



Munich Personal RePEc Archive

Financial development and income inequality in Pakistan: An application of ARDL approach

Shahbaz, Muhammad and Islam, Faridul
COMSATS Institute of Information Technology, Department
of Finance and Economics Woodbury School of Business
Utah Valley University

15. January 2011

Online at <http://mpa.ub.uni-muenchen.de/28222/>
MPRA Paper No. 28222, posted 19. January 2011 / 05:15

Financial Development and Income Inequality in Pakistan: An Application of ARDL Approach

Muhammad Shahbaz
COMSATS Institute of Information Technology,
Lahore, Pakistan
Email: shahbazmohd@live.com

Faridul Islam
Department of Finance and Economics
Woodbury School of Business
Utah Valley University
Orem, Utah 84058-5999
Phone: 801-863-8858
Email: Faridul.Islam@uvu.edu

Abstract:

The paper examines the relationship between financial development and income inequality; and also explores if the Greenwood and Jovianvich (GJ) hypothesis applies to Pakistan. Using data from 1971 to 2005, the paper implements the Auto Regressive Distributed Lag (ARDL) bounds testing approach to cointegration to examine the existence of long run; and the error correction model (ECM) for the short run relationships. Stationarity properties of the series are checked by the ADF method. The findings indicate that financial development reduces income inequality while financial instability aggravates it. Contrary to the conventional wisdom, we find economic growth worsens income distribution and that the latter is deteriorated further by trade openness. The paper does not find support for the GJ relation. Appropriate reforms aimed at developing a well-organized financial sector in Pakistan can help reduce income inequality.

Key Words: Financial Development, Income Inequality

JEL Classification codes: F43, D30

The authors gratefully acknowledge the valuable comments from anonymous referees. Based on their suggestion the paper has been thoroughly revised which improved the quality of paper, inter alia. Standard caveats apply.

Introduction

Pakistan's economy is characterized by high income disparity which took a turn for the worse during the decades of 1980s and early 1990s. A relatively stable government, established in the 1990's introduced and implemented a set of sound macroeconomic policies which helped achieve high rates of economic growth. In 2005, Pakistan recorded the second highest growth rate in the region (GoP, 2006)¹. The inflation rate hit 9.063% (7.444%) and income inequality was 42.87 % (42.50%) in 2005 (2004). The growth story led one to believe that poverty would decline, pull up the income shares of the population at the bottom 20 percent by improving the income distribution. Contrary to the expectations, income share of the group fell from 6.18% to 6.12% during the same period implying that the value of the gini-coefficient went up. As a result, the plight of the bottom 20% worsened and so did their economic condition.

Despite mixed results, it is generally agreed that developed financial sector can offer viable solutions to address economic crisis. Policies directed at creating sound financial sector works through two channels. First, such policies can make credit cheaper for all investors, but the small entrepreneurs are likely to benefit more. The unleashing of entrepreneurial talent boosts productive activities, generates employment opportunities, and enhances welfare of poor people. Secondly, the availability of fund at low cost can provide crucial support to the financially disadvantaged families by allowing them to invest in education and health of their children. Education helps human capital formation and opens the window for an improved income distribution. Education also creates a level field for all in a highly competitive world which expands the opportunity set². Human capital promotes technological progress via innovation, the most important ingredients for economic growth. The latter is necessary, but not sufficient condition for reduced income inequality³.

The objective of present study is to empirically examine the long run relation between financial development and income inequality in Pakistan by employing the autoregressive distributive lag (ARDL) bounds testing approach to cointegration. The sample period used in the study covers the data from 1971-2005. In addition to long relation the, the paper tests the Greenwood and Jovianvich (GJ, hereafter) (1990) hypothesis which posits that at the initial stages of the development of the financial sector, income distribution may deteriorate; but over time as the process takes full effect, income inequality tends to improve. It is not difficult to view the GJ hypothesis within the broader perspective of the Kuznets hypothesis which states that income inequality worsens at the initial stages of economic growth but improves as the growth process continues. The concept has been extended to cover the relation between environmental degradation and economic growth under the title of Environmental Kuznets Curve which also

¹ Government of Pakistan

² However it needs to kept in mind that the developing countries encounter high rates of inflation over an extended period of time. Access to financial markets and/or fully indexed assets is available to those at the higher end of income distribution which allows them daily indexed protection of their income against high inflation.

³Cysne et al. (2004), Erosa and Ventura (2002), Lucas and Stokey (1987), Sturzenegger (1992), develop models which purport to answer this question. In an economy with cash-in-advance constraints, higher rates of inflation and (and hyperinflation) acts as a tax on goods that force to reallocate cash to consumption of goods requiring credit. This process of financial adaptation is imperfect, as the Brazilian experience shows, because the poor are financially strapped, having to hold cash, and thus suffer disproportionately by high inflation tax which widens inequality.

produces an inverted U-shaped relation; as the GJ relation, with some difference. Empirical findings suggest a positive relation between economic growth and financial development which helps establish the more general case of EKC, of which the GJ is particular example. The inverted U-relationship posited in the GJ hypothesis is intuitively appealing particularly, when one considers the broader impact of financial development on human capital formation; and also the implications for the growth of small entrepreneurial class. Whether or not stimulation of economic activity ultimately reduces income inequality, depends on economic policies; and is left to empirical determination. The topic is of particular importance in the light of the observed trends – one of a widening economic inequality – in Pakistan. The idea that social justice and economic growth should go hand in hand is important which is part of normative of economics.

It may be noted that the financial sector's development in Pakistan has been somewhat slow. Thus if the GJ hypothesis holds for Pakistan then the nation might achieve equity in income distribution in the future if proper policies are put in place early. A few studies explore the relationship between financial development and economic growth in the context of Pakistan. The authors are not aware of any study that examines the relation between financial development and income inequality. In particular, there has been no formal test of the GJ hypothesis – the postulated inverted-U relation for Pakistan. This paper provides evidence on such a relationship and thus makes a modest effort to fill in a gap in the literature. The findings should be helpful in pursuing policy to addresses the issues of distributive justice.

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 outlines data and methodological issues. Section 4 reports results. Section 5 draws conclusion and offers some policy recommendations.

2. Literature Review

Available evidence tends to confirm that in the long run, well performing and developed banking/financial system helps capital accumulation, promotes economic efficiency and supports sustained economic growth⁴ [see, Goldsmith, 1969; Mckinnon, 1973; King and Levine, 1993; Khan, 2000; Pagano and Volpin, 2001; Christodoulou and Tsionas, 2004; Shan, 2005; Khan et al. 2005; Ma and Jalil, 2008; Shahbaz et al. 2008; Shahbaz, 2009a and Shahbaz et al. 2010a]. However, the rich benefit disproportionately from financial development because of their easy access to financial services which helps widen income disparity. They take advantages of the opportunities by adopting capital intensive technologies--local or imported--which often requires more skilled labor. As a result, the poor who lack such skill suffer. The absence of developed financial sector also hurt the poor because it gets costly for them to access to financial resources.

Financial services tend to be expensive in the early periods of development due to screening and risk pooling which also causes suffering of the poor [see Behrman et al. 2001 Dollar and Kraay, 2003 and Beck et al. 2007]. Money markets are characterized by asymmetric information, intermediation and transaction costs. The poor do not have collateral and they lack credit records and '*connections*' which make them ineligible for loans at reasonable interest rates. These constraints may lead to inefficient allocation of capital because of denial of funds to small entrepreneurs where the returns may be high [Banerjee and Newman, 1993; and Galor and

⁴ See Levine (1997) for comprehensive understanding.

