Income Inequality, Financial Development, and Macroeconomic Fluctuations

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CERTIFICATE

It is to certify that this thesis submitted by **Mr. Sajjad Hussain** is accepted in its present form by the Department of Economics, Quaid-i-Azam University, Islamabad as satisfying for the requirement for partial fulfillment of the degree of Master of Philosophy in Economics.

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Dedicated to

My Family and Teachers

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CONTENTS

Chapter 1

INTRODUCTION

Income distribution in Pakistan has been quite unequal. Data given in table 1 shows that in 1963-64, gini-coefficient for Pakistan was 0.3666 that reached to the level of 0.4129 in 2001-02. It was the lowest ever 0.3379 in 1970-71 and the highest ever 0.4187 in 1998-99. It is interesting to note that income inequality in Pakistan has been more perverse in urban areas than that in rural areas. Gini-coefficient for urban areas in Pakistan was 0.3698 in 1963-64 and 0.4615 in 2001-02. It was the lowest ever 0.3589 in 1985-86 and the highest ever 0.4615 in 2001-02. Gini-coefficient for rural areas in Pakistan was 0.3543 in 1963-64 and 0.3762 in 2001-02. It was the lowest ever 0.3005 in 1968-69 and the highest ever 0.4218 in 1990-91. It is important to note that variability in income distribution as measured by standard deviation of gini-coefficients has been greater in urban areas than that in rural areas of Pakistan over the period of this study.

Above figures show that income inequality in Pakistan is getting worse over time. It has occurred in spite of the fact that government introduced the special redistribution scheme of Zakat in early 1980s through out Pakistan. Since then government collects Zakat funds from rich people and disburses them directly to poor people of the society. It means that there must be some structural problems in the economy due to which income distribution has worsened even after the promulgation of Zakat system.

Due to such an undesirable change in income inequality, poor segments of the society are losing hope for better future. Rising income inequality is commonly believed to be degenerative for social, political and economic cohesion of the society. It gives way to a number of social evils like corruption, robbery, nepotism and discrimination. It also paves way for direct confrontation between 'haves' and have-nots' of the society that is in no way congenial for economic growth and welfare of the society. It is why policy makers in every country including Pakistan are giving high priority to eradication of poverty and income inequality.

There is a multitude of socio-cultural and economic factors that may have a direct or indirect effect on income distribution of a country. For example, social security system in place, social status of a family and cast system, political situation in the country and concerned region, geographic value of the locality definitely affect income distribution. It is therefore quite difficult to take into account all such variables in a manageable econometric model. Therefore, only few economic variables which previous authors have identified as probable determinants of income inequality are analyzed in this study.

In literature, three variables that are financial development, fluctuation in GDP growth rate and level of GDP per capita have been frequently mentioned as having significant influence on income distribution of a country or region. Since the objective of this research is to identify structural variables that have aggravated income inequality over time even after promulgation of interventionary redistributive scheme of Zakat, therefore, we have tried rigorously to identify any discernable relationship between income inequality with these often quoted determinants of income inequality.

There is ample evidence that a well-functioning financial system that is easily accessible by masses of a country or region spurs economic growth and levels income distribution. It can be understood by imagining a financially underdeveloped and a financially repressed system where information asymmetries are high, transaction costs are unaffordable and contract enforcement is lax. In such circumstances, bank loans go mostly to rich borrowers because they can get around the problem of information asymmetry to a great extent by affording valuable collaterals and high net worth against bank borrowings.

On the other hand, bank officials ration out poor entrepreneurs who lack collaterals and connections with high-ups even if they chalk out promising investment projects. As a result, they remain poor because they were born poor even if they possess excellent business capabilities and they come up with worthwhile economic projects. It is therefore hypothesized that financial development ameliorates the worries of entrepreneurs belonging to lower-income class relatively more and thus bridges out income gap in the society.

The link between income distribution and output variability is established looking at the economic history of various nations. It has been observed in a number of Latin American countries that the higher is output variability of a country, the worse is income distribution in that country. Therefore, the proposition that variability in GDP of a country adversely affects its income distribution has been tested empirically for Pakistan as well.

Relationship between GDP per capita and income inequality is derived from the 'trickle–down' theory proposed by Kuznets (1955). According to this theory, high economic growth initially benefits rich segments of a society mostly industrialists. Benefits of economic growth 'trickle down' to working class only after rich industrialists indulge in mass production and conspicuous consumption. Therefore, it is hypothesized that an increase in GDP per capita worsens income inequality in the short run.

For empirical analysis of income inequality, most of the previous studies have used cross-country data probably due to shortage of time series data for a single country or region But the fact is that cross-country data does not completely incorporate special socio-political features of respective countries or regions, which may strongly affect relationship between income inequality and independent variables. Therefore, results based on cross-country data may not be so reliable. It means that analysis of income inequality on the basis of time-series data is highly imperative. This study is meant to investigate statistically significant determinants of income inequality on the basis of time-series data for Pakistan. Since published time-series data consists of only 17 discontinuous observations that are definitely inadequate for statistical reliability, therefore we have generated data by simple interpolation for those intervening years for which published data is not available.

The remainder of the study is organized as follow. Chapter 2 reviews relevant literature on the subject. Chapter 3 discusses variables that are used in our model of income inequality, mentions their data sources and highlights the methodology of this research. Chapter 4 presents descriptive analysis of income inequality in Pakistan. Chapter 5

carries empirical results of regression equations and their discussion. Concluding remarks and policy implications are given in the last chapter.

Chapter 2

REVIEW OF LITERATURE

There are a number of socio-political, financial and economic factors that influence income distribution in one way or the other. It is a too big task for this study to identify and quantify all such factors and then to analyze their affect in a meaningful way. Therefore, to keep it simple and manageable, few economic and financial variables that previous studies have found relevant to explain income distribution have been selected. These variables are the level of financial development, fluctuations in GDP and GDP per capita. This chapter is divided into four sections. In first three sections, mostly those studies have been quoted that illustrate the importance of each of the three explanatory variables. The fourth section mentions some studies that are interesting to review but do not fall in the category of any of the first three sections of this chapter.

2.1 Financial Development and Income Distribution

Financial development has important effect on income distribution. There are two schools of thought concerning the relationship between finance and income inequality. One school of thought suggests a non-linear 'inverted U-shaped' relationship between finance and inequality. In their pioneering work, Greenwood and Javanovic (1990) developed a relationship between financial development, growth and income distribution. They have argued that financial intermediation and growth are endogenously determined. Financial development stimulates growth by providing higher rate of return to be earned on the

capital. On the other hand, growth provides the means to implement costly financial structure.

They have developed a model that predicts a nonlinear relationship between financial development and income inequality during the process of economic development. At the early stages of economic development, only the rich can afford to access financial markets, which means that at lower levels of economic development, financial development raises income inequality and at higher levels of economic development, financial development benefits an increasing proportion of society and thus it makes income distribution more equitable.

In contrast to the inverted U-shaped relationship predicted by Greenwood and Javanovic (1990), Galor and Zeira (1993) and Baneerjee and Newman (1993) suggest a negative and linear relationship between financial development and income inequality. Their argument is that financial development helps the poor raise their standard of living irrespective of the level of development. It means that the level of financial development remains an important determinant of income inequality at all level os economic development.

Galor and Zeira (1993) model the dynamic evolution of income distribution in an economy with indivisibility in human capital investment, where agents live for two periods, and generations are linked through bequests. Agents can either work as unskilled labour for both periods, or make an indivisible investment in human capital while being young in the first period and then work as skilled labour in the second period. However, due to financial market imperfections, only agents with sufficiently large inheritance or

with high income levels can afford to invest in human capital and make their children skilled workers and rich people of the society in future, while poor agents cannot afford, due to paucity of funds, to impart high skills to their children, therefore they remain unskilled and poor in future. Therefore, initial wealth distribution matters a lot for income distribution. of an economy. . Since inequality in wealth perpetuates through bequests over generations, therefore, in the long run, there will be a polarization of wealth between high-income skilled workers and low-income unskilled ones. Consequently the rich/educated families will converge to high-income steady state, whereas the poor/uneducated ones will converge to the low-income steady state within the same economy.

Similar predictions can also be found in the model of Baneerjee and Newman (1993) that correlates the dynamics of wealth distribution with financial market imperfections. The model shows that opportunity for investment in high return projects may be restricted to those individuals who own wealth greater than a threshold level. More specifically, under the imperfect financial markets, only agents with wealth in excess of this threshold level may undertake high return mega investment projects while those with inadequate wealth will not. As a result, an initially rich family will get richer and richer through their investment in high return projects while an initially poor family having no access to credit markets will remain poor.

