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Fiscal Policy and Income Inequality in Pakistan: An ARDL Approach

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Abstract

This study is an attempt to capture the impact of fiscal policy on income inequality in Pakistan. It employed Autoregressive Distributed Lag (ARDL) model on annual time series data from 1980 to 2012. The stationarity of data is checked by Augmented Dickey Fuller unit root test. Short-run dynamics are tested by error correction model. Model reliability is tested with the help of the diagnostic tests. Chow test is applied to detect structural breaks and Gregory-Hansen technique is employed as a remedial measure of the structural breaks. Results indicate that development expenditures and financial development has diminishing effect on income inequality. On the other hand fiscal deficit and urbanization are affecting the income inequality positively. The current expenditures and indirect tax has no influence on Gini-coefficient. The study recommends that fiscal deficit should be diminished by reducing current expenditures. The development expenditures require an increase to decrease income inequality. For the financing revenue from indirect taxes may be increased, it will not hurt the income inequality. The financial development as a tool for decreasing inequality is also proposed.

JEL Classification: E62, D3, H3

Keywords: income disparity, fiscal policy, gini-coefficient, ardl, development expenditures, fiscal deficit, financial development, urbanization.

1. Introduction

Debate on income inequality is not new in the economic literature. Earlier Marxists focused on the theory of social classes and blamed capitalistic system for having unequal societies. They argued that propertied class suppress labor class and generate inequality. Classical economists were mainly concerned with the income distribution between factors of production. Now the economists are conscious about income distribution at household and personal level.

With the passage of time there emerged a number of determinants of income inequality in an economy. For instance, role of urbanization in income inequality was introduced by Kuznets (1955). He took the urbanization and industrialization as two complimentary processes. The urbanization lead to industrialization and it increases inequality at the initial stage of

industrialization. The industrialization increases the income gap between urban and rural population, until the benefits of industrialization are reached to rural households. Austrian school of thought believes that inflation generating through monetary phenomenon increase inequality. Patrick (1966) claimed that financial sector development can reduce the income inequality because financial development increases provision of credit and productive capacity of the households having no or comparatively less assets.

The co-existence of inequality and economic growth is linked with Kuznets's (1955) views that at initial level of development of an economy it faces high income inequality and then it starts decreasing, that is income inequality has a U-shaped curve against economic growth. Kaldor (1956) also linked income inequality with development process and accepted U-curve hypothesis. Barro (2000) proved the same phenomenon empirically* but with certain limitations and reservations. Sylwester (2002) proved an inverse relationship between education expenditures and income inequality in OECD, East Asian, Latin American and African countries. The relationship was stronger in OECD countries but it was existed to some extent in developing countries. Angello and Sousa (2012) revealed that degree of openness of trade reduces inequality in industrialized economies. Brennenman and Kerf (2002) and Caldern and Serven (2004) attempted to estimate the impact of infrastructure development on poverty and inequality. Both of the studies proved an inverse association between infrastructure development and income inequality.

1.1. Fiscal Policy and Income Inequality

Neoclassical growth models limits the role of fiscal policy in income inequality and believe that fiscal policy has temporary effects on growth so it becomes difficult to decide the effect of fiscal policy on income inequality in an economy. But analyses in the framework of endogenous growth models made it possible to see the role of fiscal policy in income inequality. In this way endogenous growth theory opened new horizon for the role of fiscal policy in income inequality. Under these models fiscal variables impact the level and growth rate of output and change the temporary impact (under neoclassical models) into permanent impact. So fiscal policy can be used as an important tool for redistribution, although the exogenous or endogenous growth models do not include distributional issues directly. There emerged an indirect relationship between economic growth and income inequality.

The government expenditures as a component of fiscal policy in the forms of subsidies, social welfare expenditures, infrastructure expenditures, expenditures on poverty reduction programs and expenditures on food and health instigate the income inequality to decrease (Ramos and Roca-Sagales 2008). The governments need resource to finance these expenditures and generally tax revenue is the major source for meeting these expenditures. If the taxes are regressive these expenditures do not work for inequality reduction and if taxes are progressive the inequality would be reduced.

Regarding the current expenditures and development expenditures it is evidenced that development expenditures reduce the income inequality and current expenditures enhance the income inequality (Ali and Ahmed, 2010). Gallo and Sagales (2013) evidenced that current expenditures increase income inequality, although the current expenditures have certain spending such as pensions and other benefits which are considered as decreasing the income inequality. Ramos and Roca-Sagales (2008) suggested that government should increase the public spending to improve the situation of income inequality but it may happen at the cost of growth.

The empirical research evidenced that fiscal policy tools are more effective in developed and advanced economies. The evidences from OECD countries showed that Gini coefficient was reduced by 15 percent by effective working of fiscal tools (Brandolini and Smeeding, 2009; Barnard and Atta, 2010). The public spendings on housing, food, health and education decrease inequality (Decoster et al. 2009; Donoaghue et al. 2004). The governments in these economies usually believe on transfer payments and public expenditures for reducing inequality. But role of the taxes becomes important in the perspective of efficiency. The indirect taxes cause to increase income

* However, Samanta and Cerf (2009) have shown that higher income inequality has positive impact on GDP growth rate.