Zeira, 1993]. These factors cause further income inequality [see for more details, Banerjee and Newman, 1993; Aghion and Bolton, 1997; Greenwood and Jovanovic, 1990] which can be exacerbated by other economic, technical and institutional factors. Because poor tend to have lower level of education, the formal financial sector is less inclined to offer loans to them. The 'dualism' in financial services in many high income countries can be explained by this factor [Claessense, 2006; and Perotti, 1996]⁵. The foregoing discussion point to some of the areas where poor may be disadvantaged.

Dollar and Kraay, (2003) used effect of trade, inflation, government consumption and financial development on the income of bottom 20% population. They find that trade openness improves the income of the poor, but inflation, government consumption and financial development worsen income inequality. Shahbaz (2009b) documented that financial development, investment in agriculture and manufacturing help those at the bottom. Variables such as economic growth, financial instability lower income share of the poor.

Barro (2000) and Li and Zou (2002) investigated the relationship between financial development and income inequality with the battery of other variables. They found that financial development, trade and government spending on education and health care improve income distribution while inflation produces the opposite effect. Calderon and Serven (2003) noted that development of financial sector worsens income distribution while education improves it. Lopez (2004) used dynamic panel model with fixed-effect approach to examine effect on income distribution. He found that better education and low level of inflation improves income inequality; while developed financial sector, rise in international trade and decline in government expenditures leads to deterioration in income distribution.

A developed financial system generates and channels financial resources more efficiently compared to the traditional ones. Rajan and Zingales, (2003) argue that the poor borrow from informal sector on hard terms. A well-organized financial sector can complement informal sources and develop efficient financial system; thereby earn high return on investment, generate employment, and increase income of the poor who otherwise would not have access to the formal sources [Mosley, 1999; Jeanneney and Kpodar, 2005 and Beck et al. 2007].

Westley, (2001) investigated the impact of financial markets on income distribution for Latin American countries, noting that easy access to financial resources through micro finance policies can reduce income inequality. Burgess and Pande (2005) opined that opening of bank branches in rural areas helped improve income distribution in India. Clarke et al. (2003, 2007) examined the impact of financial development on income inequality for both developing and developed nations. They found favorable impact of financial development on income distribution and also support for GJ hypothesis. Beck et al. (2007)⁶ reported that easy access to credit increased the income level of the poor. Their empirical exercise indicate that almost 60 percent of increase in the income of the poor is attributable to economic growth; the rest from decline in income inequality due to financial development. They also reported that improved financial

⁵The relation between financial development and income inequality is not just coincidence, it is causal. The positive impact of financial development on economic growth suggests that the poor may borrow to augment their income. A more equitable income distribution thus may create pressure on politicians for market based fund allocation.

⁶ He used dynamic panel model for of 83 nations.

sector creates opportunities for the less privileged due to access to credit. Li et al. (2008) confirmed the existence of inverted-U-shaped curve for East Asian countries. Rehman et al. (2008) found that financial development improves income distribution but the findings do not support inverted U-shaped relationship. Financial development in Latin American and Caribbean nations did not improve the income of the poor (Canavire et al., 2008). Kappel (2010) noted that financial development narrows income inequality through enhanced loan markets and stock market development. Tan and Law (2009) found that financial deepening improves income distribution⁷.

Motonishi (2006) noted that financial development improves income shares of poor and boosts productivity of other sectors. Using the generalized method of moment (GMM) approach, Liang (2006) probed the impact of financial development on income inequality in rural China. He found that easy access to credit improves income distribution in rural regions. However, the estimates of linear and non-linear terms did not support GJ hypothesis.

Ang (2008, 2010) found that financial development and higher banking density improve income share of the poor in India. Although the study supported a linear relation between the series, the findings did not validate the GJ hypothesis. Ang (2009) argues that the absence of financial reforms and a lack of equal access to financial services might have aggravated income inequality. Law and Tan (2009) did not find financial development statistically significant determinant of income distribution for Malaysia.

Bittencourt (2006, 2009, 2010) concluded that financial development eases access to financial services and improves the income share of bottom 20 percent population in Brazil. Shahbaz (2009b) found support for the McKinnon Conduit Effect in Pakistan; but financial instability and crisis tightens credit constraints for the poor. Wahid et al. (2010) pointed out that financial development widens income inequality, but economic growth helped create a more egalitarian society by redistributing income in Bangladesh.

3. Data Description and Methodology

3.1. The data and the model

All data used in this paper have been combed from the World Development Indicators (WDI-CD-ROM, 2007), except the series on gini-coefficient. The latter data is from Haroon (2005) who covers the period of 1973-2003. Using the same methodology we extended the series for the period 1971 to 2005.

The following specification is used in the empirical model to examine the relationship between financial development and income inequality.

$$Gini = f(FD, FINS, CV) \dots \quad (1)$$

Eq (2) represents the simple linear functional formulation of the model.

$$LGini = \alpha_0 + \alpha_1 LFD + \alpha_3 FINS + \alpha_2 CV + \varepsilon_t \dots \quad (2)$$

⁷ He applied General Method of Movement (GMM) to panel data for 35 nations.

Where, FD represents financial development. The series is computed by taking domestic credit distributed to the private sector as share of GDP^{8,9}. Domestic credit to private sector used here is the total amount of credit distributed by the financial intermediaries to the private sector¹⁰. For our purpose, the measure is taken as ratio of GDP. This also is the amount of credit from the savers to private sector, through financial intermediaries. Private credit is a comprehensive proxy for financial development. This is a better measure compared to liquid liabilities, or and M3 as share of GDP [see Levine, 1992; Dermiguc-Kunt and Levine, 2008; Shahbaz et al. 2008 and Shahbaz, 2009b].

The gini-coefficient (GINI) measures inequality in the distribution of income. Financial instability (FINS) is computed by the authors using the formula developed by Loayza and Rancier (2002, 2005, 2006)¹¹. The CV refers to a set of control variables which includes inflation (INF); initial GDP per capita, proxy for growth momentum (GDP); government spending as share of GDP (GS) (proxy for government size); manufacturing value-added as share of GDP (M); and openness to trade (TR) [(Export+Imports)/GDP]. The GDP considers the impact of financial development on steady-state income distribution. Inflation reduces the general purchasing power for all but hurts the poor and middle income groups more compared to the wealthy. The upper class can hedge their exposure to inflationary situation (Easterly and Fisher, 2001) because of their easy access to financial services. Thus inflation worsens income inequality. The size of government measured by the government expenditures on final consumption posits that such expenses will worsen income inequality¹² because the rich will benefit from the services of the financial institutions through their political links while the poor

⁸ Shahbaz (2009a, Shahbaz et al. (2010a, b) show that domestic credit to private sector is better indicator of financial development for Pakistan.

⁹ Taken as a ratio of GDP, this also is the amount of credit from the savers to private sector, through financial intermediaries. This private credit is a comprehensive proxy for financial development, in comparison to liquid liabilities as share of GDP, or and M3 as share of GDP [see Levine, 1992; Dermiguc-Kunt and Levine, 2008; Shahbaz et al., 2008 and Shahbaz, 2009b].