Another study by Perotti and Claessense (2005) investigates that income inequality could itself be a hindrance to productive financial reforms and financial development when powerful interest groups can block or manipulate reforms so as to capture their benefits

for themselves while avoiding their costs. In other words, if financial development leads to the expansion of already financially sound economic entities at the cost of weaker ones, because being tactful the former are able to socialize the costs of investment while retaining most of its benefits, then financial reforms can actually worsen distribution of income and wealth.

Liang (2006) examines empirically the impact of financial development on income inequality in rural China, using Chinese provincial data over the period of 1991-2001 and applies the generalized method of moment (GMM) technique. The ratio of the total loans to rural GDP is used as the proxy for the financial development. He tests the linear hypothesis suggested by Galor and Zahira (1993) and Banerjee and Newman (1993). In addition to the financial variable, he uses real GDP per capita in rural areas, government expenditure in agriculture as a ratio of GDP and development level of the town and village enterprises (TVE) measured by the ratio of TVEs employment to total labour force as explanatory variables. The study reveals that financial development has reduced income inequality in China. However, when the squared terms of financial variable and GDP per capita are included in empirical estimations to test the non linear relationship between finance and income inequality, then results show that the coefficient of financial variables are always insignificant and even have the wrong signs.

Li, Squire and Zou (1998) examine the relationship between financial depth and income inequality using dataset of gini coefficients for 40 developed countries. They come up with similar results that better functioning financial markets are strongly associated with lower income inequality.

The specification of Li and Zou (2002) analyze with the level of the Gini as the dependant variable and controls that include inflation, financial development, government spending and openness. Their results suggest that, higher inflation would lead to lower inequality, whereas higher government spending, improved financial sector, and better education would lower it. Similarly, in another cross-country study, Calrke, Xu and Zou (2003) analyze the relationship between finance and income inequality. They also find that income inequality is lower in countries with developed financial sectors, and that income inequality further decreases as economies develop their financial intermediaries.

Using broad cross-country comparison Beck, Demirgue-Kunt and Lavine (2004) examine the relationship between financial development, changes in the distribution of income and changes in the level of poverty. They use two specifications to investigate the relationship between finance and income distribution and two additional specifications to examine the finance-poverty eradication nexus. First, the paper examines the impact of financial development on growth rate of income of each economy's poorest 20 percent. The paper assesses the effect of finance on income growth of the poor while controlling for average per capita GDP growth. Second, they examine the distributional consequences of financial development by examining the growth rate of gini coefficient. The growth rate of gini coefficient measures the deviations from the perfect income equality. In their third specification they test weather financial development has any impact on poverty beyond its impact on average per capita growth. Finally they use same experiment by using the growth rate of Poverty Gap measure.

The paper finds that financial development boosts the income of poor and hence reduces income inequality. Countries with better-developed financial intermediaries experience faster decline in measures of both poverty and income inequality. Greater financial development induces income of poor to grow faster than GDP per capita, income inequality to fall more rapidly, and poverty rates to decrease at a faster rate.

2.2 Macroeconomic Fluctuations and Income Distribution

A well-documented study by Caroli, Eve and Penalosa (2004) suggests that volatility in output can affect income distribution if agents with different endowments have different attitudes towards risk. For illustration of their point of view, they consider an economy with workers and entrepreneurs, and suppose that entrepreneurs are less risk-averse than workers. They also suppose that entrepreneurs have access to the industrial technology, which is subject to random aggregate shocks. It means that due to random occurrence of technology shocks, marginal product of workers also fluctuates from period to period. Therefore, workers being risk averse would themselves be willing to accept fixed wages less than their average productivity in order to avoid uncertainty of non-fixed wages that must be linked with fluctuating marginal productivity and technology shocks. In other words, entrepreneurs, by virtue of being less risk-averse, can capture the risk-premium of fixed wages, and thus increase their share of income. It means that the more volatile is the technology, the larger will be the risk-premium, which workers would be willing to pay to have fix wages. It shows that income inequality will worsen over time between entrepreneurs and workers due to their different attitudes towards risk..

In another study Garcia-Penalosa and Turnovsaky (2005) examine the effect of production technology on average growth rates, its volatility and the distribution of income when individuals have an elastic supply of labour. As is well known about such real business cycle type of models, a technological progress and consequent increase in output has two conflicting affects, income and substitution effects, on supply of labour and thus on income of labour. For realistic values of the degree of risk-aversion in their view, the income effect dominates. It means that a technological progress reduces supply of labor. Consequently the relative share of capital in output increases that, in turn, accelerates capital accumulation. In short, faster technological progress and economic growth raises the income share to capital and reduces the income share of labor even though the wage rate keeps on increasing. .

An alternative mechanism, explored by Checchi and Penalosa (2004), focuses on effects of attitude towards risk on human capital formation. For illustration, the authors suppose that output fluctuates due to technology shocks and at least a part of this risk or fluctuation in output is passed on to wages because, in neoclassical framework, wages must be equal to average productivity of labor. In such an environment, decision of young individuals, whether to invest or not to build up their human capital, depends upon the amount of bequests from their parents and the amount they borrow from financial intermediaries.

If agents have decreasing absolute risk-aversion, then inherited wealth acts as an insurance mechanism, so that only those individuals would undertake risky investment to build their human capital who either have sufficiently high inheritance or have

sufficiently high net worth or collaterals to borrow from financial intermediaries. As future earnings that are closely linked with GDP fluctuate more, the risk premium on human capital also increases. As a result, the level of inheritance required to build up human capital directly or to afford bank borrowing on the basis of high net worth and collaterals also rises. It means that the poor who are born with meager inheritance value become even poorer as they cannot invest in human capital formation. Therefore, an economy with greater variation in its GDP level would exhibit fewer years of education for overall population, particularly for its poor people and thus would end up with ever-worsening income distribution.

In an empirical analysis, Breen and Garcia-Penalosa (2005) explored the impact of macroeconomic volatility on the distribution of income using cross-section sample of 80 developed and developing countries of the world. In their estimation, they have measured macroeconomic volatility of a country by standard deviation of the growth rate of output. The paper reveals that output volatility along with labour market rigidities seem to be the major determinant of a country's degree of inequality. Instead of acknowledging the traditional trickle-down theory, they have suggested the opposite. That is, distributional equity should be given priority through redistributive and regulatory policies that, in turn, would enhance GDP growth by removing labour market rigidities and enhancing macroeconomic stability.

For empirical estimation, they have calculated annual growth rates of real GDP over the period of 1960 to 1990. Then they have calculated standard deviations of annual growth

rates over 30-years. The main result of their paper comes out that greater volatility is associated with higher degree of income inequality.

2.3 GDP Per Capita and Income Distribution

It is well known in economic development literature that economic growth is a necessary but not a sufficient condition for economic development. If GDP per capita of a country increases but income inequality worsens at early stages of development of an economy as predicted by 'trickle-down' theory by Kuzznet (1955), then growth and development level of the country move in opposite directions. Economic development requires a higher real GDP per capita and amelioration of income inequality.

According to 'trickle-down' theory, benefits of economic growth first go to the rich and then in the second round, when the rich indulge in conspicuous consumption and mass production, go to the poor. Thus, the poor benefit from economic growth only indirectly through a vertical flow of income from the rich to the poor. It implies that proportional benefits of growth going to the poor will always be less than what they would be if the poor workers are paid according to their contribution.

Ali and Tahir (1999) have analyzed the long run relationship between GDP per capita, poverty and income inequality in Pakistan. They developed consistent time series estimates of rural and urban poverty for 14 years. Since the time series data of poverty consisted of only 14 observations, therefore they pooled rural and urban data to make 28 observations. By using 28-pooled observations, then they estimated poverty elasticity of growth and poverty elasticity of income inequality.

The authors also analyzed relationship between GDP per capita and poverty, and between GDP per capita and income inequality and interaction among these three variables. There results show that income inequality worsens as GDP growth rate increases and poverty level increases income inequality increases. The study concludes that GDP per capita has always helped reducing poverty level but it has always worsened income inequality at national level, particularly more in rural areas. Increase in income inequality, keeping GDP per capita unchanged, has caused poverty to rise more in urban areas than in rural areas.