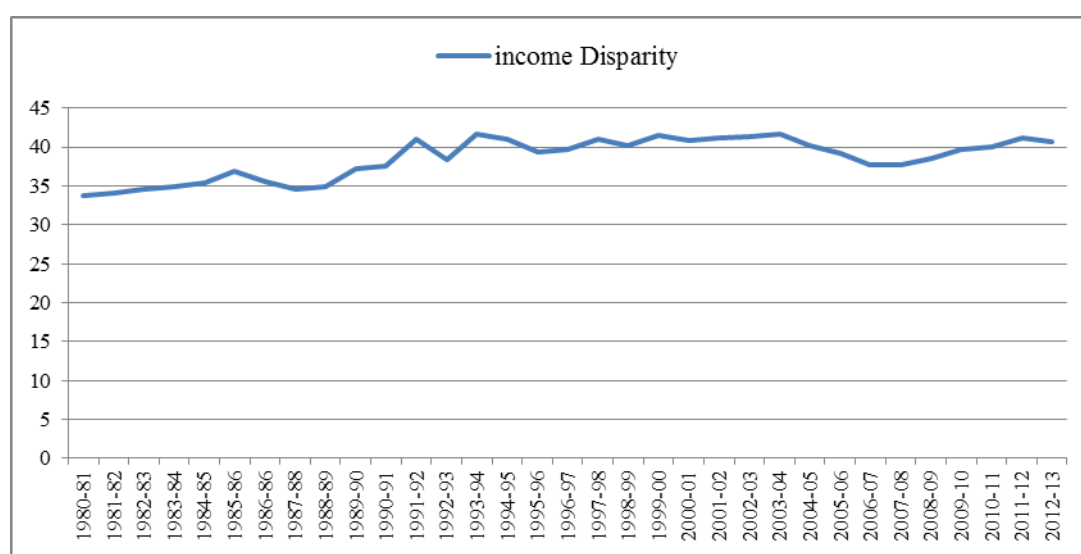
inequality because they are highly regressive*. However, Galo and Sagales (2013) found that direct taxes increase the income inequality.

The income redistribution effect of fiscal policy in UK has been examined by Ramos and Roca-Sagales (2008), and they explained that public expenditures improve the distribution of income more than taxes even though the tax system is progressive in the country. Taxes deteriorate the income distribution and particularly indirect taxes negatively affect the distribution of income.

1.2. Income Inequality in Pakistan

In Pakistan historical trend of income distribution shows a persistent existence of income inequality. It is not only harming the growth process of the country rather making a burden in the social, cultural and political development of the economy along with enhancing the numerical strength of the deprived section of the society†. The income inequality has an increasing trend since 1980 as shown in figure 1.

Figure: 1 Income Inequality in Pakistan (1980-2012)



In 1980s the income inequality increases but comparatively at a lower rate. The Middle East phenomena (overseas employment in Middle East) not only reduced the poverty but also help to contain the sharp rise in income inequality. Power of the Middle East phenomena may be expressed by the figure that in 1982/83 remittances were about 10 percent of the GDP of Pakistan. In 1990s inequality rise sharply possibly due to Structural Adjustment Programs (SAP). Implementation of SAP leads to withdrawal of subsidies, reduction in public sector program and increasing the tax which enhanced the burden on common man. During the period of 2000-2010, initially the income inequality increased but after 2004 it decreased. Overall in 2000-10 the income inequality remained almost constant but at a higher level. After 2010, it again rises. The figure shows that in 1993-94, during 2000 and 2004, and in 2012 the income inequality was comparatively higher and greater than 0.4.

The literature has identified a number of factors affecting income inequality in Pakistan. They include the urbanization, financial development, government spendings, loan from IMF, adaptation of SAP, tax structure and political inefficiency in allocation of expenditures (Sherazi et al. 2001; Li and Zou, 2002; Ali and Ahmed, 2010; Shahbaz and Islam, 2011). Pakistan's tax structure is regressive as the major emphasis is on indirect taxes. Tax net is loose where upper class is escaping while middle class is paying the tax. Government expenditures are politically induced and inefficiently allocated (Sherazi et al. 2001; Ali and Ahmed, 2010; Shahbaz and Islam, 2011). It means fiscal policy may be one of the factors of income inequality in Pakistan. On the other hand

* However, Galo and Sagales (2013) found that direct taxes increase the income inequality.

† In some economies, the income inequality negatively impacts the fiscal multiplier and its effectiveness (see Samanta and Cerf, 2009)

theoretically one of the objectives of fiscal policy is to mitigate the income inequality in an economy. There are diverging empirical evidences on achieving this objective of fiscal policy. For Pakistan the fiscal policy is successful for achieving this target needs attention of the researchers.