¹⁰ This however, does not include credit disbursed by central bank and development banks to the public sector, credit to state-owned enterprises and cross claims of one group of intermediaries to other group of intermediaries.

¹¹ There are two approaches to measure financial instability in the literature. First, the standard deviation of growth rate of the financial development variable (Jeanneeny and Kpodar, 2006). Second, the absolute value of the residuals obtained by regressing the variable (FD) on its lagged value and a time trend. Let V^{FD} measure the instability of the series FD, and g^{FD} be the growth rate of FD. The standard dev of FD can be written as:

$$V_1^{FD} = \sqrt{\sum_{t=1}^n \frac{1}{n-1} (g_t^{FD} - F D^{FD})^2}$$

The average of the absolute value of residuals is: $V_2^{FD} = \frac{1}{n} \sum_{t=1}^n |\varepsilon_t|$

ε is obtained by estimating the following equation

$$x_t = \alpha + \beta_1 x_{t-1} + \beta_2 t + \mu_t$$

The generic X_t can be modified to pick the series of interest by $FD_t = \beta_0 + \alpha_1 FD_{t-1} + \alpha_2 t + \mu_t$ using the second method to measure financial instability is superior to 1st one. The first approach does not assume a stochastic or deterministic time trend while second assumes that. The value of index starts from 100, higher values suggest more financial instability.

¹² Government expenditures are for the purchase of goods and services. Also included is compensation of public employees, expenditure on security, (but not defense expenses that are part of government capital formation).

is left out. The impact of financial instability is captured by using an index which essentially is the absolute value of residuals taken from the trend. The effect of trade openness on inequality can go either way. Income distribution improves if trade is pro-poor, and conversely. The sectoral structure of the country has been examined through the inclusion of manufacturing sector value added as share of GDP. This may improve income distribution by generating employment opportunities for both skilled and unskilled labor.

Following methodology of Clarke et al. (2003, 2007) we test the GJ hypothesis using the non-linear specification:

$$LGini = \alpha_1 + \alpha_{11}LFD + \alpha_{12}LFD^2 + \alpha_{13}FINS + \beta_s CV + \varepsilon_t \quad (3)$$

Equation-3 predicts inequality-narrowing theory if $\alpha_{11} < 0$ holding $\alpha_{12} = 0$. Again if $\alpha_{12} = 0$, $\alpha_{11} > 0$ then we have the inequality-widening theory. The inverted U-shaped hypothesis requires that $\alpha_{11} > 0$ and $\alpha_{12} < 0$; but if $\alpha_{11} < 0$ and $\alpha_{12} > 0$ we end up with U-shaped relation.

3.2. Cointegration

There are several approaches to cointegration e.g., the residual based Engle-Granger (1987) test; maximum likelihood based Johansen (1991, 1992) and Johansen and Juselius (1990) test. These approaches require that all variable be integrated of same order; or else create inefficiency which affects the predictive powers (Kim et al. 2004 and Perron, 1989, 1997)¹³. Pesaran et al. (2001) developed the Autoregressive Distributive Lag Model or ARDL bounds testing approach to cointegration which is better suited to small samples (Haug, 2002). The ARDL also applies irrespective of the order of integration such as $I(0)$ or $I(1)$ (Pesaran et al. 2001). The unrestricted model of ECM with satisfactory lags captures the data generating process within the general-to-specific framework (Laurenceson and Chai, 2003). Pesaran and Shin, (1999) contended that, “appropriate modification of the orders of the ARDL model is sufficient to simultaneously correct for residual serial correlation and the problem of endogenous variables” (p: 16).

The unrestricted error correction method (UECM) used to examine the long and the short run relationships take the form described in equation-3 below:

$$\begin{aligned} \Delta LGINI_t = & \alpha_0 + \alpha T + \sum_{i=1}^p \beta_i \Delta LGINI_{t-i} + \sum_{i=1}^p \delta_i \Delta LFD_{t-i} + \sum_{i=1}^p \varepsilon_i \Delta FINS_{t-i} + \sum_{i=1}^p \sigma_i \Delta LGDP_{t-i} \\ & + \sum_{i=1}^p \omega_i \Delta INF_{t-i} + \sum_{i=1}^p \vartheta_i \Delta LGS + \sum_{i=1}^p \phi_i \Delta LM_{t-i} + \sum_{i=1}^p \varphi_i \Delta LTR_{t-i} + \lambda_1 LGINI_{t-1} \\ & + \lambda_2 LFD_{t-1} + \lambda_3 FINS_{t-1} + \lambda_4 LGDP_{t-1} + \lambda_5 INF_{t-1} + \lambda_6 LGS_{t-1} + \lambda_7 LM_{t-1} \\ & + \lambda_8 LTR_{t-1} + \mu_t \end{aligned} \quad (4)$$

¹³ Structural changes in developing economies occur due to many causes such as economic crises, institutional arrangements change, policy changes regime shift war etc (Kim et al. 2004 and Perron, 1989, 1997).

Where, the series are as defined earlier; and T is time trend. The L implies that the variables have been transformed in natural log. The first part of equation-4 with $\beta, \delta, \varepsilon, \sigma, \omega, \partial, \phi$ and φ refer to the short run and the rest with λ s to the long run parameters. The null hypothesis of no cointegration is: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = \lambda_7 = \lambda_8 = 0$ and the alternate: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq \lambda_7 \neq \lambda_8 \neq 0$ implies cointegration among the series (eq. 4).

In the ARDL bounds testing, if the calculated F-statistic exceeds the upper critical bound (UCB), then the series are cointegrated; and if it is below the lower critical bound (LCB), there is no cointegration. If the calculated F-statistic is between the UCB and the LCB, then decision about cointegration is inconclusive. The critical bounds are taken from Pesaran and Pesaran, (1997). The ARDL bounds testing approach to cointegration uses $(p+1)^k$ formula to estimate the number of regressions. The p indicates the maximum number of lags utilized; and k the total number of variables. The lag length is selected using the minimum values of both AIC and SBC¹⁴. The diagnostic tests check for serial correlation, ARCH, functional form of the model, normality of residual and the white heteroscedasticity. The stability test of long and short run parameters are checked by using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares (CUSUMsq) of recursive residuals.

4 Empirical Results

Table-1 shows that financial development, economic growth and size of government are correlated with income inequality. The relation is positive and significant but negative with financial instability and inflation although, but insignificant. Finally, manufacturing sector and trade openness also associate positively with income inequality, but insignificant. Financial instability and inflation are inversely correlated with development of financial sector. Economic growth and government spending positively correlate with financial development. The manufacturing sector and trade openness correlate positively with financial development, but insignificant. The manufacturing sector and trade openness are positively correlated but insignificant. Inflation is inversely linked with government size. Trade openness and manufacturing sector are directly correlated with inflation.

Table-1 Correlation Matrix

Variables	LGINI	LFD	FINS	LGDP	LGS	INF	LM	LTR
LGINI	1.0000							
LFD	0.6700	1.0000						
FINS	-0.4094	-0.2192	1.0000					
LGDP	0.9277	0.6098	-0.3884	1.0000				
LGS	0.9582	0.6737	-0.3984	0.9370	1.0000			
INF	-0.4741	-0.6020	0.4388	-0.4573	-0.3835	1.0000		
LM	0.2555	0.2185	-0.0011	0.2178	0.4003	0.1255	1.0000	
LTR	0.3184	0.2170	-0.1229	0.1336	0.3740	0.1920	0.5661	1.0000

¹⁴ The mean prediction error of AIC based model is 0.0005 while that of SBC is 0.0063 (Shrestha and Choudhary, 2005). SBC is used for the parsimonious model and AIC chooses maximum pertinent lag.