Jamal (2004) has also investigated the impact of GDP per capita and income inequality on poverty level. Since continuous time series data on income inequality and on poverty is not available for Pakistan, therefore the author has used the interpolated time series data on income inequality and on poverty. To generate time series date, at first, a quadratic curve is fitted on actual observations by taking log of the poverty measure and then by taking log of gini coefficients on time and time square variables. As a result he obtains the time series data on gini coefficients and population below the poverty line. His poverty measure is based on headcounts below the poverty line> his analysis is spread over the period of 31 years, 1973 to 2003.

The study reveals that elasticity of poverty with respect to various measures of income inequality is negative and statistically significant. Also its magnitude is relatively greater than elasticity of poverty with respect to GDP growth.

2.4 Some Other Studies Related to the Topic

Humberto and Lopez (2003) try to assess from a cross-country perspective, the impact of the series of policies on inequality. However it has already proved that in growth literature these series of policies have empirically significant effect on growth. Rather than constructing a new inequality model, this paper builds on existing empirical growth model and the estimation results are based on a dynamic model.

This paper finds that improvement in education and infrastructure, and lower inflation levels improve both GDP growth rate and income distribution and reduce poverty. The paper also concludes that financial development, trade openness and size of government budget have positive impact on GDP growth rate and income inequality. Furthermore, the paper has assessed whether the indirect negative impact of these policies on income inequality through improvement in GDP growth is offset by their direct positive impact on income distribution. The paper finds that pro growth policies have been proved to be pro poor in the long run but anti poor in the short run.

Using time series data, Nath and Mamun (2004), attempt to examine the interrelationship among trade liberalization, growth and income inequality in Bangladesh. Their results from vector autoregressive (VAR) model suggest that there is no evidence that trade liberalization has accelerated GDP growth. However, according to their results, trade openness promotes investment. The paper has not found any strong evidence that trade liberalization affects income distribution.

Amjad and Kemal (1997) analyze the impact of macro economic polices on poverty alleviation. It is the first attempt in Pakistan to explain the poverty trend with the help of macro economic determinants. They provide a consistent time series data on poverty for the period 1963-64 to 1992-93 for both rural and urban areas. The paper explores the influence of such factors as economic growth, agriculture growth, terms of trade for the agriculture, industrial production, rate of inflation, employment, wages, remittances and tax structure on poverty. Given that the number of observations was quite limited in their study, the authors employ simple one variable regression analysis. Using double log transformation they regress one exogenous variable at a time on poverty incidence.

They find that real GNP per capita, real remittances per capita, real wages in manufacturing, total labour force as percentage of total population and real subsidies per capita are statistically significant determinants of poverty and signs of all these explanatory variable are as expected. The paper concludes that the Structural Adjustment Program has tended to increase poverty levels. The paper also outlines some strategies for poverty eradication. Besides other safety nets, promotion of informal sector enterprises has been emphasized.

Ehtisham and Ludlow (1989) examine the impact of GDP growth rate on poverty and income inequality. Being critical of earlier methodologies to estimate poverty in Pakistan mainly because income levels that are too 'arbitrary' are chosen to estimate poverty, and being critical of the idea that income level, which correlates poorly with living standards, the authors argue to estimate poverty for using some correlates of living standards. They are also critical of the approach towards income inequality estimates, which, they believe,

has been estimated somewhat mechanically. The purpose of the paper is to improve upon the methodology and drive estimate of poverty and income inequality systematically. Using a range of poverty lines to examine the sensitivity of cut-off points and providing some points of comparison of the incidence of poverty over time, the authors present estimates of Sen index.

Besides theoretical improvement of poverty estimation, another important contribution of this paper is that it disaggregates data at provincial, urban and rural levels. The authors have rightly focused their attention on poor population in each province. Their results suggest that at national as well as at provincial levels, overall there has been an absolute and relative decline in living conditions of the poor. Their results for income inequality measured by gini coefficients show that only marginal improvement in income distribution has been observed. However, using different indicators of income inequality and further disaggregating data by district level, their results show a large variation in income inequality over time.

The results at provincial level for the period 1976 to 1985, show that extreme poverty increased in most rural and urban areas of NWFP and Balochistan while income inequality in urban SIndh and urban Punjab improved over this period. Overall the authors conclude that due to high growth since the 1960s, there has been an improvement in living standards that had a favorable impact on poverty and income distribution in Pakistan.

Jafri, et al (1995) analyzes trends in income inequality and poverty during the period 1979 to 1991 in Pakistan. Gini coefficients and income shares for different income

groups are used to show the changes in income inequality over this period. The study concludes that income inequality decreased over the period 1979-87, but then worsened over the period 1988-91. Gini coefficients in the period 1979-87 fell slightly while the ratio of income shares of the highest 20 percent population to the lowest 20 percent population improved slightly. Their results also show that income inequality is worse in urban areas than in rural arrears. The results of this study are consistent with those of other studies, where it is seen that the incidence of poverty had increased over this time period, with far greater worsening in urban areas.

Chapter 3

VARIABLES, DATA AND METHODOLOGY

This chapter describes possible proxies for dependent and independent variables of this research, mentions data sources for selected proxies of respective variables and finally chalks out econometric methodology for empirical estimation. It is divided into five sections. First section talks about various measures and data sources of dependent variable that is income inequality. Second section proposes a practical measure of financial development and its data sources. Section three comes up with a naive measure of fluctuations in GDP growth rate. Section four mentions data sources of GDP per capita. Final section discusses various methodologies to identify statistically significant determinants of income inequality.

3.1 Income Inequality

Many approaches exist for the measurement of income distribution across regions and groups. The most commonly used measures of income inequality include gini coefficient; decile ratio or the proportion of total income earned by the bottom 20%, middle 60% and top 20% of population. Gini coefficient is the area between Lorenz curve and perfect equality line. Gini coefficient for any country can take value between 0 and 1. When the value of Gini coefficient is 0, this means that there is no income inequality and each individual in the economy has same level of income. When the value of Gini coefficient

is 1, this indicates that there is perfect income inequality and only one individual has the whole income of the economy and every one else has zero income.

The gini coefficient satisfies four important properties of a good measure of income inequality: anonymity, scale and size independence and Pigou-Dalten principle of transfer. Anonymity implies that identity of the rich and the poor should not bring any change to inequality measure. For example, if Zaid moves to low-inome population and Umar moves to hig-income population, then inequality measure should not change. Scale independence means that the gini coefficient does not change with the size of economy. The level of income inequality may be same in a small economy, say a US$ one billion economy, and in a large economy, say a US$ one trillion economy. Population independence implies that population size of a country does not matter. The level of income inequality may be same in a small economy, say a one million people economy, and in a large economy, say a one billion people economy. Pigou-Dalton principle of transfer requires that whenever some income is transferred from a rich person to a poor one but such a transfer does not reverse the ranking of two individuals, then the measure of inequality should decrease.

Besides all these qualities, a major limitation of gini coefficient is that, it is more sensitive to the middle part of population than to either of the two extreme parts of population. It is therefore important to use some other measures of income inequality that give more weightage to either or both extreme ends of population. Therefore we have used two other income inequality measures. One is the income share of the poorest 20 percent of population, and the other is the ratio of income shares of the richest 20 percent

to the poorest 20 percent of population. Above measures of income inequality are calculated using data given in various issues of Household Income and Expenditure Surveys (HIES) published by the Federal Bureau of Statistics (FBS).

FBS conducted its first HIES in 1963 and 17 more surveys with unequal intervals up till 2006. Various authors have calculated gini coefficients and income shares of each quintile either using family income or household expenditures or per capita income, and either taking grouped data or primary data for some of the years when HIES was conducted. Some authors have improved their inequality measures by using income tax data.[1] Therefore, to have a consistent measures of income inequality, we have adopted inequality measure of Anwar (2005) who has used household income and grouped data to calculate income inequality measures for all years when HIES was conducted except the last one in 2006.

3.2 Financial Development

To measure financial development, previous studies have used domestic private credit to GDP ratio, liquid liability to GDP ratio, bank credit to GDP ratio and M2 to GDP ratio. Among these measures of financial development, private domestic credit to GDP ratio has been used most often. Therefore we have also used this measure as a proxy for financial development.

Domestic private credit equals the value of credit by financial intermediaries to private sector divided by GDP. This measure excludes credits issued by the central bank and

[1] See Anwar (2005) table.1 for more details.

development banks. Furthermore, it excludes credit to state-owned enterprises and cross claims of one group of intermediaries on another. Thus, private credit shows the amount of credit channeled from private savers, through financial intermediaries, to private firms. The data on domestic private credit has been collected from various issues of International Financial Statistics (IFS), various issues of World Development Indicators (WDI) and various issues of Economic Survey of Pakistan.