In the light of above, the current study attempt to find the role of fiscal policy in income inequality in Pakistan. The core objective of the study is to empirically estimate the impact of the components of the fiscal policy on income inequality. The components of fiscal policy are reducing income inequality, or not, is the research question to be answered. Based on the results some policy proposals would be framed.

2. Literature Review

A variety of literature exists on fiscal policy and its impact on poverty and income inequality. Shirazi et al. (2001) used the micro data from Household Integrated Economic Survey to see the redistributive effect of fiscal policy in Pakistan. Fiscal policy was incorporated in the analytical model in the form of public expenditures and taxes. Public expenditures were categorized into education, defense, health, agriculture and general administration. They were also divided into urban and rural areas expenditures. Taxes were decomposed into indirect tax, import and export duties as well as categorized into the tax burden faced by rural and urban population. Results explained that upper class is getting least benefits from government expenditure and tax burden is also higher on upper class. It causes the income inequality to decrease. The study also concluded that urban households are getting more benefits as compared to rural households. It was recommended that fiscal policy in Pakistan should be more pro-poor and focused on low income group of the economy.

Samanta and Cerf (2009) focused on fiscal policy and income inequality in the perspective of welfare impact of government expenditures in 10 transitional economies. The study used time series data and employed OLS and 2SLS models. The estimation witnessed that more unequal income distribution needed more government expenditure to increase income and ultimately to overcome income inequality. It was recommended for transitional economies to follow privatization, openness of trade and more progressive tax system to improve the economic situation.

The role of public expenditures in reducing poverty in Pakistan has been examined by Ali and Ahmed (2010) by splitting expenditures into current and development expenditures and employing ARDL technique on annual time series data. Results revealed that development expenditures reduce poverty but current expenditures increase the poverty. However both types of expenditures affect the poverty through inequality. Development expenditures slide down the income inequality and current expenditure increases the income inequality. The study suggested that government should diminish the proportion of current expenditures and increase the ratio of development expenditures to have the reduction in poverty and inequality.

Muinelo-Gallo and Roca-Sagalés (2011) attempted to estimate the impact of fiscal instruments on economic growth and income inequality in 43 countries by using annual time series data and employing OLS model. The results showed that current expenditures and direct taxes reduce economic growth and income inequality. It was proposed that public investment size should be increased to reduce inequality as trade off between growth and equity can be eliminated.

Probing the role of fiscal consolidation in income inequality in 18 industrialized countries, Angello and Sousa (2012) found that fiscal consolidation has a positive impact on income inequality. The study further explained that during the period of consolidation there was high income inequality and the size of the fiscal consolidation program has an increasing impact on income inequality. The spending cuts were found extremely damaging for income distribution while tax hikes were found helpful in improving the income distribution. Inflation and low economic growth rate enhance the effect of fiscal consolidation on inequality.

Claus et al. (2014) investigated the impact of fiscal policy on income inequality in 15 Asian countries including Pakistan. In the part of fiscal revenues personal income tax, corporate tax, payroll tax, social security contribution, custom and excise duties were included. The expenditures included were health expenditure, education expenditures and social protection expenditures. The results explained that even progressive taxation system is playing a minor role in redistribution of income. Education and health expenditures are reducing inequalities but

surprisingly social protection expenditures and housing expenditure are increasing income inequality. It explained that social protection expenditures target only a selected segment of the society while others remain deprived. The study proposed that these countries should increase the tax base and reduce the tax rates. To increase the tax base reductions in tax concessions and tax holidays are proposed.

The impact of different fiscal instruments on income distribution and economic growth has also been estimated by Gallo and Sagales (2013) for Uruguay. Vector autoregressive technique was employed on annual time series data. The study explained that current expenditures and direct taxes increase income inequality. However public investment decreases the income inequality. The results revealed that fiscal policy is responsible for increasing income inequality in Uruguay.

In the literature different aspects of the fiscal policy in relevance to income inequality have been probed by the researchers using various econometric techniques. We are going to analyze the impact of fiscal policy on income inequality by including four aspects of fiscal policy like current expenditures, development expenditures, indirect taxes and fiscal deficit along with supportive variables of financial development and urbanization*. We will use the fresh data and see the impact of fiscal policy on income inequality in the presence of financial development and urbanization. So the current study will be an addition to the literature in the focused area.

3. Methodology

3.1. Sources of Data and Model Specification

The study used annual time series data for the period 1980 to 2012. The data has been taken from various issues of Economic Survey of Pakistan by State Bank of Pakistan (SBP various years) and 50 Years of Pakistan in Statistics by Federal Bureau of Statistics (FBS 1999).

