or poor strata of the people can access the growing financial markets and get benefit of it and thereby inequality get reduced. Hence, proponents of second set of theories says that there is some threshold level of economic development after which the incomes of poorer segments increase with expansion of financial markets.

Though, only few attempts have been made to analyse the relationship between financial development and income inequality and outcomes are mixed yet the research on the effects of financial development across the world have been growing rapidly with a general consensus that financial development increases economic growth (Levine, 2005). Greenwood and Jovanovic (1990) is the pioneer study to explore the association between economic growth, financial development and income distribution by treating income distribution as an exogenous variable. Further, Galor and Zeira (1993), and Banerjee and Newman (1993) have highlighted the role of financial markets (especially the credit market) for more even distribution of income. They suggested that the initial income gap would not be reduced unless financial markets are well developed. Kirkpatrick (2000) has mentioned that if in a country financial system is well-functioning it will help in mobilising of savings, resource allocation, and facilitation of risk management and thereby provides support for capital accumulation, improves efficiency of investment and promotes innovations in technology hence contributes to economic growth. Similarly, Clarke et al., (2006) have studied how financial development influences the distribution of income. For the analysis they used cross-country data set and found that financial development robustly reduces the level of income inequality. However, it is not that causality is univariate only i.e., causality runs from financial development to economic growth only but it is a bivariate case i.e., economic growth also help, promotes and provides necessary infrastructure for the financial development. And this has been empirically verified also for example, Demetriades and Hussein (1996), Luintel and Khan (1999), and Apergis et al., (2007) have found the evidence of a bi-directional causal relationship between financial development and economic growth. However, as Beck et al., (2007a) argue that the close relations between finance and growth do not necessarily mean that financial development reduces poverty.

India in her 11th five year plan has proposed to achieve inclusive growth or what someone may call growth with sustainable development i.e., - growth to be achieved involves all strata's of the society and provides opportunities for development. Further, to achieve an inclusive growth rate Indian government is focusing on the financial sector. Beck et al., (2007a) suggested that financial development will help for poor to come out from below poverty line only if financial development increases average growth to be achieved by increasing the incomes of the both rich and poor and if average growth is achieved by increasing the income of only rich strata of the society in that case it will not help for the poor. More recent work in the current area including Kai and Hamori (2009) and Ang (2010) who also find that financial deepening reduce income inequality³. However, Li et al., (1998) found that financial development lowered inequality and raised the average income of the bottom 80th percentile of the population. Honohan (2004) also finds that financial depth is negatively associated with a headcount measure of poverty. Similarly, Beck et al., (2007b) by using data from a world-wide sample find that financial development disproportionately raises the income of the poorest quintile and that it reduces income inequality.

Apart from that, Balamoune-lut and Lutz (2005) examined the effects of financial deepening, openness to trade and foreign capital on rural-urban income inequality in African countries. They found insignificant impact of financial deepening and foreign direct investment to decrease rural-urban income inequality while openness to trade reduces it. Similarly, Shahbaz et al., (2007a) explored the relationship between financial development, trade-openness and rural-urban income inequality and found that the financial development declines rural-urban income inequality in Pakistan. Economic growth, foreign direct investment, and trade openness widen the rural-urban income gap while low inflation is associated with high rural-urban income gap in the country.

³ Shahbaz and Aamir (2008) have also analyzed the role of foreign direct investment in Pakistan in reducing the inequality during 1971-2005. They found that FDI inflow have positive impact on inequality i.e., it worsens income distribution because it is focused towards capital intensive industrial and services sectors of urban localities. Further, they found that relation between income distribution and trade-openness is as per the Leontief paradox i.e. more trade promotes rich class more. Therefore they concluded by saying that there is imperative need to revise the macroeconomic policy of attracting the FDI in Pakistan.