3.3 Macroeconomic Fluctuations

In their multi-country analysis, Richard and Penalosa (2005) have used standard deviation and variance of growth rates of real GDP as an indicator of macroeconomic fluctuations. Since we want to examine statistically significant determinants of income inequality only for Pakistan for which annual growth rates of real GDP render only single observation of standard deviation, therefore we have used the square of the difference between respective year's annual growth rate of real GDP and annual average compound growth rate of real GDP for the whole period of this study, 1963-2001, as a proxy for macroeconomic fluctuations. This variable has been worked out by the researcher himself on the basis of data given in various issues of Economic Survey of Pakistan.

3.4 GDP Per Capita

Real GDP per capita is one of the important determinants for economic development. It is defined as the gross domestic product divided by midyear population and then deflated by corresponding inflation rate. We have taken data on this variable from World Development Indicators (2006).

3.5 Econometric Methodology

We have tested the following model to determine statistically significant arguments of income inequality in Pakistan

$G = f(FD, MEF, Y)$

where G stands for a measure of income inequality, FD represents a measure of financial development, MEF indicates macroeconomic fluctuations or variation in growth rates of real GDP and Y represents GDP per capita.

We have estimated the linear form of this relationship as given below: -

$$G = \alpha + \beta FD + \gamma MEF + \delta Y + \mu \qquad (1)$$

Where the intercept term, α, captures the effect of all theoretically relevant variables for this model but missed in this specification, β is the coefficient of FD variable, γ is the coefficient of MEF variable, δ is the coefficient of Y variable and u is the error term with standard assumption of zero expected value, constant variance and no serial correlation.

On the basis of results of previous researches, the sign of β is expected to be negative which means that financial development reduces income inequality. On the other hand, the signs of γ and δ are expected to be positive which indicate that output volatility and GDP per capita further widen the existing level of income inequality.

The model has been estimated thrice; at first taking gini coefficients as the measure of income inequality, then income share of the poorest 20% population and at last the ratio of income shares of the richest 20% to the poorest 20% population. Taking each measure

of income inequality, the regression is fit for overall Pakistan as well as for its rural and urban areas

Chapter 4

Profile of income inequality in Pakistan

Before looking into determinants of income inequality, it may be interesting to have a cursory look of the state of income inequality in Pakistan. After independence in 1947, the first household income and expenditure survey (HIES) that provided the basic data to assess income distribution in the country was conducted in 1963. Since then it has been continuing but with irregular intervals. So far, 18 such surveys have been carried out.

Various authors have measured income inequality by using different criteria and for different years on the basis of data mainly contained in these surveys but occasionally supplemented by income tax data and other sources. The whole list of such studies and a brief description of each of them is given in Anwar (2005). Therefore, to ensure consistency, this research has adopted inequality measures that are gini coefficients and income shares by quintile from Anwar (2005). The following summary tables are prepared on the basis of detailed data given in that study.

These tables show three alternative measures of income inequality; gini coefficients, income share of the poorest 20% population and the ratio of income shares of the richest 20% population to the poorest 20% population. Average, maximum and minimum values of each of these measures of income inequality are reported for overall Pakistan and for

its rural and urban areas in table1. The table also shows standard deviation of each measure around its average value over the whole period of this study, 1963-2001. Table 2 repeats the same exercise as in table 1 for each of the four decades of the study. Table 3 presents simple correlation of each of the three measures of income inequality with each of the explanatory variable for overall Pakistan and for its rural and urban areas.

Table 1: Profile of Income Inequality over 1963 – 2001 in Pakistan

	Inequality measures	Mean	Maximum	Minimum	Standard deviation
Pakistan	**Gini**	0.3738	0. 4187	0.3379	0.0252
	PR	7.22	8.04	6.07	0.56
	RTP	6.28	7.83	5.25	0.76
Rural area	**Gini**	0.3483	0.4218	0.3005	0.0293
	PR	7.61	8.54	6.00	0.72
	RTP	5.70	8.10	4.56	0.88
Urban area	**Gini**	0.3899	0.4615	0.3589	0.0299
	PR	7.12	7.72	6.59	0.35
	RTP	6.55	7.80	5.80	0.63

Source: Calculations by the researcher on the basis of data given in Anwar (2005)

The following abbreviations are used in all tables of this research.
Gini is the gini coefficient
PR is the income share of poorest 20 percent population
RTP is the ratio of income shares of richest 20 percent to poorest 20 percent population
FD is the private domestic credit to GDP ratio
GDPP is the real per capita GDP
GR is the GDP growth rate
MEF is the variable for macroeconomic fluctuations

Table 1 shows all three measures of income inequality for overall Pakistan and for its rural and urban areas over the whole period of this study 1963-2001. If we look at the mean value of gini coefficient, it has been greater in urban area than that in rural area of Pakistan. Last column of the table that shows standard deviation of each income inequality measure around its mean value indicates that variation in gini coefficient has been worse in urban area than that in rural area.

When we examine the average income share of poorest 20 percent population, we find that it has been smaller in urban area than that in rural area. Its standard deviation has also been smaller in urban area than that in rural area. The ratio of income shares of richest 20 percent population to poorest 20 percent population has been smaller in rural area than that in urban area. However, its standard deviation has been smaller in urban area than that in rural area.

All three measures of income inequality show that income inequality generally is higher in urban area than that in rural area. It may be because of the fact that urban labour force is more diversified in terms of skill, education, union membership and minimum wage law. Thus, wage income in urban areas is more unevenly distributed than that in rural areas. Likewise, income from self-employment is more concentrated in urban areas than that in rural areas because urban self employment ranges from wealthy businessmen to poor workers whereas bulk of the rural self employed is almost homogeneous in informal sectors.

Table 2: Decade-Wise Profile of Income Inequality in Pakistan

	Pakistan			Rural area			Urban area				
	Gini	PR	RTP	Gini	PR	RTP	Gini	PR	RTP	FD	GR
1960s											
Mean	0.355	7.59	6.71	0.327	7.99	5.17	0.386	7.31	6.37	25.4	7.61
Max	0.367	7.91	6.80	0.342	8.52	5.87	0.407	7.72	7.03	26.3	11.4
Min	0.339	7.28	6.55	0.301	7.35	4.56	0.369	6.84	5.84	23.1	5.4
St.dev	0.014	0.32	0.12	0.025	0.07	0.61	0.019	0.05	0.53	1.32	2.63
1970s											
Mean	0.364	7.67	6.60	0.335	7.74	5.46	0.390	7.19	6.51	23.6	4.72
Max	0.395	8.04	6.79	0.355	8.54	6.49	0.412	7.53	7.13	29.1	10.2
Min	0.338	7.19	6.47	0.306	6.53	4.62	0.369	6.80	5.96	19.2	0.47
St.dev	0.029	0.44	0.17	0.026	1.06	0.95	0.022	0.37	0.59	2.92	3.04
1980s											
Mean	0.366	7.46	6.68	0.336	8.07	5.22	0.373	7.25	6.21	26.0	6.29
Max	0.380	7.67	6.91	0.353	8.39	5.65	0.384	7.44	6.67	29.8	7.92
Min	0.358	7.10	6.54	0.323	7.66	4.89	0.359	6.90	5.96	24.0	4.46
St.dev	0.010	0.27	0.16	0.013	0.33	0.34	0.013	0.23	0.33	1.94	1.23
1990s											
Mean	0.397	6.60	7.30	0.377	6.98	6.54	0.404	6.88	6.76	23.9	3.95
Max	0.417	7.11	7.47	0.422	7.24	8.11	0.462	7.04	7.80	25.5	7.71
Min	0.360	6.07	7.03	0.352	6.00	5.84	0.362	6.59	5.94	22.0	1.01
St.dev	0.022	0.33	0.18	0.024	0.48	0.90	0.042	0.35	0.39	1.17	1.91

Source: Calculations by the researcher on the basis of data given in Anwar (2005)

Table 2 gives decade-wise comparison of all measures of income inequality because a single measure for the whole period hides the transition process that is essential for understanding the incidence of income inequality and may be useful for policy purposes. Therefore, the whole period of study 1963-2001 is divided into four decades; 1960s, 1970s, 1980s and 1990s. The last decade of 1990s also include the year of 2001. Information for each decade in table 2 is exactly like the one in table 1 for the whole period

The decade-wise comparison shows that gini coefficient for overall Pakistan in the 1990s turns out to be the highest and in the 1960s to be the lowest. It means that income inequality has consistently worsened over time. It seems at odds with the fact that government of Pakistan has been operating the system of Zakat in the economy since early 1980s. The Zakat system is categorically meant for poverty alleviation. Since poverty and income inequality move generally in the same direction, therefore one should rightly expect that income distribution in the country would have improved over time particularly after 1980s. The standard deviation of gini coefficients had been the highest in 1970s and lowest in 1980s which means that changes in income distribution had been the most in 1970s and least in 1980s.

