Income Inequality in Pakistan:
Trends, Determinants and Impact

Policy Brief 2

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UNDP
Pakistan

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The paper describes the extent of and trends in inequality levels in terms of income, land ownership, level of education of breadwinners and multi-dimensional regional disparities. The impact of income inequality on poverty reduction is also assessed by estimating the poverty elasticity with respect to growth and income distributions. Using an integrated macroeconomic model, poverty incidence is simulated with various combinations of growth and income inequality levels.

It is noted that income distribution has worsened during the period 1988 to 2005. National inequality estimates in terms of the Gini coefficient show an increase of about 17 percent or 6 percentage points from 0.35 in 1987-88 to 0.41 in 2004-05.
The Gini for urban areas has increased from 0.40 to 0.43 while for rural areas, it increased from 0.30 to 0.35 during the period. Comparatively, increase in the level of rural inequality is more distinct than the magnitude of urban inequality. The provincial Gini coefficients for 1987-88 and 2004-05, are the highest for Punjab, followed by Sindh, NWFP and Balochistan.

Another popular method of assessing inequality is to compare the lowest and highest income quintile shares. Statistics show that in 1987-88, the lowest 20 percent in terms of per capita income obtained just about 9 percent of the national income while the highest 20 percent obtained 44 percent. By 2004-05, the share of the lowest 20 percent had further declined to 7 percent and that of the highest quintile increased to 49 percent. The picture clearly portrays the widening gap between the income shares of the poorest and richest.

Inequality in land ownership in terms of the Gini coefficient was almost stagnant at 0.63 during the last decade but provincial differences existed. The empirics in terms of land inequality and poverty incidence clearly confirmed that a higher land inequality is associated with higher levels of deprivation and poverty. As the value of the Gini coefficient rises from low to high, the incidence of poverty also rises.

The level of education is highly correlated with income earned. Thus, inequality in this dimension is directly related with income inequality. Estimates of inequality in terms of the Gini coefficient for the level of education of the head of household or earners in household indicate an extremely high level of inequality, especially in rural areas.

Regional disparity in terms of a national multi-dimensional Gini coefficient has increased by about 28 percent from 0.39 to 0.5 during the early 80's and late 90's. The provincial multi-dimensional Gini in 1998 was the highest in Balochistan (0.74), followed by NWFP (0.51), Sindh (0.38), and was the lowest in Punjab (0.19).

The empirical assessment of relationship between inequality and economic growth reveals that average growth worsens distribution and is unlikely to aid in reducing poverty without explicit distribution policies. Powerful evidence of the fact that the nature of growth in Pakistan is 'inequality-increasing' is supported by the fact that an increase in per capita income also raises inequality, with a one percent increase in per capita income raising inequality by 0.081 percent.

Econometric evidence suggests that inflation (higher food prices) and dualism (manufacturing to agriculture wage gap and terms of trade) significantly contribute in worsening inequality. On the contrary, income distribution may be improved with the help of progressive taxation and enhancing the level of development expenditure on social services and investment.

The paper also scrutinized the poverty, inequality and growth nexus in terms of elasticities. The poverty elasticity with respect to an average Gini coefficient is estimated as 3.27, while the estimated poverty elasticity with respect to growth is 1.25. The higher elasticity of poverty with respect to the Gini coefficient implies that income distribution is more important as a poverty predictor than growth and confirms the role of inequality in the prevalence of and/or increase in poverty.

A multi-sectoral and multi-equations macroeconomic model is used to simulate poverty with various combinations of growth and inequality. The United Nations Development Programme's (UNDP) Millennium Development Goals (MDGs) targets to reduce poverty to half by the year 2015. In Pakistan's case, this translates into reducing the incidence of poverty to 15 percent by 2015. The model simulations show that if the GDP growth rate continued to be maintained at 6 percent per annum and measures were adopted to hold the Gini coefficient constant at the 2004 level of 0.417, poverty incidence would probably decline to 19.5 percent by 2015. However, with the Gini coefficient held constant at 0.417, lower GDP growth rates of 5 and 4 percent are likely to result in a higher incidence of poverty at 22.2 and 25.3 percent respectively in 2015. Alternatively, to achieve the target of 15 percent by 2015, inequality (Gini) must be reduced at the level of 0.40, 0.39 and 0.38 with the GDP growth rate of 6, 5 and 4 percent respectively. In conclusion, the empirical assessment of poverty, inequality and economic growth established that using growth alone as a measure of poverty reduction is insufficient.

1. Introduction

Inequality is often discussed with reference to its role in poverty reduction and its effects on economic growth. Cross-country research on poverty and inequality concludes that for a given level of average income, education, land ownership etc., increased inequality in these characteristics will almost always imply higher levels of both absolute and relative deprivation in these dimensions (McKay, 2002). Thus, inequality is critically important for the attainment of the Millennium Development Goal (MDG) for poverty. In fact, Hanmer and Naschold (2000) concluded that "at least in Africa, MDGs on poverty reduction cannot be achieved without reduction in inequality". Similarly, there is increasing evidence that countries with high levels of income and asset inequalities achieve lower economic growth rates on average. In addition, a given rate and pattern of growth of household incomes will have a larger poverty reduction impact when these incomes are more equally distributed to begin with.