To incorporate the fiscal policy in the model government expenditures categories into current expenditures and development expenditures are included. Current expenditures are comprised of interest payments, subsidies, general administration, defense, pension's grants, etc. while development expenditures are comprised of expenditures on public sector development programs and other developmental projects regarding human capital and infrastructure.

Revenue is collected through direct taxes and indirect taxes. In Pakistan indirect taxes are the major source of revenue and it has different real impact on purchasing power of the people in different income groups. So indirect tax revenue is included in the analysis to see its contribution in income inequality. Fiscal deficit is a prominent feature of Pakistan's economy. The gap between expenditures and revenue is bridged by fiscal deficit that may affect the people of different income group differently and influence income inequality. The fourth variable related with fiscal policy included in the model is fiscal deficit. The supporting variables are financial development and urbanization.

The financial development has emerged as a new area affecting a large number of macroeconomic indicators in Pakistan (Khan and Hye, 2013). It is based on the fact that in the last three decades financial sector has tremendous growth rate. The credit distributed to private sector has been taken as an indicator of financial development. It includes all the sources of credit including loans, trade credits, purchase of securities and all credit advances by banking and non-banking†. Urbanization is the phenomena involved with income inequality and there exists income inequality between urban and rural population of the economy. Urbanization as a factor of income inequality has been analyzed by a wide range of researchers (Dutt, 2001; Davis and Henderson, 2003).

The functional form of the model is expressed in equation 1.

$$\text{GINI} = f(\text{CEXP}, \text{DEXP}, \text{INDT}, \text{FISCD}, \text{FINAND}, \text{URBAN}) \dots\dots (1)$$

$$\text{GINI} = \beta_0 + \beta_1\text{CEXP} + \beta_2\text{DEXP} + \beta_3\text{INDT} + \beta_4\text{FISCD} + \beta_5\text{FINAND} + \beta_6\text{URBAN} + e \dots\dots (2)$$

GINI = Gini coefficient

* The control variables in the analysis impact of fiscal policy on income inequality has a wide range including population growth, dependency burden of youth and old age, globalization, corruption and education (Claus, et. al. 2012).

† Fishman and Love (2003) and Petersen and Rajan (1997) have used broad money as the percentage of GDP and the trade credit for provision of financial development. Khan and Hye (2013) have created an index for financial development.

CEXP = Current expenditures (Government current expenditures in million rupees)

DEXP = Development expenditures (Government development expenditures in million rupees)

INDT = Indirect tax revenue (Government revenues from indirect taxes in million rupees)

FISCD = Fiscal deficit (Government fiscal deficit as percentage of GDP)

FINAND = Financial development (Credit disbursed to private sector as percentage of GDP)

URBAN = Urbanization (Urban population as the percentage of total population)

The current expenditures, development expenditures, indirect tax revenues and urbanization are taken in log form.

3.2. Econometric Estimation

3.2.1. Unit Root Test

In time series analysis data stationarity is a necessary condition. If time series data is not stationary, shocks in the data will exist disappear and results will be aggravated. On the other hand in stationary time series data shocks are eliminated and data turn back to its mean value. Indication of stationarity is that by increasing the lags correlogram is declined. In non-stationary series autocorrelation plot would expand. If we have the model

$$Y = \Omega Y_{-1} + \mu \dots\dots (3)$$

Where μ = white noise error

Condition of stationarity is $|\Omega| < 1$. If it is not, time series will be non-stationary.

So the hypothesis is $\Omega = 1$ (series has a unit root)

While alternative hypothesis is $\Omega < 1$

We will apply the Augmented Dickey Fuller (ADF) test to check the stationarity of the data.

3.2.2. Autoregressive Distributed Lag Model (ARDL)

General test to estimate the cointegration among the variables is Johansen cointegration test or Engle Granger approach. These methods have two main problems. First one is that it requires the data to be integrated of same order. Secondly small data estimation becomes difficult under such techniques. To overcome these problems Autoregressive Distributed Lag (ARDL) test was introduced by Pesaran and Shin (1999). In this test dependent variable is regressed upon its own lag value including current and lag values of other explanatory variables. As the model is going to be tested through ARDL bounds technique that depends on F statistics, the Bounds test will show that either the variables are co-integrated or not.

H_0 = There is no cointegration among the variables.

That is $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$

H_1 = There is cointegration among the variables.

That is $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 \neq 0$

We will use the same technique for current analysis.