Looking at rural and urban figures for gini coefficients and their standard deviations, it is interesting to note that the pattern of income inequality in rural area is exactly like the one for whole Pakistan. However, for urban area, the highest gini coefficient is for 1990s as for overall Pakistan and its rural area, but the lowest gini coefficient had been for 1980s unlike for overall Pakistan and its rural area where it was lowest in 1960s. It may

be due to better implementation of Zakat system in urban areas in initial years of its promulgation. Looking at the variation in gini coefficients, it was highest in urban area in the 1990s.

The income share of poorest 20 percent population for overall Pakistan had been the highest in the 1970s than any other decade. In contrast to this, income share of poorest 20 percent for overall Pakistan and its rural and urban areas was the lowest in 1990s. The standard deviations for over all Pakistan and for its rural and urban area show that the income share of the poorest 20 percent population varied more in the 1970s than in any other decades.

At national level, 1970s turned out to be the best decade for the poorest 20 percent population in Pakistan as their income share was the highest during that decade. However, the same is not true for rural and urban areas of the country. In rural area, the income share of poorest 20 percent population had been the highest in the 1980s whereas in urban area, it had been the highest in 1960s. Standard deviation of income shares of poorest 20 percent population had been the highest in 1970s for overall Pakistan and for its both rural and urban areas, which shows that income share of the poorest 20 percent varied the most in that decade. It could be attributed to pro-poor policies of Pakistan Peoples' Party that had been in power from early 1970s till 1977.

In overall Pakistan and it rural and urban areas, the ratio of income shares of 20 percent poorest to 20 percent richest population had been the highest in 1990s. This suggests that the gap between the rich and the poor had been the highest in 1990s for overall Pakistan

and it rural and urban areas. The standard deviation of this variable had been the most in 1990s for overall Pakistan but for rural and urban areas it had been the highest in 1970s.

The worsening of income inequality during the 1990s may be due to the fact that the adjustment policy reforms funded notably by International Monetary Fund and World Bank were aimed primarily at reducing current and fiscal deficits and removing policy distortions without duly taking into account adverse distributional consequences. Therefore, such macro policies inflicted an adverse effect not only on the incidence of poverty but also on the extent of income inequality.

It is important to note from table 2 that all income inequality measures increased from 1960s to 1970s while the private domestic credit to GDP ratio declined over that period. Income inequality remained almost same from 1970 to 1980 while financial development increased significantly over that period. Moreover, income inequality increased significantly from 1980s to 1990s but financial development decreased over that period. It shows that a high level of income inequality has been mainly accompanied with low level of financial development.

It can also be seen from the table that income inequality had been the lowest in 1960s when average GDP growth rates had been the highest. Moreover, income inequality increased from 1960s to 1970s while the average GDP growth rate declined over this period. However, income inequality remained almost same from 1970s to 1980s but GDP growth rate was increased significantly. Finally, income inequality increased significantly from 1980s to 1990s while GDP growth rate decreased significantly over that period.

Table 3: Simple Correlation of Various Measures of Income Inequality with Independent Variables

	Inequality measures	FD	GDPP	MEF
Pakistan	GINI	-0.46	0.64	0.21
	PR	0.48	-0.71	-0.14
	RTP	-0.52	0.71	0.06
Rural area	GINI	-0.47	0.59	0.15
	PR	0.51	-0.43	-0.09
	RTP	-0.48	0.48	0.03
Urban area	GINI	-0.47	0.28	0.03
	PR	0.42	-0.42	-0.03
	RTP	-0.48	0.35	0.07

Source: Calculations by the researcher on the basis of data given in Anwar (2005) and various issues of IFS, WDI and Economic Survey of Pakistan.

Table 3 presents simple correlation of various measures of income inequality with each of the explanatory variables. The correlation coefficients in column 1 and 2 suggest that there is negative relationship between gini coefficients for overall Pakistan and its rural and urban areas, and financial development in Pakistan. It means that income inequality reduces with development of financial sector. However, the correlation coefficient of income share of poorest 20 percent population in overall Pakistan and in its rural and urban areas with financial development had been positive but it implies the same that financial development helps the poor raise their income share. Similarly, a negative relationship between the ratio of income shares of richest 20 percent population to

poorest 20 percent population in overall Pakistan and in its rural and urban areas with financial development indicates that financial development had been instrumental to reduce income gap between the rich and the poor. So on the basis of simple correlation coefficients, a negative relationship between income inequality and financial development in overall Pakistan and in its rural and urban areas is hypothesized.

The column 3 of this table shows that there is a positive correlation of gini coefficients for overall Pakistan and its rural and urban areas with GDP per capita. Whereas, there is a negative correlation coefficient between income share of the poorest 20 percent population in overall Pakistan and in its rural and urban area and GDP per capita. Similarly the correlation coefficient of the ratio of income shares of richest 20 percent population and poorest 20 percent population in overall Pakistan and in its rural and urban areas with GDP per capita has been positive. The correlation coefficients of each measure of inequality with per capita GDP lead to the same conclusion that per capita GDP has a negative impact on income inequality.

The last column of table 3 shows the correlation coefficient of each measure of income inequality in overall Pakistan and in its rural and urban areas with fluctuations in GDP growth rate or with macroeconomic fluctuations. The signs of all correlation coefficients are exactly the same as in column 3, though magnitude of correlation coefficients in last column has been quite smaller than those in column 3. It means that macroeconomic fluctuations worsen income inequality as does GDP per capita but adverse consequences of macroeconomic fluctuations are far less than those of GDP per capita.

Chapter 5

EMPERICAL RESULTS AND THEIR DISCUSSION

One of the major problems with income inequality data is that it is inadequate for statistical reliance and it is also discontinuous. Household income and expenditure surveys (HIES) were started in 1963 that have been continued to date. However, they have been conducted with irregular time intervals. As a result, only 17 surveys had been completed until 2001. Since almost all measures of income inequality use HIES data one way or the other, therefore only 17 observations of income inequality can be obtained from published data, which are, of course, insufficient to draw statistically reliable causal relationships. To assure statistical reliance, data can be generated by various methods of interpolation but such a generated data set involves interpolation bias.

Therefore, estimation of causal relationship between income inequality and three independent variables, financial development, GDP per capita and macroeconomic fluctuations has been subdivided into two parts, estimation using published data and estimation using both published and interpolated data. First part designated as 5.1 contains estimation on the basis of published data only that may not be statistically reliable but they are free from interpolation bias. Empirical results of this part are shown in tables 4 to 6. On the other hand, section 5.2 contains estimation on the basis published and self-generated data. Empirical results of this section are shown in tables 7 to 10.

These results are dependable statistically but may be subject to some error because of the particular method used for interpolation.

5.1 Empirical Estimation using Published Data

Although published data contains only 17 observations that are insufficient to draw any statistically reliable inferences, yet they are beyond interpolation bias. Therefore, to avoid interpolation bias, regression equations of this study are estimated on the basis of published data only. Three proxies for income inequality; gini coefficient, income share of poorest 20 percent population and the ratio of income shares of richest 20 percent to poorest 20 percent population have been used. Then for each proxy of income inequality; three equations; one for overall Pakistan and the other two for its rural and urban areas, have been estimated. In total, 9 regression equations have been estimated in this section.