3. Methodology and data source

For the analysis we have adopted model used by Shahbaz et al. (2007a) for case of Pakistan. All series have been transformed into natural log form. Log-linear specification provides better and reliable results as compared to simple linear specification (see for more details Shahbaz, 2010)⁴. For empirical analysis we use economic growth, trade-openness and consumer prices as⁵ control variables and the estimable equation is being modeled as follows:

$$\ln INQ_t = \beta_o + \beta_{FD} \ln FD_t + \beta_{GDPC} \ln GDPC_t + \beta_{CPI} \ln CPI_t + \beta_{TR} \ln TR_t + \varepsilon_t \quad (1)$$

The non-linear or monotonic impact of financial development on rural-urban earnings gap is checked by including the squared term of $\ln FD_t$ in equation-1. The estimable equation is being modeled as given below:

$$\ln INQ_t = \delta_o + \delta_{FD} \ln FD_t + \delta_{FD^2} \ln FD_t^2 + \delta_{GDPC} \ln GDPC_t + \delta_{CPI} \ln CPI_t + \delta_{TR} \ln TR_t + \varepsilon_t \quad (2)$$

Where t represents time, FD_t is share of domestic credit to private sector in GDP as a proxy for financial development⁶, INQ_t is ratio between agricultural to industrial value-added as share of (GDP) a measure of rural-urban income inequality, $GDPC_t$ is real GDP per capita for economic growth, CPI is consumer price index a proxy for consumer prices while TR_t (export + imports as share of GDP) captures the phenomenon of openness of foreign trade and the remainder is error term which is assumed to be white noised.

There are various unit root tests such as ADF by Dickey and Fuller (1981), P-P by Phillips and Perron (1988)⁷ and DF-GLS by Elliot et al., (1996) to test the stationary properties of the data series. However, Ng and Perron (2001) has suggested that ADF, P-

⁴ Actually, log transformation declines sharpness of the data

⁵ For all variables data has been obtained from the Hand Book of Statistics of Indian Economy and accessed from official website of RBI on 16 December, 2009 and International Financial Statistics of International Monetary Fund CD-ROM. Study period is 1960 to 2008 and all values are in Rupees in Billion.

⁶ This indicator intimates the actual amount which is collected by financial institutions from savers and distributed to investors for potential projects (Shahbaz et al. 2007b, 2008, Shahbaz 2009a, b and Shahbaz et al. 2010 a, b).

⁷ Since, PP test has advancements over DF/ADF test in the sense that whereas DF/ADF test use a parametric autoregression to approximate the ARMA structure of the errors in the test regression, PP test correct for any serial correlation and heteroskedasticity in the errors.

P and DF-GLS unit root tests suffer from severe size distributions properties when error term has negative moving-average root. When root is close to minus one (e.g., -0.79) the rejection rate can be as high as 100% (see Schwert, 1989). Ng and Perron (2001) has proposed four tests utilizing GLS detrended data which are based on modified SIC and modified AIC, while DF/ADF, P-P and DF-GLS unit root tests are based on non-modified information criteria. The calculated values of these tests based on the forms of Philip-Perron (1988) Z_a and Z_t statistics, the Bhargava (1986) R_1 statistics, and the Elliot et al., (1996) created optimal best statistics. Therefore, we utilize Ng and Perron (2001) unit root test to examine the stationarity level of the variables.

This paper applies a recent approach developed by Pesaran et al. (2001) and termed as autoregressive distributed lag (ARDL) bounds testing approach to cointegration as the most appropriate specification to examine the long run relationship between financial development and rural-urban inequality (earnings-gap) in the case of India with incorporation of control variables i.e., economic growth, consumer prices and trade openness. There are certain advantages of this approach. First, the short- and long- runs parameters are estimated simultaneously. Secondly, it can be applied irrespective of whether the variable are integrated of order zero i.e., $I(0)$ or integrated of order one i.e., $I(1)$. Thirdly, it has better small sample properties vis-à-vis multivariate cointegration test i.e., it is more useful when sample size is small (Narayan, 2004). Fourth, ARDL bounds testing approach to cointegration is free from any problem faced by traditional techniques such as Engle-Granger (1987), Philips and Hansen (1990); Johansen and Juselius (1990); Johansen (1991) and Johansen (1992) maximum likelihood ratio in economic literature. The error correction method integrates the short-run dynamics with the long-run equilibrium, without losing long-run information. The ARDL bound testing approach involves the unconditional error correction version of the ARDL model to investigate which is being modeled as follows:

$$\begin{aligned}
\Delta \ln INQ_t = & \alpha_0 + \alpha_T T + \alpha_{INQ} \ln INQ_{t-1} + \alpha_{FD} \ln FD_{t-1} + \alpha_{GDPC} \ln GDPC_{t-1} + \alpha_{CPI} \ln CPI_{t-1} + \alpha_{TR} \ln TR_{t-1} \\
& + \sum_{i=1}^p \alpha_i \Delta \ln INQ_{t-i} + \sum_{j=0}^q \alpha_j \Delta \ln FD_{t-j} + \sum_{l=0}^n \alpha_l \Delta \ln GDPC_{t-l} + \sum_{m=0}^n \alpha_m \Delta \ln CPI_{t-m} + \\
& + \sum_{o=0}^o \alpha_o \Delta \ln TR_{t-o} + \mu_t
\end{aligned} \tag{3}$$