Table -2 Unit-Root Estimation

Variables	Level			1 st Difference		
	Intercept and trend	Lags	Prob-value	Intercept and trend	Lags	Prob-value
LGINI	-0.9691	1	0.9348	-5.5912	1	0.0004
LFD	-2.5832	1	0.2894	-5.4434	1	0.0005
INF	-3.6463	1	0.0410	-4.4434	1	0.0067
FINS	-3.0344	5	0.1412	-4.1225	4	0.0158
LGS	-1.3546	1	0.8556	-3.2323	1	0.0958
LM	-2.3807	1	0.3825	-5.0357	1	0.0015
LGDP	-2.6927	1	0.2459	-7.4190	1	0.0000
LTR	-2.7979	1	0.2081	-4.0890	1	0.0155

Formally, existence of a cointegrating relation is postulated in the presence of a common non stationary trend among the series. Engle–Granger’s approach does not offer the best choice if more than one cointegrating vector is present (Seddighi et al. 2006). Although the ARDL approach does not require the pre-testing for non stationarity of the series, an order of integration of I(2) or higher can make the results unreliable (Ouattara, 2004). The test for unit root is to insure that none of series is integrated at I(2) or higher. The results of the ADF¹⁵ unit root test developed by Dickey and Fuller (1981) reported in Table-2 show that inflation (INF) is stationary and the rest (GINI, FD, FINS, GS, M, GDP and TR) contain unit root at level, but are 1st differenced stationarity, I(1). This feature makes ARDL bounds testing approach the weapon of choice for examining cointegration.

Table -3 Lag Length Selection

Order of lags	Akaike Information Criteria	Schwartz Bayesian Criteria	F-Statistics for Cointegration
1	-20.88693	-17.62182	2.741
2	-22.40363	-16.17425	6.780*
<i>Sensitivity Analysis</i> ¹⁶			
Serial Correlation LM, F = 1.64(0.212)			
ARCH Test: 1.92 (0.151)			
Normality J-B Value = 1.60(.4487)			
Heteroscedesticity Test, F = 2.65(0.0296)			
Ramsey RESET Test, F = 0.601935(0.445746)			

The appropriate lag order chosen by AIC is 2, as shown in Table-3¹⁷. The ARDL method computed a total of $(2+1)^8 = 6561$ regressions using equation-4. The calculated F-statistic is 6.780 which exceeds the UCB, 5.85 at the 1% level of significance in Pesaran et al. (2001). This confirms the existence of cointegration among the series. The partial long-run impact of financial development on income inequality is reported in Table-4. The coefficient of financial development is negative. This implies that a 1% increase in financial development improves income distribution by 0.122% on an average ceteris paribus. This suggests that by granting easy

¹⁵ ADF test include both intercept and trend

¹⁶ Results are interpreted in Appendix-A.

¹⁷ See Feridun and Shahbaz (2010) and Shahbaz (2010) for details.

access to finance to the poor, financial development redistributes income. This might be the case if easy loan helps human capital formation or promotes entrepreneurial skill among the disadvantaged. The findings are consistent with those of Barro (2000); Li and Zou (2002); Clarke et al., (2003, 2007); Motonishi (2006); Demirgüç-Kunt and Levine (2008); Ang (2008, 2010) and Bittencourt, (2006, 2009, 2010) but contrast with Dollar and Kraay (2003); Calderon and Serven (2003); Roine et al., (2009); Keppel (2010) and Wahid et al., (2010).

Table-4 Long Run Results

Dependant Variable =LGINI			The Non-linear model	
Regressor	Coefficient	Prob-values	Coefficient	prob-values
Constant	0.4721 (1.0331)	0.3110	0.6011 (0.4071)	0.6891
LFD	-0.1221 (-3.0171)	0.0056	-0.2061 (-0.2251)	0.8233
LFD²	0.0128 (0.0915)	0.9277
LFINS	0.0051 (2.0842)	0.0471	0.0050 (1.9090)	0.0681
LGDP	0.0732 (2.3464)	0.0268	0.0733 (2.2333)	0.0343
LGS	0.1732 (7.4521)	0.0000	0.1741 (7.1023)	0.0000
LINF	-0.0131 (-1.7732)	0.0879	-0.0134 (-1.7311)	0.0949
LM	-0.4621 (-5.2681)	0.0000	-0.4654 (-4.9545)	0.0000
LTR	0.09111 (1.9812)	0.0583	0.0914 (1.9363)	0.0646
R ² = 0.9829 Adj-R ² = 0.9783 F-Statistics = 213.5959 Durbin-Watson = 1.8132			R ² = 0.9829 Adj-R ² = 0.9774 F-Statistics = 179.7695 Durbin-Watson = 1.8244	
Robustness Checks (Diagnostic Checks)				
Serial Correlation LM, F = 0.2430(0.7860) ARCH Test: = 0.7040 (0.4078) Normality J-B Value = 0.2498(0.8825) Heteroscedasticity Test, F = 0.8648(0.5911) Ramsey RESET Test, F = 2.0694(0.1473)			Serial Correlation LM, F = 1.7467(0.1867) ARCH Test = 0.6800 (0.4158) Normality J-B Value = 0.6949(0.7064) Heteroscedasticity Test, F = 0.6332(0.8125) Ramsey RESET Test, F = 3.2793(0.0558)	

Note: *t*-values are given in parentheses

The increase in financial instability tends to raise income inequality but its impact is minimal. Financial crisis creates uncertainty and volatility in investment thus slow down the rate of economic growth. Lower rate of economic growth does not help job creation particularly for the poor and thus adversely affects income distribution [see Jeanneney and Kpodar (2005, 2006) for more on how financial crisis affect income distribution]. Our findings confirm to those found by Shahbaz (2009b) and Akhter et al. (2010). The growth in GDP has positive impact on income

inequality and is significant. For Pakistan, a 1% increase in initial real per capita GDP leads to deterioration of income distribution by 0.073%, on an average *ceteris paribus*. An implication of this is that fruits of growth tend to be concentrated in the hands of the rich. This is consistent with findings by Shahbaz et al. (2007a) and Shahbaz (2010). The inequalities in the income of the rural vs. the urban is widening compared to the income inequality within the urban areas is also a major reason for high income inequality in the country (Shahbaz et al. 2007c).

Our findings suggest that a 1% increase in government expenditure increases the income inequality by 0.173%. Maybe, government expenditures are driven by political considerations rather than being need-based. National resources are diverted to meet political ends at the expense of productive development projects. Expenditures on human capital formation and health care have taken the back seat. This will hurt both the short and the long run economic growth prospects of Pakistan. Our findings contrast with those of Dollar and Kraay (2003) who found that high government consumption reduces income inequality. A large size of public sector in a pluralistic democracy tends to support the core urban formal sectors by using transfer system or targeted taxation or raising job opportunities. This lowers income inequality (Lee, 2005). Table-4 shows that moderate inflation improves income distribution but its affect is negligible. This happens because mild inflation serves as a tonic for investors and thus promotes investment which generates employment opportunities. Also, inflation favors the debtors and most of the poor in developing economies are indebted. The finding lends support to Bittencourt, (2006, 2009). A 1% rise in inflation reduces income inequality by 0.013%. The estimates show a negative impact of manufacturing growth on income inequality. A 1% improvement in the manufacturing sector lowers income inequality by 0.46% which results from the job opportunities for both skilled and unskilled workforce in the sector. (All interpretations are on an average *ceteris paribus*).