Table 4: Regression Results on the Basis of Published Data Only; Dependent Variable is Gini Coefficient

	Explanatory variables	Coefficient	t-statistic	Probability
Pakistan	Constant	3.7082	5.9051	0.0001
	FD	-0.4644	-2.9221	0.0119
	MEF	0.0354	1.4139	0.1809
	GDPP	0.1337	3.6036	0.0032
	R-square	0.63	F-statistic	7.4989
	Adjusted R-square	0.55	Prob. of F-statistic	0.0037
Rural area	Constant	3.6964	4.0831	0.0013
	FD	-0.5338	-2.3299	0.0366
	MEF	0.1310	0.3618	0.7233
	GDPP	0.1563	2.9251	0.0119
	R-square	0.53	F-statistic	4.9226
	Adjusted R-square	0.42	Prob. of F-statistic	0.0168
Urban area	Constant	4.6763	4.9041	0.0003
	FD	-0.4625	-1.9167	0.0775
	MEF	0.0006	0.0153	0.9880
	GDPP	0.0483	0.8581	0.4064
	R-square	0.27	F-statistic	1.6619
	Adjusted R-square	0.11	Prob. of F-statistic	0.2238

Table 5: Regression Results on the Basis of Published Data Only; Dependent Variable is Income Share of Poorest 20 % Population

	Explanatory variables	Coefficient	t-statistic	Probability
Pakistan	Constant	1.9228	3.2483	0.0063
	FD	0.6056	4.0425	0.0014
	MEF	-0.0565	-2.3982	0.0322
	GDPP	-0.1781	-5.0931	0.0002
	R-square	0.78	F-statistic	14.9585
	Adjusted R-square	0.72	Prob. of F-statistic	0.0002
Rural area	Constant	1.2633	1.0588	0.3090
	FD	0.5819	1.9269	0.0761
	MEF	0.0262	0.5505	0.5913
	GDPP	-0.1205	-1.7096	0.1111
	R-square	0.40	F-statistic	2.8588
	Adjusted R-square	0.26	Prob. of F-statistic	0.0778
Urban area	Constant	1.5519	2.8874	0.0127
	FD	0.3664	2.6939	0.0184
	MEF	-0.0468	-2.1837	0.0479
	GDPP	-0.0659	-2.0751	0.0584
	R-square	0.51	F-statistic	4.5812
	Adjusted R-square	0.40	Prob. of F-statistic	0.0212

Table 6: Regression Results on the Basis of Published Data Only; Dependent Variable is Ratio of Income Shares of Richest 20% to Poorest 20% Population

	Explanatory variables	Coefficient	t-statistic	Probability
Pakistan	Constant	2.0745	6.5889	0.0000
	FD	-0.3924	-4.9251	0.0003
	MEF	0.0369	2.9377	0.0115
	GDPP	0.1040	5.5897	0.0001
	R-square	0.82	F-statistic	19.7338
	Adjusted R-square	0.78	Prob. of F-statistic	0.0000
Rural area	Constant	2.5122	1.4746	0.1641
	FD	-0.9204	-2.1349	0.0524
	MEF	0.0086	0.1269	0.9010
	GDPP	0.2246	2.2320	0.0438
	R-square	0.45	F-statistic	3.5979
	Adjusted R-square	0.33	Prob. of F-statistic	0.0432
Urban area	Constant	3.1070	2.6800	0.0189
	FD	-0.6864	-2.3394	0.0359
	MEF	0.0417	0.9034	0.3827
	GDPP	0.0887	1.2962	0.2175
	R-square	0.36	F-statistic	2.4688
	Adjusted R-square	0.22	Prob. of F-statistic	0.1082

Table 4 shows the results of three estimated regressions in which income inequality in overall Pakistan and in its rural and urban areas respectively has been regressed on three independent variables, financial development, GDP per capita and macroeconomic fluctuations. In these regression equations, income inequality has been approximated by gini coefficients, financial development by credit of financial intermediaries to private sector to GDP ratio and macroeconomic fluctuations by square of the difference between respective year's annual growth rate of real GDP and annual average compound growth rate of real GDP for the whole period of this study, 1963-2001. All regression equations have been estimated in log-linear form. It means that log values of all variables rather than their normal values have been used. Therefore, regression coefficients express respective elasticities that are interpreted as percentage change in dependent variable due to a one percent increase in independent variable.

Empirical results show that elasticity of gini coefficient for overall Pakistan with respect to private domestic credit as percentage of GDP comes out -0.4644, which means that a one percent increase in private domestic credit to GDP ratio causes a 0.4644 percent decrease in gini coefficient. The elasticity of gini coefficient for overall Pakistan with respect to GDP per capita is 0.1337. It implies that a one percent increase in the GDP per capita leads to a 0.1337 percent increase in gini coefficient. The coefficient for growth fluctuations is 0.0354, which can be interpreted as one percent change of GDP growth rate from its average leads to a 0.0354 percent increase in gini coefficient for Pakistan.

The coefficients for financial development and GDP per capita are significant while the coefficient for growth fluctuations is insignificant for overall Pakistan. The results reveal

that financial development helps reduce income inequality in Pakistan while GDP per capita causes income inequality to increase further. The variable for the macroeconomic fluctuations has negative impact on income distribution but it is not significant. These results are consistent with those of Thorsten Asli and Levine (2004). Their study concludes that financial development in term of increased supply of domestic credit makes the distribution of income more equitable while GDP per capita has a negative impact. The variable for the macroeconomic fluctuations has the expected sign according to the theory of Breen and Garcia-Penalosa (2005). In their view, more fluctuations in national output lead to higher income inequality.

Our results are also consistent with those of Jamal (2005) that GDP per capita has positive relationship with income inequality. However, Jamal and some other studies of income inequality like Beck, Demirgue-Kunt and Lavine (2004), Breen and Garcia-Penalosa (2005) have used gini coefficients for the whole country without disaggregating them for rural and urban components as dependent variables. On the other hand, this study uses measures of income inequality for rural and urban areas also.

In second equation, gini coefficients for rural area of Pakistan have been regressed on financial development, GDP per capita and growth fluctuations. All coefficients of this regression equation have the same signs as those in first equation However, magnitudes and significance levels of two equations are somewhat different. Similarly, all coefficient of third equation, which is for urban area, have the same signs as coefficients of other two equations have. However, in third equation, only financial development qualifies for a

statistically significant determinant at 10 percent level of significance while growth fluctuations and GDP per capita are insignificant though with expected signs.

Overall, our results show that financial development contributes towards smoothening of income distribution. However, impact of financial development is more in rural areas than in urban areas. The same is true with respect to GDP per capita and macroeconomic fluctuations though in opposite direction. These results confirm simple correlation results given in table 3 of previous chapter as correlation coefficient between income inequality and financial development is positive and correlation coefficients between income inequality and GDP per capita and macroeconomic fluctuations are both positive.

Table 5 presents the results of next three equations in which income share of poorest 20 percent population in overall Pakistan and in its rural and urban areas respectively has been used as a second measure of income inequality. It is regressed on financial development, growth fluctuation and GDP per capita for overall Pakistan and its rural and urban areas separately. All regression equations have also been estimated in log-linear form.

For overall Pakistan the elasticity of income share of poorest 20 population with respect to financial development is 0.6056 and it is highly significant, which indicates that a one percent increase in private domestic credit to GDP ratio leads to an increase in income share of poorest 20 percent population by 0.6056 percent. The elasticity of income share of the poorest 20 percent population with respect to macroeconomic fluctuations is -0.0565 and significant at 3 percent level of significance which indicates that a one percent change of GDP growth from its mean value leads to 0.0565 percent decrease in

income share of poorest 20 percent population for overall Pakistan. The elasticity of income share of poorest 20 percent population with respect to real GDP per capita is -0.1781 and significant at one percent level of significance, which shows that a one percent increase in the real GDP per capita causes the income share of poorest 20 percent population to decrease by 0.1781 percent.

For rural area of Pakistan, regression coefficients of financial development and GDP per capita have expected signs that are positive and negative respectively while coefficient of macroeconomic fluctuations has positive sign that is in contrast with previous findings quoted in chapter two. Moreover, only coefficient of financial development is significant at 10 percent level of significance while the other two coefficients are insignificant. It means that in rural area of Pakistan, financial development helps increase the income share of poorest 20 percent population significantly while fluctuations in GDP growth rate and GDP per capita do not aggravate income inequality significantly.

For urban area of Pakistan, all regression coefficients are of expected signs as those of regression equation for overall Pakistan. That is, financial development has positive and other two variables, macroeconomic fluctuations and GDP per capita has negative signs. Furthermore, first two regression coefficients are significant at 5 percent and the last one at 10 percent level of significance. It has an interesting implication that fluctuations in GDP growth rate and GDP per capita have statistically significant depressing effect on income share of poorest 20 percent population in urban area only and not in rural area of Pakistan.