The decision about cointegration in ARDL bounds testing approach depends upon the generated critical bounds by Pesaran et al. (2001). The null hypothesis of no cointegration is $H_0 : \alpha_{INQ} = \alpha_{FD} = \alpha_{GDPC} = \alpha_{CPI} = \alpha_{TR} = 0$ the alternative hypothesis of cointegration is $H_a : \alpha_{GDPC} \neq \alpha_{CO} \neq \alpha_K \neq \alpha_{EMP} \neq 0$. Then next step is to compare the calculated F-statistics with lower critical bound (LCB) and upper critical bound (UCB) tabulated by Pesaran et al. (2001). The null hypothesis of no cointegration may be rejected if calculated value of F-statistics is more than upper critical bound. The decision may be about no cointegration if lower critical bound is more than computed F-statistics. Finally, if calculated F-statistics is between UCB and LCB then decision about cointegration is inconclusive. To check the reliability of the results reported by ARDL model, we have conducted the diagnostic and stability tests. In the diagnostic tests, we examine for the presence of serial correlation, incorrect functional form, non-normality and heteroscedasticity associated with the model. The stability test is conducted by employing the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUM_{SQ}).

4. Data analysis and empirical findings

First of all descriptive statistics of variables has been analysed and it is found that all variables to be incorporated in our model have normal distribution at 5% level of significance (detailed results are presented in appendix 1, Table 1). In the next step stationary property of the data series of all test variables has been found through Ng-Perron (2001) unit root test and results are reported in Table-1.

Table-1 Ng-Perron (NP) Unit Root Test

Variables	MZa	MZt	MSB	MPT
$\ln INQ_t$	-13.5193(1)	-2.5902	0.1916	6.7956
$\ln FD_t$	-3.5031(1)	-1.3117	0.3744	25.803
$\ln GDPC_t$	-0.0016(1)	-0.0007	0.4298	47.864
$\ln CPI_t$	-10.3464(2)	-2.2108	0.2136	9.1050
$\ln TR_t$	-9.4741(1)	-2.0894	0.2205	9.9778
$\Delta \ln INQ_t$	-29.4357(1)*	-3.8361	0.1303	3.0974
$\Delta \ln FD_t$	-17.7627(1)**	-2.9707	0.1672	5.1874
$\Delta \ln GDPC_t$	-27.9191(1)*	-3.7360	0.1338	3.2648
$\Delta \ln CPI_t$	-24.6406(2)**	-3.5100	0.1424	3.6983

$\Delta \ln TR_t$	-23.7325(1)**	-3.4103	0.1437	4.0455
Note: ** and * indicate significance at 1% and 5% levels respectively				

Table-1 reports that rural-urban income inequality, financial development, economic growth, consumer prices and trade openness have unit root problem at their level form while they turned to be stationary in first differenced form. This unique order of integration of the variables leads us to proceed for the application of ARDL bounds testing approach to examine the long run relationship among the variables. Results of ARDL bounds testing approach to cointegration are pasted in Table-2. For the analysis we choose optimal lag structure as suggested by AIC i.e. for $\ln INQ_t$ lag is 3 and, for $\ln GDPC_t, \ln CPI_t$ and $\ln TR_t$ lag is 2.

Table-2 ARDL Bounds Testing to Cointegration

Panel I: Bounds testing to cointegration		
Estimated Equation	$\ln INQ_t = f(\ln FD_t, \ln GDPC_t, \ln CPI_t, \ln TR_t)$	
Optimal lag structure	(3, 2, 2, 2, 2)	
F-statistics	10.397	
Significant level	Critical values ($T = 49$)*	
	Lower bounds, $I(0)$	Upper bounds, $I(1)$
1 per cent	7.337	8.643
5 per cent	5.247	6.303
10 per cent	4.380	5.350
Panel II: Diagnostic tests		
R^2	0.8875	
Adjusted- R^2	0.7891	
F-statistics	9.019 (0.0001)	
J-B Normality test	0.7663 (0.6816)	
White Heteroskedasticity Test	1.6094 (0.1306)	
ARCH LM test	0.4260 (0.6559)	
Ramsey RESET	0.0294 (0.8653)	
* indicates critical values generated by Narayan (2005) using unrestricted intercept and unrestricted trend, pp: 1990.		