The relationship between trade openness and income inequality is positive and significant. A 1% rise in trade openness increases income inequality by 0.091%. This finding is in line with Shahbaz et al. (2007b) and with Bensidoun et al. (2005) who argue that trade openness intensifies income inequality. Bensidoun et al. (2005) point out that most exporting firms use workers who are educated. This explains why trade may not benefit the poorer workers who tend to have low education¹⁸. Bhagwati and Srinivasan (2002) in a seminal article wrote, “While freer trade, or “openness” in trade, is now widely regarded as economically benign, in the sense that it increases the size of the pie, the recent anti-globalization critics have suggested that it is socially malign on several dimensions, among them the question of poverty. Their contention is that trade accentuates not ameliorates, deepens not diminishes, poverty in both the rich and the poor countries. The theoretical and empirical analysis of the impact of freer trade on poverty in the rich and in the poor countries is not symmetric, of course (p. 7). In recent times many other economists echo the concern of Bhagwati [Agenor, 2003; David and Scott, 2005; Osmani, 2005; Biswass and Sindzingre, 2006, Shahbaz et al. 2007a, Shahbaz and Aamir 2008 and Shahbaz 2008].

We now report the results of the test of GJ (1990) hypothesis -- the inverted-U-shaped relation between financial development and income inequality. To test this we incorporated a

¹⁸ They also found that international trade leads to inequality increasing both in rich and poor countries while improve income distribution in middle-income countries.

nonlinear term i.e. square of FD in the basic log-linear model. The coefficient turns out to be positive, but insignificant. We thus failed to provide support in favor of the GJ hypothesis. We should be careful about interpreting the results. Maybe, financial development needs to interact with the economy further before any meaningful result can emerge. The interest in the topic likely to be rekindled in future research when more data becomes available. The non-linear relationship between financial development and income inequality was also not found for China (Liang, 2006); and Ang (2008, 2010) for India. But Clarke et al. (2003, 2007) found support for the GJ hypothesis using cross-sectional data set of developing economies¹⁹.

The results of diagnostic test reported in the lower segment of Table-4 indicate no serial correlation and autoregressive conditional heteroscedasticity. The residual term is normally distributed and there is absence of white heteroscedasticity for both the models. The linear model functional form appears justified; but the non-linear model shows specification problem. It is plausible that the financial sector still is in a state of underdevelopment and is a long way from maturity. The impact of financial development on income inequality is robust and stable.

The results of short run behavior of financial development on income inequality within the error correction model (ECM) are examined by using equation-5.

$$\begin{aligned} \Delta LGINI = & \alpha_0 + \sum_{j=0}^n \beta_{FD} \Delta LFD + \sum_{j=0}^n \beta_{FINS} \Delta FINS + \sum_{j=0}^n \beta_{GDP} \Delta LGDP + \sum_{j=0}^n \beta_{GS} \Delta LGS \\ & + \sum_{j=0}^n \beta_{INF} \Delta INF + \sum_{j=0}^n \beta_M \Delta LM + \sum_{j=0}^n \beta_{TR} \Delta LTR + \eta ECM_{t-1} + \varepsilon_t \end{aligned} \quad (5)$$

The short-run adjustment process is examined from the ECM. If the coefficient of ECM lies between 0 and -1 , the correction to GINI in period t is a fraction of the error in period $t-1$. In this case, the ECM causes the GINI to converge monotonically to its long-run equilibrium path in response to the changes in the exogenous variables. If the ECM is positive or less than -2 , this will cause the GINI to diverge.

If the value is between -1 and -2 , the ECM will produce dampened oscillations in the GINI around its equilibrium path. ECM is between 0 and -1 and is statistically significant at the 7% level (Table-5). This implies that the error correction process converges monotonically to the equilibrium path. In our case the coefficient of ECM_{t-1} is -0.1376 and significant, again confirming the existence of cointegration. It also implies that a deviation from the equilibrium level of GINI during the current period will be corrected by 13.76% in the next period.

¹⁹ Algeria, Argentina, Australia, Austria, Belgium, Burkina Faso, the Bahamas, Bolivia, Botswana, Brazil, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Cyprus, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Finland, France, Gabon, Gambia, Germany, Ghana, Greece, Guatemala, Guinea Bissau, Guyana, Honduras, Hong Kong (China), Indonesia, India, Ireland, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Luxembourg, Madagascar, Malawi, Mali, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Senegal, Sierra Leone, Singapore, South Africa, Spain, Sri Lanka, Sudan, Sweden, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Kingdom, United States of America, Venezuela, Zambia, and Zimbabwe.

Table 5 Error Correction Version

Dependant Variable = Δ LGINI			
Regressor	Coefficient	T-Statistics	Prob-values
Constant	0.0086	12.284	0.0000
Δ LFD	-0.0167	-1.8148	0.0821
Δ FINS	0.0002	0.5203	0.6076
Δ LGDP	0.0292	3.1768	0.0041
Δ LGS	0.0174	2.0124	0.0555
Δ INF	-0.0028	-1.7844	0.0870
Δ LM	-0.0644	-2.2155	0.0365
Δ LTR	0.0163	1.9258	0.0660
ECM _{t-1}	-0.1376	-1.9031	0.0691
R ²	0.5008	Adj-R ²	0.3344
S.E. Regression	0.0030	SIC	-8.1365
R.S.S	0.0002	F-statistic	3.0101
L-L Equation	149.9880	D. W-stat	1.4732

Note: R.S.S, LL, SBC and DW are respectively residual sum of squares, log Likelihood, Schwartz Bayesian criteria and Durbin Watson.

It is evidenced that in short run, income distribution seems to be improved with an increase in easy access to finance for poor segments of population. Moreover, it is said that coefficient i.e. 0.122 (significant at 1 %) of FD is greater in long span of time as compared to estimate i.e. 0.0167 (significant at 10 %) of FD in short run. This shows importance of financial development to decrease income inequality in long run. Impact of financial instability on income inequality is positive but insignificant. Economic growth deteriorates income distribution also in short run. The government size is positively linked with income inequality. The manufacturing sector and inflation are inversely correlated with income inequality. Openness to trade also seems to increase income inequality. This shows that Leontief paradox is further confirmed in short span of time. Positives impact of trade openness indicates that rich class of population is main beneficiary from trade openness in the country in both periods.

5 Conclusions and Policy Implications

The paper explores the existence of long run relationship between financial development and income inequality in Pakistan using the ARDL bounds testing approach to cointegration; and the error correction model (ECM) for short run relationships. Also, the paper tests the Greenwood-Jovanovic (1990) hypothesis -- inverted U-shaped relation between the series. ADF unit test examines stationarity of the series. The series are cointegrated. The findings suggest that financial development reduces income inequality while financial instability aggravates it. While this is true for many nations, however for Pakistan, economic growth has led to the deterioration of income distribution; as is also true of trade openness.