The equation 2 will be treated under ARDL approach as:

$$\Delta GINI = \alpha + \Sigma \alpha_{1i} \Delta GINI_{t-i} + \Sigma \alpha_{2i} \Delta LCEXP_{t-i} + \Sigma \alpha_{3i} \Delta LDEXP_{t-i} + \Sigma \alpha_{4i} \Delta LINDT_{t-i} + \Sigma \alpha_{5i} \Delta FISCD_{t-i} + \Sigma \alpha_{6i} \Delta FINAND_{t-i} + \Sigma \alpha_{7i} \Delta URBAN_{t-i} + \beta_1 GINI_{t-1} + \beta_2 LCEXP_{t-1} + \beta_3 LDEXP_{t-1} + \beta_4 LINDT_{t-1} + \beta_5 FISCD_{t-1} + \beta_6 FINAND_{t-1} + \beta_7 URBAN_{t-1} + e_t \dots\dots (4)$$

3.2.3. Error Correction Model (ECM)

If we have two variables Y and X and if both are co-integrated, we may write their relation with ECM specification as:

$$\Delta Y = \alpha_0 + \beta_1 \Delta X - \pi \mu_{t-1} + e_t \dots\dots\dots (5)$$

This is ECM equation which has the information of both short-run and the long-run relation. Where β_1 is impact multiplier and π is adjustment factor. Impact multiplier expresses the short-run effect of change in Y due to change in X while adjustment factor shows that how much of the past period disequilibrium is adjusted in the current period. We will apply ECM estimation to see the impact of fiscal policy components along with the supporting variables on income inequality in Pakistan.

3.2.4. Diagnostic Tests

Reliability of regression results is very important even the results show the good and significant relationship. It is possible that the regression does not qualify the certain diagnostic tests. There is a large number of diagnostic tests which can suggest that either empirical findings are correct or not. These tests are related to the assumptions of classical linear regression model and they are for no autocorrelation, functional form, normality and homoscedasticity. In the current study we will employ LM Lagrange multiplier for no autocorrelation, Ramsey’s Reset test for appropriate functional form and model specification, Jarque-Bera test for the normality of residuals and heteroscedasticity test based on the regression of squared residuals and squared fitted values.

3.2.5. Stability Test for ARDL Model

To test the structural change in the ARDL model the graphs of CUSUM and CUSUM Squares are examined to know that they lies in the critical bounds or not. The graph proves the model stability and the long-run estimates. We will employ the CUSUM and CUSUMSQ to check the stability of the model in current analysis.

If the stability test of the given ARDL model will not be satisfied and CUSUM or CUSUMSQ values lie outside the critical bounds then Chow test may confirm the existence of structural break. We will employ Chow test and adopt the Gregory-Hansen (Gregory and Hansen, 1996a, 1996b) approach to diagnose the structural break in the model and to have the remedial measure for the structural breaks and shocks in the given time series data.

4. Empirical Estimates

In this section the empirical estimation results for the procedure to see the impact of fiscal policy on income inequality in Pakistan are presented.

4.1. Results of Augmented Dickey Fuller Test

To check the stationarity of the data ADF test was applied. The results of ADF test are shown in table 1.

Table 1: Results of Augmented Dickey Fuller Test

Variables	Level	First difference	Critical values of unit root			Decision	Order of integration
			1%	5%	10%		
GINI	2.02508	-5.6008*	-4.3393	-3.5875	-3.22923	Nonstationary at level but stationary at 1 st difference	I (1)
CEXP	6.04803 6	-4.65813*	-3.6210	-2.9434	-2.6102	Nonstationary at level but stationary at 1 st difference	I (1)
DEXP	1.97046	-3.767919*	-3.6329	-2.94840	-2.61287	Nonstationary at level but stationary at 1 st difference	I (1)
INDT	5.43997	-1.7866***	-2.6416	-1.9520	-1.61040	Nonstationary at level but stationary at 1 st difference	I (1)
FISCD	-0.90741	-7.58927*	-	-1.95168	-1.61057	Nonstationary at level but stationary at 1 st difference	I (1)
FINAND	-0.38522	-	-	-1.95206	-1.61040	Nonstationary at level but stationary at 1 st difference	I (1)
URBAN	-5.4062*	4.336305*	2.64167	-3.56288	-3.21536	Stationary at level	I (0)
			4.28458				

*Significant at 1%, ** Significant at 5% and *** Significant at 10%

Results of ADF show that the variable of urbanization (URBAN) is stationary at level while other variables are integrated at first difference. The estimation of this model through ARDL is fully justified as ARDL is the cointegration technique that can handle the issue of data stationarity at different orders. However if the data is stationary at second difference then the results would be unreliable. In the results of ADF test none of the variable is integrated at 2nd difference or above so results of ARDL would be reliable.

4.2. Results of ARDL Technique

The results of ARDL technique for cointegration based on Schwarz Bayesian Criterion (1,0,0,1,0,0,1) are shown in table 2.