It is evident from Table-2 that the test variables included in equation-1 (i.e.,- rural-urban income inequality, financial development, economic growth, consumer prices and trade openness) are cointegrated as calculated F-statistics (F-statistics is 10.397) is higher than the upper critical bound i.e. 8.643 at 1 % level of significance using unrestricted intercept and unrestricted trend. In the next step we have estimated long run cointegration equation and results are reported in Table-3. Here we have adopted two

models; in second case square of FD has been employed to test the non-linear or monotonic affect of financial development on rural-urban income inequality.

Table- 3 Long Run Results

Dependent Variable = $\ln INQ_t$				
Variable	Coefficient	T-Statistic	Coefficient	T-Statistic
Constant	4.5584	4.9168*	5.2192	3.3386*
$\ln GDP_{C_t}$	-0.3832	-3.9739*	-0.4470	-2.8804*
$\ln FD_t$	-0.1059	-2.7555*	-0.3376	-0.7656
$\ln FD_t^2$	0.0385	0.5273
$\ln CPI_t$	-0.2435	-3.9870*	-0.2100	-2.3736**
$\ln TR_t$	0.0467	0.8339	0.0388	0.6652
R^2	0.9811		0.9813	
Ad- R^2	0.9794		0.9791	
F-Statistics	573.808		451.571	
D. W	1.6414		1.6682	
Test	F-statistic	Prob-value	F-statistic	Prob-value
$\chi^2 Normal$	1.3307	0.5140	1.4303	0.4891
$\chi^2 Serial$	0.3538	0.7041	0.2966	0.7449
$\chi^2 ARCH$	0.0450	0.8329	0.0184	0.8926
$\chi^2 Hetero$	2.1302	0.0930	1.8178	0.1296
$\chi^2 Re set$	1.0485	0.3116	1.3590	0.2682

Note: $\chi^2 Normal$ indicates to the Jarque-Bera statistic of the test for normal residuals, $\chi^2 Serial$ is the Breusch-Godfrey LM test statistic for no serial relationship, $\chi^2 ARCH$ is the Engle's test statistic for no autoregressive conditional heteroskedasticity, $\chi^2 Hetero$ is the heteroscedasticity and $\chi^2 Re set$ is Ramsey's test statistic for no functional misspecification. * and ** show significant at 1% and 5% level of significance respectively.

The results in Table-3 reveal that impact of financial development, economic growth and inflation on rural-urban inequality is negative and significant at 1% level of significance. This implies that financial development, economic growth and inflation all are working in the direction of increasing gap between rural-urban earnings in the long run. Further, it provides evidence that government's policies to boost economic growth and dependence on deepening of financial institutions' role are unable to help poor strata i.e.,- rural group of people as it is helping for increasing the income and income prospects of the urban residents. This also implies that India's policymakers' efforts to help poor people through micro-credit facilities provided by micro-finance institutions like self help groups (SHGs) have remained ineffective enough to reduce rural-urban income

inequality in the long-run. These findings are contrast with Shahbaz et al. (2007a) in case of Pakistan. However, there is an evidence of positive impact of trade openness on the income of rural people meaning thereby trade openness is able to help in increasing the income of rural group however; its impact has remained insignificant in this direction. This also gives some indication that migration of rural people to urban areas is able to bring fruits of opening up of Indian economy to rural areas as urban sector has been remained hub of the manufacturing industries and migration at a larger scale has happened from rural sector to urban sector.

Further, we find that, if we compare the value of coefficient of test variables, that GDP per capita worsens the rural-urban income inequality more any other variable included in the estimation. Negative impact of GDP is followed by inflation and financial deepening. Interestingly, we find that linear and square of financial deepening/development has negative and positive sign, but insignificant, indicating that if more efforts are put forward by the government of India in the development of financial sector definitely there is potentiality to reduce the rural-urban gap. The diagnostic tests show that residual terms of both models are normally distributed and there is no evidence of serial correlation. The autoregressive conditional heteroscedasticity and white heteroscedasticity do not seem to exit. Both models are well functioned as shown by Ramsey Reset F-statistics in Table-3.