Table 6 contains the results of next three equations in which the ratio of income shares of richest 20 percent to poorest 20 percent population in overall Pakistan and in its rural and urban areas respectively has been used as a third proxy for income inequality. Like the other two proxies of income inequality discussed above, it is regressed on financial development, growth fluctuation and GDP per capita for overall Pakistan and its rural and urban areas separately. These regression equations have also been estimated in log-linear form.

Results of our estimation for overall Pakistan and for its rural and urban areas have algebraic signs as expected. That is, financial development appears to be instrumental in reducing the ratio of income shares of richest 20 percent to poorest 20 percent population while fluctuations in GDP growth rate and GDP per capita appear to be instrumental in aggravating the ratio. The regression coefficients of all three variables are statistically significant for overall Pakistan. However, the regression coefficient of macroeconomic fluctuations is not significant for rural area of Pakistan and the regression coefficients of both macroeconomic fluctuations and GDP per capita are insignificant for urban area of Pakistan. It means that only financial development has expected and statistically significant sign both in rural and urban areas of Pakistan while macroeconomic fluctuations and GDP per capita have expected sign but are insignificant both in rural and areas of Pakistan. It is interesting to note that macroeconomic fluctuations, being insignificant for both rural and urban areas of Pakistan, appears to be significant for overall Pakistan.

To sum up, our results suggest that financial development is helpful in reducing income inequality in overall Pakistan and in its rural and urban areas irrespective of the fact how income inequality is measured. The regression coefficients of this variable have expected sign and are statistically significant in all cases. Macroeconomic fluctuations, almost in all cases, have expected sign that indicates a distorting impact on income inequality. However, this variable mostly has a statistically insignificant impact on distribution of income. The same is true for GDP per capita as for macroeconomic fluctuations except the difference that statistically insignificant results in case of GDP per capita are less than those in case of macroeconomic fluctuations.

Financial development affects income inequality in a number of ways. Deepening of financial markets enhances financial intermediation that facilitates accumulation of capital at a faster pace. Accelerated capital accumulation, in turn, raises labour productivity and real wage rate that helps in smoothening out income inequality. Accelerated capital accumulation also opens up job opportunities for unemployed and underemployed workers who mostly belong to the poor class of society. Thus, income share of lower income classes improve relatively more. Employment and increase in wages and salaries also influence family decisions about labor force participation, fertility and education mostly in such ways that are conducive for development of human capital.

In financially repressed societies, credit is generally limited to overall need of the society but it is particularly inaccessible to low-income individuals and small businessmen because they rarely have any valuable collaterals to be pledged against bank loans and personal connections to be used for bank borrowing. Thus, in context of a financially

under-developed system, being poor by birth reinforces adverse distributional consequences for the whole life because it limits the ability of small-scale and low-income producers to obtain credit from financial intermediaries.

With regard to macroeconomic fluctuations, the real business cycle theory implies that when individuals have an elastic supply of labour, a greater uncertainty in output increases savings and accelerates growth. Consequently, faster growth implies higher future wages, and hence higher consumption for any extra time spent at work. It therefore increases the labour supply, raising the return to capital and lowering wages of labour. Since capital endowments are more unequally distributed than labour time, this change in factor prices increase income inequality as suggested by Garcia-Penalosa and Turnovsaky (2005).

The coefficients of determination R^2 remain low in our analysis. It could be because of ignoring many other socio-political variables, which affect income inequality but are not included in the model due to paucity of data, time and resources. However, as compared to previous studies of income inequality by Liang (2006), Ali and tahir (1999), Breen and Gracia-Penalosa (2005), Deemirgue-Kunt and Lavine (2004), R^2 in this research is not too bad.

To avoid any possibility of multicollinearity in our estimation, we worked out simple correlation coefficients for each pair of explanatory variables that have not been reported in any table for the purposes of brevity. However, all calculated correlation coefficients

were found too low to give rise to multicollinearity problem in our estimated regression equations.

5.2 Empirical Estimation using Published and Generated Data

In section 5.1, empirical estimation has been carried out using insufficient but authentic (published) number of observations in order to avoid interpolation bias. On the contrary, in this section, the number of observations has been increased from 17 to 39 on the basis of simple interpolation of missing observations. Simple interpolation means calculation of average annual compound rate of change between discontinuous observations at first place, and then working out of values for missing years by adding the average annual rate to the value of immediately preceding year. Since there are many other methods of interpolation, therefore our interpolated data may be questionable.

Stationarity of Time Series Variables

To identify any discernable causal relationship in a time series data set, stationarity of data on each variable is a prerequisite. Therefore, stationarity or order of integration has been checked before estimation of the model. In order to check stationarity of all variables we have applied unit-root or augmented Dickey Fuller (ADF) test. The results of ADF test are presented in table 7. It is evident from these results that all of our variables are not stationary at level but they are stationary at first difference as calculated value for each variable is greater than the critical value (-2.94) at 5% level of significance.

Table 7: Unit-Root Estimation

Inequality measures	ADF Test At Level	ADF Test At First Difference
P-Gini	-2.6948	-4.2311
P-PR	-2.3331	-4.3807
P-RTP	-2.1649	-4.1915
R-Gini	-2.8822	-4.1024
U-Gini	-1.8515	-4.1024
R-PR	-2.9946	-3.9855
U-PR	-4.0217	-4.4686
R-RTP	-3.1602	-4.2474
U-RTP	-2.9136	-4.3841
FD	-3.6141	-5.2081
GDPP	-0.1210	-3.5664
MEF	-4.1131	-5.8919

Critical value at 5% level of significance is -2.9422.

As in section 5.1, three proxies for income inequality; gini coefficient, income share of poorest 20 percent population and the ratio of income shares of richest 20 percent to poorest 20 percent population have been used. Then for each proxy of income inequality; three equations; one for overall Pakistan and the other two for its rural and urban areas, have been estimated. In total, 9 regression equations have been estimated in this section on the basis of 39 observations. Empirical results are shown in tables 8 to 10.

Table 8: Regression Results on the Basis of Published & Interpolated Data; Dependent Variable is Gini Coefficient

	Explanatory variables	Coefficient	t-statistic	Probability
Pakistan	Constant	2.8273	7.9863	0.0000
	FD	-0.0624	-2.2998	0.0278
	MEF	0.0024	2.9740	0.0056
	GDPP	0.1022	3.0802	0.0043
	AR(1)	1.2961	9.5521	0.0000
	AR(2)	-0.6731	-4.9131	0.0000
	R-Square	0.87	F-Statistic	41.7907
	Adjusted R-Square	0.85	Prob. of F-statistic	0.0000
	D.W. Statistic	1.91		
Rural area	Constant	2.9554	7.5253	0.0000
	FD	-0.1968	-2.4018	0.0219
	MEF	0.0057	2.7805	0.0088
	GDPP	0.1247	3.7788	0.0006
	MA(1)	0.6117	4.5200	0.0001
	R-Square	0.71	F-Statistic	20.6765
	Adjusted R-Square	0.67	Prob. of F-statistic	0.0000
	D.W. Statistic	1.60		
Urban area	Constant	3.7079	7.6224	0.0000
	FD	-0.1571	-1.8616	0.0713
	MEF	3.78E-05	0.0731	0.9422
	GDPP	0.0479	1.1531	0.2569
	MA(1)	0.9349	12.4323	0.0000
	R-Square	0.65	F-Statistic	15.9094
	Adjusted R-Square	0.61	Prob. of F-statistic	0.0000
	D.W. Statistic	1.52		

Table 9: Regression Results on the Basis of Published & Interpolated Data; Dependent Variable is Income Share of Poorest 20 % Population

	Explanatory variables	Coefficient	t-statistic	Probability
Pakistan	Constant	3.1723	9.4405	0.0000
	FD	0.1455	2.3598	0.0242
	MEF	-0.0011	-1.3824	0.1759
	GDPP	-0.1696	-5.7880	0.0000
	MA(1)	0.9695	24.0600	0.0000
	R-Square	0.85	F-Statistic	49.5418
	Adjusted R-Square	0.54	Prob. of F-statistic	0.0000
	D.W. Statistic	1.75		
Rural area	Constant	2.2556	3.5474	0.0012
	FD	0.2119	1.6154	0.1155
	MEF	0.0011	0.9407	0.3535
	GDPP	-0.0945	-1.7754	0.0848
	MA(1)	0.6285	4.6632	0.0000
	R-Square	0.50	F-Statistic	8.7426
	Adjusted R-Square	0.45	Prob. of F-statistic	0.0001
	D.W. Statistic	1.65		
Urban area	Constant	1.8003	6.9818	0.0000
	FD	0.1418	2.4885	0.0182
	MEF	-0.00021	-0.5761	0.5686
	GDPP	-0.0309	-1.1700	0.0915
	AR(1)	0.7056	5.6679	0.0000
	MA(2)	-0.9457	-38.6778	0.0000
	R-Square	0.62	F-Statistic	10.3343
	Adjusted R-Square	0.56	Prob. of F-statistic	0.0000
	D.W. Statistic	1.77		