Table 2: Results of ARDL Technique for Gini Coefficient

Variable	Coefficients	T-ratio, p-Value
GINI(-1)	0.74682	10.636, (0.000)*
CEXP	-1.0417	-1.2824, (0.214)
CEXP(-1)	1.7833	2.1027, (0.048)**
DEXP	-0.55029	-2.2661, (0.035)**
INDT	-0.15872	-0.2362, (0.816)
FISCD	0.10713	1.8980, (0.072)**
FINAND	0.010150	0.24561, (0.808)
FINAND(-1)	-0.10488	-2.7784, (0.012)**
URBAN	3.0631	4.1604, (0.000)*
R square = 0.98433		Adjusted R square = 0.97806
D.W statistic = 1.97		F-statistics = 157.0000 [.000]
*Significant at 1%, **Significant at 5%		

We have used the ARDL bounds test approach so the evidence of cointegration among the variables is given by F-statistic. If it lies above the upper critical bounds then there will be cointegration. Results of F statistic shows that there is cointegration between the variables, as the value of F-statistic lies above the upper bound. So the null hypothesis of no cointegration is rejected.

The zero value of Gini coefficient shows perfect equality and 1 shows perfect inequality, the positive signs of the coefficients of explanatory variables represent the increasing income inequality, so their negative signs are desirable. ARDL cointegration estimation proves that lag value of inequality is causing inequality in current period. The lag value of current expenditures, fiscal deficit and urbanization are responsible for increase in income inequality. However, development expenditures, lag value of financial development are reducing inequality. Impact of the indirect tax revenue is negative but it is insignificant. The results express that the model has a good explanatory power, i.e. 98 percent of variations in the Gini coefficient is caused by the explanatory variables.

Table 3: Results of ARDL Estimates for Long-run

Variables	Coefficients	T-ratio, p-Value
CEXP	2.9292	1.5699, (0.132)
DEXP	-2.1735	-2.745, (0.012)**
INDT	-.62690	-.22945, (0.821)
FISCD	.42313	1.7079, (0.103)***
FINAND	-.37416	-2.0900, (0.050)**
URBAN	12.0985	3.1870, (0.005)*
F-statistic = 5.9514		Significant at 95%
Lower bound = 2.4829		Upper bound = 3.9494
*Significant at 1%, **Significant at 5% and ***Significant at 10%		

The ARDL estimates for the long-run explain that fiscal deficit and urbanization have positive impact on income inequality. However the development expenditures and financial development are emerged as the decreasing factor of income inequality. Current expenditures and indirect taxes have shown insignificant effect.

4.3. Results of Error Correction Model (ECM)

After knowing that the variables in the model have long-run relationship, the next step was to investigate the short-run estimates. The short-run dynamics of the model are tested by ECM which

also explains that how much of the previous disequilibrium can be adjusted in current time period. The results of the ECM are shown in table 4.

Table 4: Results of Error Correction Model for Gini Coefficient

Variables	Coefficients	T-ratio, p-Value
dCEXP	-1.0417	-1.2824, (0.214)
dDEXP	-0.55029	-2.2661, (0.035)**
dINDT	-0.15872	0.2362, (0.816)
dFISCD	0.10713	1.8980, (0.072)**
dFINAND	0.010150	0.24561, (0.808)
dURBAN	3.0631	4.1604, (0.000)*
ECM(-1)	-0.25318	-3.4973, (0.002)*
R square = 0.7780		Adjusted R square = 0.6892
Durbin Watson Stat = 1.97		F statistics = 11.68(0.000)
*Significant at 1% and **Significant at 5%		

The short-run estimates by ECM have shown that fiscal deficit and urbanization are the increasing factors of income inequality. The ARDL estimation has already shown same type of effect in the long-run. So fiscal deficit and urbanization are responsible for increasing income inequality in Pakistan. The development expenditures have negative effect on income inequality in the short-run. Same type of effect is shown in the long-run ARDL results. It explains that fiscal policy with component of development expenditures is playing its role in reducing income inequality. The value of ECM is .25318 which shows that 25 percent disequilibrium will be adjusted in current period.

4.4. Results of Diagnostic Test

Diagnostic tests are essential for finding the accuracy and reliability of the empirical findings. The results of diagnostic tests are shown in table 5.

Table 5: Results of Diagnostic Test for ARDL Model for Gini-Coefficient

Test	Co-efficient, p-Value
LM Lagrange Multiplier for no autocorrelation	1.6418, (0.215)
Ramsey reset test for functional form	1.1715, (0.293)
Jarque-Bera test for normality	0.40919, (0.815)
Regression of squared residual and square fitted residual for heteroscedasticity	1.4409, (0.240)

The results of the diagnostic tests suggested that there is no autocorrelation in the model. The functional form of the model is correctly specified given by the Ramsey’s reset test. Jarque-Bera results show the acceptance of null hypothesis that all the estimates of model are normally distributed. It is also confirmed that there is no problem of heteroscedasticity in the given ARDL model.

4.5. Results for Stability of the Model

Stability of the model is tested by CUSUM and CUSUMSQ test. The graph of CUSUM indicates that it remains within the critical bounds but the graph of CUSUMSQ is out of the critical bounds so the model has the structural break (see Appendix A).

For the detection of structural break we employed the Chow Test. Results of Chow test are shown in table 6.