After having long discussion over long run findings, the next step is to present the results pertaining to short run dynamics of the test variables using ECM version of ARDL model. Results are reported in Table 4. It is evident from Table-4 that in short run, contrary to the long run, interestingly, economic growth and inflation decrease rural-urban income inequality while trade openness increases it. The impact of financial development is inverse i.e. financial development increases rural-urban income inequality but it affect is not significant. The deviation towards equilibrium long run path is corrected 37.16% per year indicating a not very good adjustment rate vis-a-vis adjustment shown by other developing countries. For example, Shahbaz et al. (2007a) have estimated 62.9% (almost twice of this rate) adjustment rate for Pakistan.

Table- 4 Short Run Results

Dependent Variable = $\Delta \ln INQ_t$			
Variable	Coefficient	Std. Error	T-Statistic
Constant	-0.0414	0.0152	-2.7234*
$\Delta \ln GDPC_t$	0.8235	0.2054	4.0088*
$\Delta \ln GDPC_{t-1}$	-0.5790	0.2007	-2.8849*
$\Delta \ln FD_t$	-0.0095	0.1105	-0.0861
$\Delta \ln CPI_t$	0.2024	0.1182	1.7123***
$\Delta \ln TR_t$	-0.0983	0.0585	-1.6806***
ECM_{t-1}	-0.3716	0.1385	-2.6829**
Diagnostic tests	Statistics		
R^2	0.6636		
Adj- R^2	0.6144		
F-statistics	13.483 (0.0000)*		
Durbin-Watson Test	1.9454		
J-B Normality test	1.0659 (0.5868)		
Breusch-Godfrey LM test	0.0801 (0.9232)		
ARCH LM test	0.1521 (0.6983)		
Heteroscedasticity Test	0.7055 (0.6469)		
Ramsey RESET	2.2262 (0.1435)		
Note: *, (**), *** represent significance level at 1% (5%), 10% respectively.			

Further, as Hansen (1992) cautions that in the time series analysis estimated parameters may vary over time therefore, we should test the parameters stability test since unstable parameters can result in model misspecification and so may generate the potential biasness in the results. Therefore, we have applied the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUM_{SQ}) tests proposed by Brown et al. (1975) to assess the parameter constancy⁸. The null hypothesis to be tested in these two tests is that the regressions coefficients are constant overtime against the alternative coefficients are not constant. Brown et al. (1975) pointed out that these residuals are not very sensitive to small or gradual parameter changes but it is possible to detect such changes by analyzing recursive residuals. They argue that if the null

⁸ The first of these involves a plot of the cumulative sum (CUSUM) of recursive residuals against the order variable and checking for deviations from the expected value of zero. Symmetric confidence lines above and below the zero value allow definition of a confidence band beyond which the CUSUM plot should not pass for a selected significance level. A related test involves plotting the cumulative sum of squared (CUSUMSQ) recursive residuals against the ordering variable. The CUSUMSQs have expected values ranging in a linear fashion from zero at the first-ordered observation to one at the end of the sampling interval if the null hypothesis is correct. Again, symmetric confidence lines above and below the expected value line define a confidence band beyond which the CUSUMSQ plot should not pass for a selected significance level, if the null hypothesis of parameter constancy is true. In both the CUSUM and CUSUMSQ tests, the points at which the plots cross the confidence lines give some indication of value(s) of the ordering variable associated with parameter change.

hypothesis of parameter constancy is correct, then the recursive residuals have an expected value of zero and if the parameters are not constant, then recursive residuals have non-zero expected values following the parameter change. We find the evidence of parameter consistency as in both cases that is in case of CUSUM and CUSUM_{SQ} plot have been within the critical bounds of 5 % level of significance (see the appendix 1). Finally, short run model seems to pass diagnostic tests successfully in first stage. The empirical evidence reported in Table-4 indicates that error term is normally distributed and there is no serial correlation among the variables in short span of time. Model is well specified as shown by F-statistics provided by Ramsey Reset test. Finally, short run model passes the test of autoregressive conditional heteroscedasticity and same inferences can be drawn for white heteroscedasticity.

5. Conclusions and Policy Implications

In this study we analysed the role of financial deepening/development in eradication of rural-urban income inequality in the context of India. We did our analysis in the framework of time series and for analysis we applied ARDL bounds testing approach to cointegration, a better technique. Study period is 1960-2008. For, the analysis we used three control variables namely economic growth, consumer prices and trade openness.