The results support Galor and Ziera (1993) and, Newman and Bannerjee (1993) hypothesis that financial development is inequality-narrowing for Pakistan. Ease of access by the poor to financial markets and efficient credit allocation has had significant impact on poverty reduction which led to improved income distribution. Economic growth, government size and trade openness have increased income inequality. Financial instability aggravates income

inequality. Inflation and improvements of manufacturing sector reduces income inequality. However, the results from nonlinear specification do not lend support the GJ (1990) hypothesis. This may be interpreted as failure to achieve the needed maturity in financial market to trigger the onset of the relation.

The poor ought to be exposed to opportunities for better life. This can be done in many ways. Access to capital makes it easy for the disadvantaged by, (a) developing entrepreneurial skill and thus engaging in productive activities; and (b) allowing them to learn higher and quality education, particularly in the areas of science and engineering that would help human capital formation and innovation. The allocation of resources will help to increase income of the poor in the short run. A sustained long run path is achievable only through technological innovation and proper human capital development. The financial sector should receive proper attention of policy makers, keeping in mind that mismanagement could be a recipe for disaster.

While the main aim of public policy is to promote economic growth, create employment, and reduce poverty it is equally important to insure their proper management. To that end financial sector reforms should be undertaken gradually and carefully. Such move will also help to avoid financial instability. The volume of non-performing loans should be brought down. Financial institutions must be allowed to operate without fear or undue political influence. Economic decisions should be taken based on economic principles and not on political grounds.

Reference:

- Agènor, P.R., (2003), "Does Globalization Hurt the Poor?", World Bank, mimeo, Washington.
- Aghion, P. and P, Bolton., (1997), "A Theory of Trickle-Down Growth and Development", *Review of Economic Studies*, 64, pp: 151-172.
- Akhter, S., Lui, Y and K, Lui., (2010), "Cross Country Evidence on the Linkages between Financial Development and Poverty", *International Journal of Business Management*, 5, pp: 1-19.
- Ang, J. B., (2009), "Financial Liberalization and Income Inequality" MPRA Paper No. 1449.
- Ang, J. B., (2010), "Finance and Inequality: The Case of India", *Southern Economic Journal*, 76, pp: 738-761.
- Ang, J., (2008), "Finance and Inequality: The Case of India", Discussion Paper 08/08, Monash University.
- Banerjee, A. and A. Newman., (1993), "Occupational Choice and the Process of Development," *Journal of Political Economy*, 101, pp: 274-98.
- Barro, R., (2000), "Inequality and Growth in a Panel of Countries", *Journal of Economic Growth*, 5, pp: 5-32.
- Beck, T, Demirgüç-Kunt, A and R. Levine., (2007), "Finance, Inequality and the Poor", *Journal of Economic Growth*, 12, pp: 27-49.
- Behrman, JR., Birdsall, N and M, Székely., (2001), "Poverty, Inequality, and Trade and Financial Liberalization in Latin America", RES Working Papers 4261, Inter-American Development Bank.
- Bensidoun, I., Jean, S and A. Sztulman., (2005), "*International Trade and Income Distribution: Reconsidering the Evidence*", CEPII Working Papers No. 17, CEPII, Paris.

- Bhagwati, J and T. N. Srinivasan., (2002), "Trade and Poverty in the Poor Countries", *The American Economic Review*, 92, pp: 180-183.
- Biswas and Sindzingre, (2006), "Trade Openness, Poverty and Inequality in India: Literature and Empirics at the Sub-National Level" International Conference 'The Indian Economy in the Era of Financial Globalisation' Fondation Maison des Sciences des l'Homme and economix, University Paris 10-Nanterre Paris, 28 and 29 September 2006.
- Bittencourt, M. F., (2006), "Financial Development and Inequality: Brazil 1985-99", Discussion Paper no.06/582. Department of Economics, University of Bristol, 8 Woodland Road, Bristol BS8 1TN.
- Bittencourt, M. F., (2009), "Financial Development and Inequality: Brazil 1985-99", *The Developing Economies*, 47 (1), pp: 30-52.
- Bittencourt, M. F., (2010), "Financial Development and Inequality: Brazil 1985-1994", *Economic Change and Restructuring*, 43, pp: 113-130.
- Burgess, R and R, Pande., (2005), "Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment", *American Economic Review*, 178, pp: 780-795.
- Calderón C. and L. Servén., (2003), "Macroeconomic Dimensions of Infrastructure in Latin America", The World Bank.
- Canavire. B, Gustavo. J and F. Rioja., (2008), "Financial Development and the Distribution of Income in Latin America and the Caribbean", IZA Discussion Papers 3796.
- Christopoulos, D. and Tsionas, D. (2004), "Financial Development and Economic Growth: Evidence from Panel Unit Root and Cointegration Tests", *Journal of Development Economics*, 73, pp: 55-74.
- Claessens, S., (2006), "Access to Financial Services: A Review of the Issues and Public Policy Objectives", *Journal of Financial Transformation*, 17, pp: 16-19.
- Clarke, G.; Xu, L.C. and Zou, H., (2003), "Finance and Income Inequality: Test of Alternative Theories", World Bank Policy Research Working Paper.
- Clarke, G.; Xu, L.C. and Zou, H., (2007), "Finance and Income Inequality: What Do the Data Tell Us?", *Southern Economic Journal*, 72, pp. 578-596.
- Cysne, R., Maldonado, WL and PK, Monteiról., (2004), "Inflation and Income Inequality: A Shopping- Time Approach", *Journal of Development Economics*, 78, pp: 516-528.
- David and Schott, (2005), "Macroeconomics: Understanding the Wealth of Nations, A
- Demirgüç-Kunt. A and R. Levine., (2008), "Finance and Economic Opportunists", *Revue d'économie du développement*, 22, pp: 5-29.
- Dickey, D. A., and W. A. Fuller., (1981), "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root", *Econometrica*, 49, pp: 1057-1072.
- Dollar D, and A. Kraay., (2003), "Growth is Good for the Poor", *Journal of Economic Growth*, 7, pp: 195-225.
- Easterly W. and S. Fischer., (2001), "Inflation and the Poor", *Journal of Money, Credit and Banking*, 33, pp: 160-178.
- Engle, RF and Granger CWJ., (1987), "Cointegration and Error Correction Representation: Estimation and Testing", *Econometrica*, 55, pp: 251-276.
- Erosa, A. and G. Ventura., (2002), "On Inflation as a Regressive Consumption Tax", *Journal of Monetary Economics*, 49, pp: 761-795.
- Feridun. M., Shahbaz. M., (2010), "Fighting Terrorism: Are Military Measures Effective? Empirical Evidence from Turkey", *Defence and Peace Economics*, 21, 193-205.