Table 6: Results of Chow Test

F-statistics = 149973	Prob. F(9,11) = 0.0000
Log Likelihood ratio = 339.8090	Prob. Chi-Square(9) = 0.0003
Wald Statistics = 134976	Prob. Chi-Square(9) = 0.0000

The results have expressed the existence of structural break at 2001. F statistic, log likelihood and Wald statistic indicate same results. So the alternative hypothesis is accepted, i.e. the existence of structural break.

4.6. Results of Gregory-Hansen Test

For confronting the problem of structural instability we incorporated Gregory-Hansen test.

$$D_{tk} = 0 \text{ if } t < k$$

$$D_{tk} = 1 \text{ if } t > k$$

Model 1: Cointegration with level shift

$$GINI = \mu_1 + \mu_2 D_{tk} + \beta_1 CEXP + \beta_2 DEXP + \beta_3 INDT + \beta_4 FISCDD + \beta_5 FINAND + \beta_6 URBAN + e_t \dots (6)$$

Model 2: Cointegration with regime shift

$$GINI = \mu_1 + \mu_2 D_{tk} + \beta_1 CEXP + \beta_{11} CEXPD_{tk} + \beta_2 DEXP + \beta_{22} DEXPD_{tk} + \beta_3 INDT + \beta_{33} INDTD_{tk} + \beta_4 FISCDD + \beta_{44} FISCDD_{tk} + \beta_5 FINAND + \beta_{55} FINANDD_{tk} + \beta_6 URBAN + \beta_6 URBAND + e_t \dots (7)$$

In the model of level shift a dummy is incorporated that shows a change in intercept after the structural break. The regime shift model shows the impact on each coefficient when dummy is multiplied by each variable included in the model.

The Gregory-Hansen Technique by incorporating dummy variable in the OLS test is applied for the remedy of structural break. The results are shown in table 7 and 8.

Table 7: Results of Gregory-Hansen Test (with level shift) for Structural Break at 2001

Variable	Coefficient	t-Statistic	Prob.
CEXP	-6.041169	-3.704122	0.0012*
DEXP	-2.402314	-4.366101	0.0002*
INDT	3.208536	2.057053	0.0517**
FISCDD	0.321851	2.148204	0.0430**
FINAND	0.071962	0.947536	0.3537
URBAN	125.8862	4.240853	0.0003*
DUMMY	-2.067890	-2.604604	0.0162**
C	-335.1303	-4.180753	0.0004*
R ² = 0.899294		Adj R ² = 0.867251	
F – stat = 28.06543		F- stat Prob = 0.000000	

*significant at 1% and ** significant at 5%

Table 8: Results of Gregory-Hansen Test (with regime shift) for Structural Break at 2001

Variables	Coefficients	t-stat	Prob.
CEXP	0.527437	4.400917	0.0005*
DEXP	0.057728	2.047926	0.0585**
INDT	0.211642	3.059660	0.0079*
FISCDD	0.002348	0.385924	0.7050
FINAND	-0.003372	-0.677849	0.5082
URBAN	30.31396	16.88762	0.0000*
DUMMY	75.63643	4.824409	0.0002*
DUM_GI	1.000000	13.27957	0.0000*
DUM_CEXP	-0.527437	-1.175275	0.2582
DUM_DEXP	-0.057728	-0.232086	0.8196
DUM_INDT	-0.211642	-0.468687	0.6460
DUM_FISCDD	-0.002348	-0.090047	0.9294
DUM_FINAND	0.003372	0.311728	0.7595

DUM_URBAN	-30.31396	-4.961765	0.0002*
C	-75.63643	-15.12549	0.0000*
R ²	0.999923	Adj.R ²	0.999850
F-stat	13847.04	F-stat Prob	0.000000
*Significant at 1%, **Significant at 5%			

The results of Gregory-Hansen test show that dummy coefficient is having negative sign. It shows that after structural break intercepts change downwards. Results of regime shift where intercept and slope coefficient change show that variables of Gini-coefficient and urbanization are significant while other variables are insignificant.

5. Discussion

The discussion of the findings is based on the results of table 3 where the explanatory variables have shown the effect in the long-run through ARDL technique.

The results have shown that development expenditures have a negative impact on income inequality in Pakistan. It is supported by the findings of Ali and Ahmed (2010). The explanation is based on the notion that the development affects are reaching the deprived class of the economy. The development expenditures create jobs and increase the incomes of the general people. It results into decreasing income inequality.

The fiscal deficit has increasing effect on income inequality in Pakistan. The fiscal deficit makes the government to take borrowings for deficit financing. The borrowing is not properly utilized which cause pushing down the growth rate and increasing the inflation. The phenomena enhance the income inequality in the economy. The other way of deficit financing used in Pakistan is printing of currency through State Bank of Pakistan. It also creates inflation and income inequality through lowering the purchasing power of the fixed income labor class.