Table 10: Regression Results on the Basis of Published & Interpolated Data; Dependent Variable is Ratio of Income Shares of Richest 20% to Poorest 20% Population

	Explanatory variables	Coefficient	t-statistic	Probability
Pakistan	Constant	0.9909	3.2337	0.0028
	FD	-0.0527	-2.3365	0.0259
	MEF	0.0004	1.3575	0.1841
	GDPP	0.1125	3.7583	0.0007
	AR(1)	0.5335	3.6327	0.0010
	R-Square	0.92	F-Statistic	71.5771
	Adjusted R-Square	0.91	Prob. of F-statistic	0.0000
	D.W. Statistic	2.10		
Rural area	Constant	1.0348	1.2018	0.2377
	FD	-0.3310	-1.8609	0.0714
	MEF	-0.0016	-1.0554	0.2986
	GDPP	0.1817	2.5210	0.0166
	MA(1)	0.6250	4.6296	0.0001
	R-Square	0.57	F-Statistic	11.2232
	Adjusted R-Square	0.52	Prob. of F-statistic	0.0000
	D.W.Statistic	1.62		
Urban area	Constant	2.2196	2.1220	0.0419
	FD	-0.2154	-1.8126	0.0796
	MEF	0.0002	0.2036	0.8400
	GDPP	0.0388	0.4106	0.6842
	AR(2)	0.3797	2.1228	0.0419
	R-Square	0.66	F-Statistic	12.1366
	Adjusted R-Square	0.60	Prob. of F-statistic	0.0000
	D.W. Statistic	1.74		

The results in table 8 show the impact of financial development, growth fluctuations and GDP per capita on gini coefficient for overall Pakistan and for its rural and urban areas. The elasticity of gini coefficient with respect to financial development is -0.0624, which means that a one percent increase in private domestic credit to GDP ratio causes a 0.0624 percent decreases in gini coefficient of Pakistan. The coefficient for financial variable is significant and has negative sign, which shows that financial development is helpful for the poor in increasing their income share. This highlights the importance of credit allocation; it efficiently helps to reduce income inequality or to increase the earning shares of the poor. Access to credit markets by the poor, positively reduces income inequality because the poor can borrow funds for investment in productive channels like education of their children and establishment of small manufacturing units or small business.

The coefficient for growth fluctuations is 0.0024, which can be interpreted as one percent change of GDP growth rate from its average leads to a 0.0024 percent increase in the gini coefficient for Pakistan. The coefficient of gini coefficient with respect to GDP per capita is 0.1022. It shows that a one percent increase in GDP per capita leads to a 0.1022 percent increase in gini coefficient of overall Pakistan. It means that benefits of economic growth have not reached to the poor class in the country proportionately. This highlights the importance of redistribution policies that can stimulate income share of the poor class. For rural areas, our results are same in term of their significance and signs as for overall Pakistan. This shows that financial development reduces income inequality in rural area while macroeconomic fluctuations and GDP per capita make it more unequal. In urban area only financial variable is significant.

For time series data, we have also used second proxy of income inequality, which is income share of poorest 20 percent population, for overall Pakistan and for its rural and urban areas. Empirical results of three regression equations are presented in tables 9. The results confirm that financial development positively affect the income share of poorest 20 percent population in overall Pakistan and in its rural and urban areas while GDP per capita negatively affect it. However, the coefficient of macroeconomic fluctuations turns out to be statistically insignificant.

In case of third proxy of income inequality, which is the ratio of income shares of richest 20 percent population to poorest 20 percent population, the results for overall Pakistan are as expected. That is financial development leads to a reduction in income inequality while macroeconomic fluctuations and GDP per capita make income inequality more perverse. The results for rural area show that coefficient of macroeconomic fluctuations has wrong sign and is statistically insignificant. The results for urban area show that sign of all regression coefficients is as expected but macroeconomic fluctuations and GDP per capita are statistically insignificant.

We have also checked possibility of multicollinearity by examining pair-wise correlation coefficient among explanatory variables. The calculated correlation coefficients (not reported) were found so low that there should not be any problem of multicollinearity in the model. However, in our initial regression results (not reported), a serious problem of autocorrelation was found, which could be due to the fact that 22 out of 39 observations used for this estimation have been simply interpolated. Anyhow, to take care of

autocorrelation problem, we tried various autoregressive (AR) and moving average (MA) processes and chose the ones for reporting that minimized autocorrelation.

To conclude, the results of time series analysis also indicate a negative and linear relationship between financial development and all measures of income inequality in overall Pakistan as well as in its rural and urban areas. It means that our empirical results support the hypothesis of linear relationship between income inequality and financial development as suggested by Galor and Zeira (1993) and Baneerjee and Newman (1993). However, growth fluctuations do not seem to be a daunting variable to worsen income inequality because the regression coefficients of this variable are mostly insignificant. GDP per capita, on the other hand, seem to be more relevant in worsening of income inequality in Pakistan.

Chapter 6

CONCLUSIONS AND POLICY IMPLICATIONS

Income inequality in Pakistan has been quite perverse since beginning. It widened further over time. Decade-wise comparison of income inequality in chapter 3 shows that income inequality remained almost unchanged during 1970s and 1980s but it aggravated in 1990s. It happened albeit discretionary redistributive system of Zakat that was introduced country-wide in early 1980s. It shows that there are some endogenous forces that have overturned the impact of Zakat system and have made income distribution worse over time. Since income inequality is unanimously believed to be detrimental for socio-political and economic cohesion of a country, it is therefore extremely desirable to identify endogenous factors that worsen inequality.

In addition to many socio-political factors on which data is almost non-existent, few economic variables like financial development, fluctuations in GDP growth rate and level of GDP per capita are frequently quoted in literature as being powerful determinants of income inequality in any country. Therefore, the objective of this study was to investigate any discernable relationship between income inequality and these three independent variables in context of Pakistan. Since there is no unique measure of income inequality, we have used three alternative measures; gini coefficient, income share of poorest 20 percent population and the ratio of income shares of richest 20 percent

population to poorest 20 percent population. These measures of income inequality have been worked out for overall Pakistan as well as for its rural and urban areas separately.

Previous studies on the topic mostly use cross-section multi-country data to identify statistically significant determinants of income inequality probably due to paucity of time-series data on income inequality. Therefore such results incorporate the impact of socio-political factors that are generally quite different in each country. For the purposes of this study, time series data on income inequality in Pakistan is also insufficient as there are only 17 observations available. Therefore, we have estimated regression equations first on the basis of published data only just to have an idea of the direction of relationship between income inequality and the three independent variables. Then we have generated data by simple interpolation to have statistically reliable results.

Our results show that financial development has been proved quite congenial to reduce income inequality over time both in rural and urban areas of Pakistan alike. This variable has been significant for each measure of income inequality. Deepening of financial markets reduces income inequality by alleviating credit constraints. Thus the poor class can borrow funds from financial intermediaries and invest them to build up their human capital, start up productive businesses and undertake promising investment. Ultimately they are able to increase and improve their mobility and economic prospects, and hence break the cycle of income inequality.

On the other hand, GDP per capita has been proved a source of widening income inequality both in rural and urban areas of Pakistan. It means that the trickle-down effect of rising GDP per capita does not seem to be descending to poor segments of society yet.

Similarly, fluctuations in GDP growth rate have caused income inequality to widen further. However, this variable has not been so significant in most of the cases. It means that fluctuations in GDP growth rate have not any discernable and persistent impact on income inequality.

The main policy implication of this study is that financial development should be attached top priority in order to smooth out income inequality in the country. Financial development is like providing the poor with leveled playing ground. Having access to bank borrowing, the poor seem to be making their own fortune without requiring any further help through discretionary redistributive schemes. Another implication of this research is that the trickle down theory has not been working as expected in case of Pakistan. Since the trickle down theory implicitly emphasizes a pro-rich investment strategy to start the process of economic development, this thinking therefore needs to be reconsidered in favor of a pro-poor or at least a balanced strategy to launch a successful development process.

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