- Galor, O. and J. Zeira., (1993), "Income Distribution and Macroeconomics", *Review of Economic Studies*, 60, pp:35-52.
- Goldsmith, R., (1969), "Financial Structure and Development", *A Handbook*, Yale University Press, 1969.
- GoP., (2006). *Economic Survey of Pakistan*, publishes by Finance Ministry of Pakistan, Islamabad, Pakistan.
- Greenwood, J. and B. Jovanovic., (1990), "Financial Development, Growth, and the Distribution of Income", *Journal of Political Economy*, 98, pp: 1076-1107.
- Haroon, J., (2005), "Does Inequality Matter for Poverty Reduction" Research Report no.58 at Social Poverty and Development Center, Karachi, Pakistan.
- Haug, A., (2002), "Temporal Aggregation and the Power of Cointegration Tests: A Monte Carlo Study", *Oxford Bulletin of Economics and Statistics*, 64, pp: 399-412.
- Jeanneney S. G, and Kpodar .K, (2005), "Financial Development, Financial Instability and Poverty", CSAE WPS/2005-09, CERDI-CNRS-University of Auvergne.
- Jeanneney S. G, and Kpodar .K, (2006), "Financial Development, Financial Instability and Poverty", CERDI, Etudes et Documents, E.2006. University of Auvergne.
- Johansen, S and Juselius, K., (1990), "Maximum Likelihood Estimation and Inference on Cointegration With Applications to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, 52, pp: 169-210.
- Johansen, S., (1991), "Estimation and Hypothesis Testing of Cointegrating Vectors in Gaussian Vector Autoregressive Models", *Econometrica*, 59, pp: 1551-1580.
- Johansen, S., (1992), "Cointegration in Partial Systems and the Efficiency of Single-equation Analysis", *Journal of Econometrics*, 52, pp: 389-402.
- Kappel, V., (2010), "*The Effects of Financial Development on Income Inequality and Poverty*", Working Paper 10/127, CER-ETH – Center of Economic Research at ETH Zurich.
- Khan, A., (2000), "The Finance and Growth Nexus", *Business Review*, pp: 3-14.
- Khan, M.A., Qayyum, A and Skiekh, S. A., (2005), "Financial Development and Economic Growth: The Case of Pakistan" Paper Presented at 21ST Annual Meeting & Conference, PIDE. Quid-I-Azam University Campus, Islam Abad.
- Kim, T-K., S, Leybourne and P, Newbold., (2004), " Behaviour of Dickey-Fuller Unit-Root Tests Under Trend Misspecification", *Journal of Time Series Analysis*, 25, pp: 755-764.
- King, R G. and R, Levine., (1993), "Finance and Growth: Schumpeter Might Be Right", *Quarterly Journal of Economics*, 108, pp: 717-37.
- Laurenceson, J and J, C.H. Chai., (2003), "Financial Reform and Economic Development in China", Cheltenham, UK, Edward Elgar.
- Lee, C-S., (2005), "Income Inequality, Democracy, and Public Sector Size", *American Sociological Review*, 70, pp: 158-181.
- Levine, R., (1992), "Financial Structures and Economic Development", Policy Research Working Paper Series 849, The World Bank.
- Levine, R., (1997), "Financial Development and Economic Growth: Views and Agenda", *Journal of Economic Literature*, 35, pp: 688-726.
- Li, H. and H, Zou., (2002), "Inflation, Growth, and Income Distribution: A Cross-Country Study", *Journal of Economics and Finance*, 3, pp: 85-101.
- Liang, Z. (2006), "Financial Development and Income Inequality in Rural China 1991-2000," World Institute for Development Economic Research Paper, 2006/96.

- Loayza, N and R, Ranciere., (2002), "Financial Development, Financial Fragility, and Growth". Working Papers Central Bank of Chile-145, Central Bank of Chile.
- Loayza, N and R, Ranciere., (2005), "Financial Development, Financial Fragility, and Growth". IMF Working Paper no.170.
- Loayza, N and R, Ranciere., (2006), "Financial Development, Financial Fragility, and Growth", Journal of Money, Credit and Banking, 38, pp: 1051-1076.
- Lopez, H., (2004), "Pro-poor-Pro-growth: Is there a Trade Off?" The World Bank, Policy Research Working Paper No. 3378.
- Lucas, R. E. and N. Stokey., (1987), "Money and Interest in a Cash-in-Advance Economy" Econometrica, 55, pp: 491-514.
- Ma, Y, and Jalil. A, (2008), "Financial Development, Economic Growth and Adaptive Efficiency: A Comparison between China and Pakistan", China & World Economy, 16, 97-111.
- McKinnon, R I. (1973). *Money and Capital in Economic Development*. Washington, D.C., The Brookings Institution.
- Mosley. P, (1999), "Micro-macro Linkages in Financial Markets: the Impact of Financial Liberalization on Access to Rural Credit in Four African Countries", Journal of International Development, 1, pp: 367-384.
- Motonishi, T., (2006), "Why has Income Inequality in Thailand Increased? An Analysis Using Surveys from 1975 to 1998", Japan and the World Economy, (18), pp: 464-487.
- Osmani, S. R. (2005), "The Impact of Globalization on Poverty in Bangladesh" Working Paper No. 65, Policy Integration Department National Policy Group International Labour Office Geneva.
- Ouattara, B., (2004), "*Foreign Aid and Fiscal Policy in Senegal*", Mimeo University of Manchester, Manchester, UK.
- Pagano, M and P, Volpin., (2001), "The Political Economy of Finance", Oxford Economic Papers.
- Perotti, R., (1996), "Growth, Income Distribution and Democracy", Journal of Economic Growth, 1, 149-87.
- Perron, P., (1989), "The Great Crash, the Oil Price Shock, and the Unit Root Hypothesis", Econometrica, 57, pp: 1361-1401.
- Perron, P., (1997), "Further Evidence on Breaking Trend Functions in Macroeconomic Variables", Journal of Econometrics, 80, pp: 355-385.
- Pesaran, M. H and Pesaran, B. (1997), "Working with Microfit 4.0: Interactive Econometric Analysis", Oxford: Oxford University Press.
- Pesaran, M. H., Shin, Y and Smith, R.J., (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", Journal of Applied Econometrics, 16, pp: 289-326.
- Pesaran, MH and Shin, Y., (1999), "An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis", Chapter 11 in Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium, Strom S (ed.). Cambridge University Press: Cambridge.
- Rajan, R and L, Zingales., (2003), "The Great Reversals: the Politics of Financial Development in the Twentieth Century," Journal of Financial Economics, 69, pp: 5-50.
- Rehman, H., Khan, S and Ahmad, I., (2008), "Income Distribution, Growth and Financial Development: A Cross Countries Analysis", Pakistan Economic and Social Review, 46, pp: 1-16.