The financial development has shown negative impact on income inequality. It explains that due to the financial development more credit is distributed to the private sector which increases the employment opportunities and choices. It reduces the income inequality. Furthermore, the financial development makes the loaning available to lower class which results into decreasing inequality in the economy.

Urbanization has a positive impact on income inequality. It explains the rural urban disparity. Urbanization rate in Pakistan is highest in South Asian countries. It is expected that urban and rural population would be equal in 2030. Wage differentials and good quality of life in cities compel rural people to migrate to urban areas. But the job opportunities in cities are already limited and migrants build pressure on the constrained job opportunities of the cities. The situation compels the migrants to live in slums and creating new slums in the cities. Deficit of houses and other social problems like lack of clean water and sanitation facilities make the lives of people miserable. So the urbanization process creates unequal classes even in the cities (Li and Zou, 2002).

6. Conclusion and Policy Implications

We have attempted to see the impact of fiscal policy on income inequality in Pakistan by ARDL approach. The empirical estimation shows that development expenditures as a component of fiscal policy is reducing income inequality in Pakistan. Financial development has also shown negative impact on Gini coefficient. On the other hand fiscal deficit and urbanization have shown increasing impact on income inequality.

To control the existing trend of income inequality in Pakistan it is recommended to enhance the ratio of development expenditures in the budget. Currently the ratio of such type of expenditures is not encouraging as in the last decade the development expenditures were 20 percent of the budget.

These development expenditures are distributed into public sector development program, rural support program, infrastructure, education and health projects. They may have the spillover effects, as in the current analysis urbanization has shown positive impact on income inequality. By providing the share of rural support program and allocating a significant part of the development expenditures in rural areas the income inequality may be declined.

The financial development has also emerged as an important tool to slide down the income inequality in Pakistan. The financial policy makers should further focus on financial development.

Fiscal deficit has also shown an increasing effect on income inequality. To narrow down the fiscal deficit, the current expenditures should be decreased as major part of the current expenditures goes to interest payments, defense expenditures and administration. The interaction of fiscal deficit, current expenditures and development expenditures with income inequality consequent on the point that current expenditures is the area needs government's attention. It will show a spreading effect on decreasing the income inequality in the economy. However, for decreasing fiscal deficit the tax revenue may also be increased.

Urbanization process is increasing income inequality in the economy. To reduce such type of effect development projects should be introduced in the rural areas.

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УДК 33

**Налогово-бюджетная политика и неравенство доходов в Пакистане:
ARDL подход**

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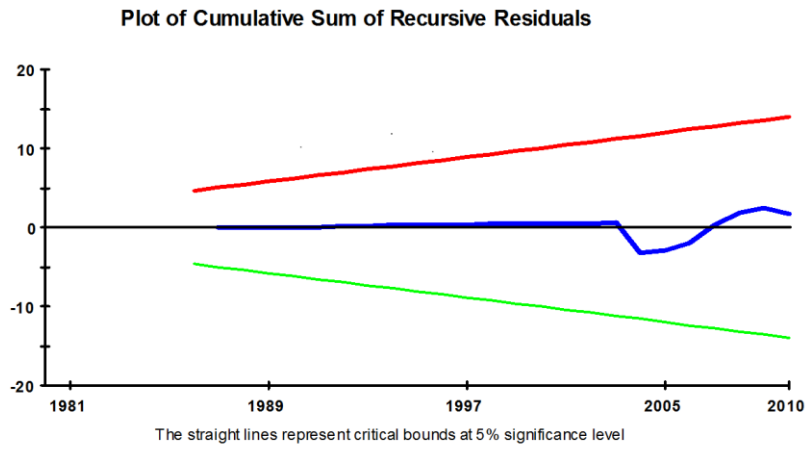
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Аннотация. Данное исследование – это попытка выявить влияние фискальной политики на неравенство доходов в Пакистане. Краткосрочная динамика контролируется моделью коррекции ошибок. Надежность модели протестирована с помощью диагностических тестов. Тест Чоу и техника Грегори-Хансена применяется для выявления структурных сдвигов. Результаты указывают на то, что расходы на финансовое развитие оказывают влияние на уменьшение неравенства в доходах. С другой стороны бюджетный дефицит и урбанизация влияют на неравенство доходов положительно. Текущие расходы от косвенных налогов не оказывают никакого влияния на коэффициент Джини. Исходя из полученных результатов исследования, рекомендуется следующее: бюджетный дефицит должен быть уменьшен за счет сокращения текущих расходов. Увеличение расходов по развитию потребует увеличения расходов по сокращению неравенства доходов. Возможность обеспечения финансового развития как инструмента снижения неравенства также рассматривается.

Ключевые слова: неравенство доходов, налогово-бюджетная политика, коэффициент Джини, ARDL, расходы по развитию, финансовый дефицит, финансовое развитие, урбанизация.

Appendix A
CUSUM of the model (Fiscal Policy and Income Inequality)



CUSUMSQ of the model (Fiscal Policy and Income Inequality)