We found that all test variables are nonstationary in their level form while stationary in first difference form that is all variables have first order auto-regressive scheme. Cointegration test conducted through ARDL approach shows that test variables are cointegrated in the long run implying that they will move together.

Our results reveal that financial development significantly against the reduction of the rural-urban inequality in the long run process but if it is developed more it helps in minimization of gap in rural-urban income levels. This also implies that India's policymakers efforts to help poor people through micro-credit facilities provided by micro-finance institutions like self help groups (SHGs) have remained ineffective enough to reduce rural-urban inequality in the long-run but there is evidence to turn around the situation provided enough efforts are put into. Further, we have also found significant evidence to conclude that economic growth and inflation all are working in the

direction of increasing rural-urban inequality in the long run. However, there is evidence that trade openness is able to help in increasing the income of rural group however; its impact has remained insignificant in this direction. Therefore, we can say that there is urgent need for Indian policy makers to look into the deregulation of the market and put forward steps for structural and trade reforms.

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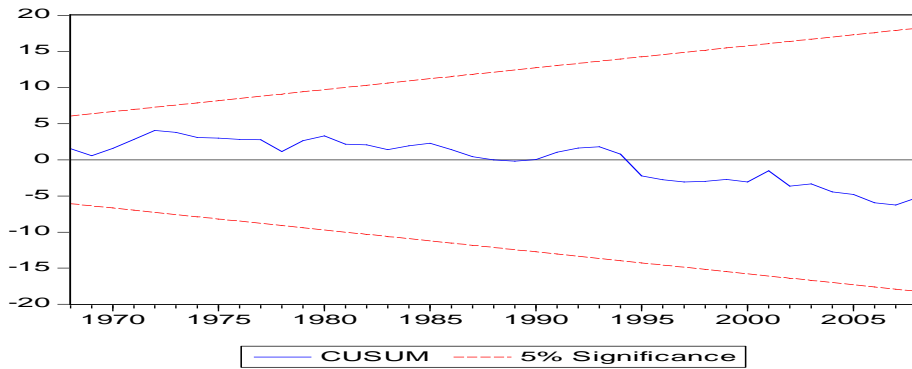
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Appendix 1

Table-1 Descriptive Statistics

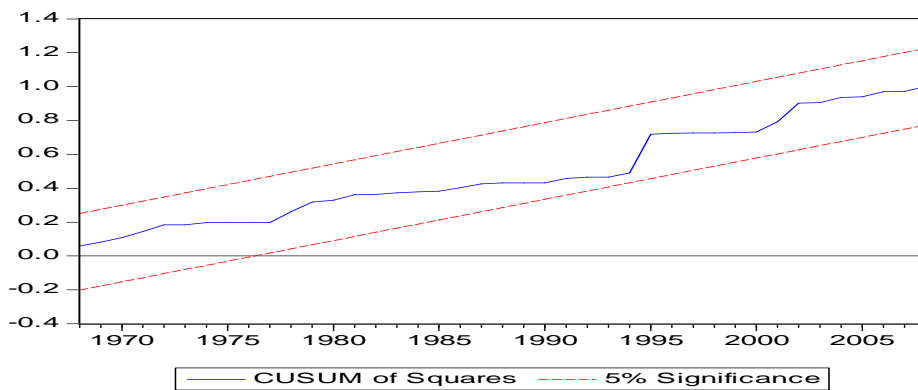
Variables	$\ln INQ_t$	$\ln GDPC_t$	$\ln FD_t$	$\ln CPI_t$	$\ln TR_t$
Mean	0.6153	7.0808	3.0382	3.0901	-3.2161
Median	0.6703	6.9649	3.1765	3.0860	-3.3293
Maximum	1.3496	7.9703	3.9192	4.8035	-0.4938
Minimum	-0.0876	6.6332	2.0711	1.3454	-5.2706
Std. Dev.	0.3933	0.3866	0.4853	1.1025	1.5013
Skewness	-0.1313	0.7293	-0.4260	-0.0124	0.1625
Kurtosis	1.9374	2.3759	2.2703	1.6649	1.7316
Jarque-Bera	2.4458	5.1390	2.5693	3.6401	3.5004
Probability	0.2943	0.0765	0.2767	0.1620	0.1737

Figure-1 Plot of Cumulative Sum of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

Figure-2 Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level