- Roine, J., Jonas, V and D, Waldenström., (2008), “The long-run determinants of inequality: What can we learn from top income data?” *Journal of Public Economics*, 93, 974-988.
- Seddighi. H. R, A. Lawler, A. V. Katos.,(2006). *Applied Econometrics: A Practical Approach*. Routledge, London and New York.
- Shahbaz, M and N, Aamir, (2008), “Foreign Direct Investment and Income Distribution: A Case Study for Pakistan”, *International Research Journal of Finance and Economics*, 7, pp: 7-18.
- Shahbaz, M., (2008), “Does Globalization Benefit the Poor? Evidence from Pakistan”, *Journal of Economic and Social Policy*, 5, pp: 9-27.
- Shahbaz, M., (2009a), “A Reassessment of Finance-Growth Nexus for Pakistan: Under the Investigation of FMOLS and DOLS Techniques”, *ICFAI Journal of Applied Economics*, pp: 65-80.
- Shahbaz, M., (2009b), “Financial Performance and Earnings of Poor People: A Case Study of Pakistan”, *Journal of Yasar University*, 4, 2557-2572.
- Shahbaz, M., Ahmad, K and AR, Chaudhary., (2008), “Economic Growth and Its Determinants in Pakistan”, *The Pakistan Development Review*, 47, 471-486.
- Shahbaz, M., Ahmad, QM., Ahmad MH and MS Butt., (2007a), “An Empirical Investigation of the Relationship between Trade Liberalization and Poverty Reduction: A Case for Pakistan”, *The Lahore Journal of Economics*, 12, 99-118.
- Shahbaz, M., Butt, S. M., and Aamir, N., (2007c), “Rural-Urban Income Inequality under Financial Development and Trade Openness in Pakistan: The Econometric Evidence”, *The Pakistan Development Review*, 46, pp: 657-672.
- Shahbaz, M., Butt, SM and Aamir, N., (2007b), “Trade and Inequality Nexus in Pakistan: Under Investigation of Alternative Techniques”, *European Journal of Economics, Finance and Administrative Sciences*, pp: 57-72.
- Shahbaz, M., SMA, Shamim and N, Aamir (2010a). Macroeconomic Environment and Financial Sector’s Performance: Econometric Evidence from Three Traditional Approaches, *The IUP Journal of Financial Economics*, 1&2: 103-123.
- Shahbaz. M, (2010), “Income Inequality-Economic growth and Non-Linearity: A Case of Pakistan”, *International Journal of Social Economics*, 37, 613-736.
- Shahbaz. M, Wahid. A. N. M and Kalim. R., (2010b), “Is Inflation Regressive or Progressive? Long Run and Short Run Evidence from Pakistan”, *International Journal of Management Studies*, 17, pp: 1-27.
- Shan, J. (2005), “Does Financial Development ‘Lead’ Economic Growth? A Vector Auto-regression Appraisal”, *Applied Economics*, 37, pp: 1353-1367.
- Shrestha, M and A, Chowdhury., (2005), “ARDL Modeling Approach to Testing the Financial Liberalization Hypothesis” University of Wollongong Economics Working Paper Series 2005, <http://www.uow.edu.au/commerce/econ/wpapers.html>
- Sturzenegger, F., (1992), “Inflation and Social Welfare in a Model with Endogenous Financial Adaptation”, NBER Working Paper Series.
- Tan, H-B and Law, S-H., (2009), “Does Financial Deepening Improve Income Distribution? A Dynamic Panel Analysis on Developing Countries”, Nottingham Univ. Business School Malaysia Campus Research Paper No. 2009-01.
- Tan, H-B and Law, S-H., (2009), “The Role Financial Development on Income Inequality in Malaysia”, *Journal of Economic Development*, 34, pp: 134-168.

Wahid, N. M. A., Shahbaz, M., Shah, M. and Salahuddin, M. (2010), “Does Financial Sector Development Increase Income Inequality? Some Econometric Evidence from Bangladesh”, Accepted for publication in Indian Economic Review.

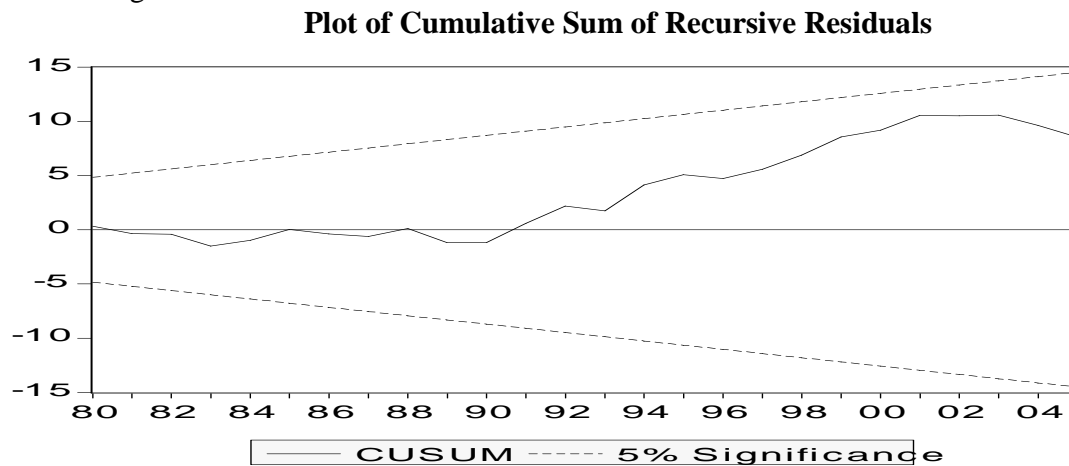
Westley, G.D., (2001), “Can Financial Market Policies Reduce Income Inequality”, Inter-American Development Bank, Washington D.C.

Appendix-A

Sensitivity Analysis and Stability Test

The robustness of short run results is investigated through diagnostic and stability tests. The diagnostic tests such as LM test for serial correlation, normality of residual term, white heteroscedasticity and model specification test have been conducted. The results are reported in the lower segment of Table-3. The empirical findings show that short-run model seems to pass all diagnostic tests successfully. The empirical evidence indicates no confirmation of serial correlation and residual term is normally distributed. Furthermore, model has passed the Ramsey Reset test which indicates that functional form of model is well specified. The analysis indicates the existence of white heteroscedasticity in short run model. The existence of white heteroscedasticity is due to mixed order of integration between variables. It is posited by Shrestha and Choudhary, (2005) that mixed order of integration such as $I(0)$ and $I(1)$ among variables often present the problem of white heteroscedasticity²⁰. The stability tests have been used to investigate the stability of long and short run parameters. In doing so, cumulative sum (CUSUM) and cumulative sum of squares (CUSUMsq) tests have been employed.

Figure 1

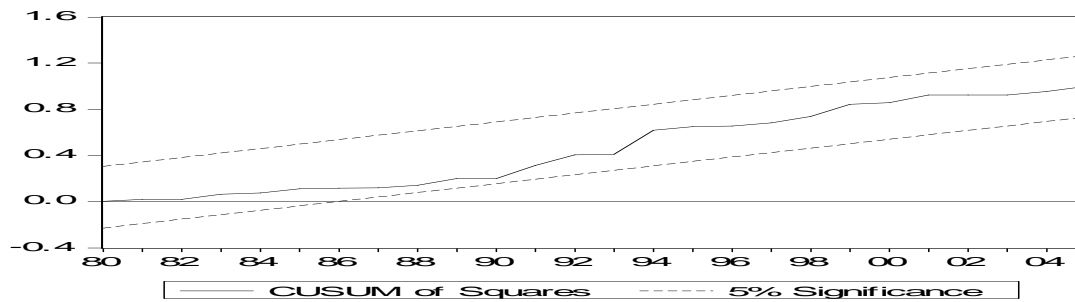


The straight lines represent critical bounds at 5% significance level.

²⁰ It is not necessary condition

Figure 2

Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level.

Pesaran and Shin, (1999) have suggested to estimate the stability of long and short run estimate through CUSUM and CUSUMsq tests. The graphs of both **CUSUM** and **CUSUMsq** are presented above (see figure 1 and 2). The figure 1 and 2 specifies that plots for both **CUSUM** and **CUSUMsq** are between critical boundaries at 5 % level of significance. This confirms the accuracy of long and short run parameters which have impact on income inequality in case of Pakistan. Moreover, both tests also verify the stability of ARDL model for structural stability. This indicates that model seems to steady and specified appropriately.