Inequality in income and assets is also a significant factor behind crime, social unrest and violent conflict. Skewed income distribution is likely to create large differences on the basis of ethnicity and regions. These aspects act as a potential threat to political stability. A high degree of inequality, ingrained into the structure of society and economy and reinforced by policy actions, contributes to a sense of grievance and injustice, promotes despondency and anger, and generates social tensions and instability.

Various authors have contributed to the empirics[1] of income inequality in Pakistan covering the period of the last four decades. These studies however are not comparable due to differences in methods, choice of welfare indicator (income or consumption), arrangement of data (individual v/s income groups), choice of inequality indices etc. It is also noted that sometime two studies concluded contradictory income inequality trends for the same period. Thus, as argued in Anwar (2005), it is difficult to reach at an unambiguous conclusion about income inequality[2] trends. Keeping this limitation of existing evidence regarding income distribution, Anwar (2005) provided a consistent series of Gini coefficients based on a consistent methodology and using grouped household income data. His results suggest a declining trend during the 60's, an increasing trend during 70's, a stagnant position of inequality during 80's, and a rapid increase in the inequality coefficient during 90's. Kemal (2007) also maintained that the "income inequalities in Pakistan have increased sharply in the 1990s and the data shows the trend of worsening income distribution continues even in the current decade".

The consistent estimates of income inequality, reported in Anwar (2005) are computed from published grouped household data. It can be proved that the magnitude of inequality estimated from grouped data is underestimated as compared with one computed from individual household level data. Moreover, the study (Anwar, 2005) does not capture the impact of family size on income distribution.

This research provides evidence of income inequality from 1988 to 2005 using household level data from four household surveys. Per capita income is used in computing inequality measures as a welfare variable. Other inequalities in terms of land ownership, human capital, and regional imbalances in economic and infrastructure development are also presented. The magnitudes of these inequalities are furnished in the Situation Analysis. Section 3 summarizes findings of an econometric analysis of macro determinants of income inequality. The study also empirically evaluates the role of income inequality in poverty reduction. The results of the sensitivity analysis are reported in section 4. Key findings are recapitulated in section 5.

1 See for example, Guisinger (1978), Kemal (1981), Kruijk and Leeuwen (1985), Salman and Tahir (1999), and Anwar (2003)
2 A list of all previous studies on income distribution is provided in Anwar (2005).

2. Situation Analysis

The following sub-sections present inequality estimates. Besides providing an extent of income and non-income inequalities, historical trends in these dimensions are also presented.

2.1 Profile of Income Inequality

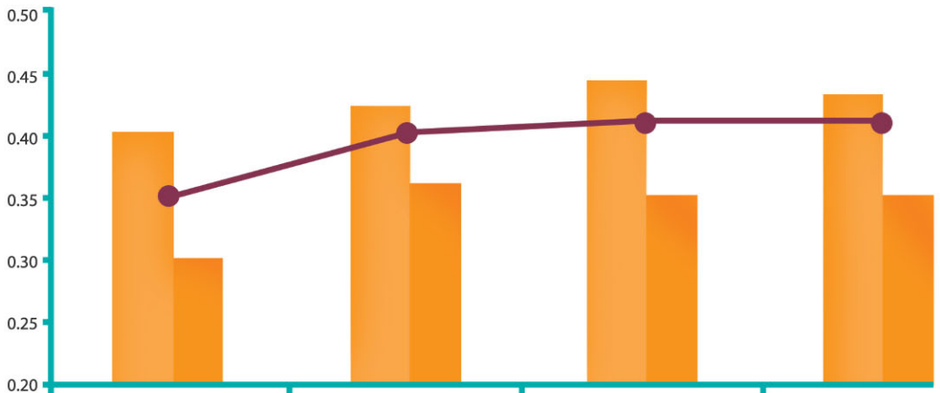
Traditionally in Pakistan, income or consumption inequality measures are computed form Household Income and Expenditure Surveys (HIES) conducted occasionally by the Federal Bureau of Statistics. Inequality is estimated on the basis of either per capita household income or per capita household expenditure. The inequality of per capita income is generally larger than that of the per capita consumption. Although there exists no consensus on whether one should use income or expenditure, per capita income is generally preferred to compute inequality measures.

Income inequality profile across regions and across provinces is developed by analyzing unit record data of four Household Income and Expenditure Surveys (1987-88, 1998-99, 2000-01, and 2004-05). The estimates are presented below, while a concise description of income inequality measures used in the analysis is provided in the appendix.

2.1.1. National and Regional Scenario

Figure-1 portrays trends in national, urban, and rural income inequality as measured by Gini coefficients from 1987-88 to 2004-05.

Figure-1
Per Capita Income Inequality [Gini Coefficients]



	1987-88	1998-99	2000-01	2004-05
Urban	0.4	0.42	0.44	0.43
Rural	0.3	0.36	0.35	0.35
National	0.35	0.4	0.41	0.41

Sources: Estimated from HIES unit record data. (Various years)

Deterioration in income distribution during this period is evident from the figure above. National inequality estimates show an increase of about 17 percent or 6 percentage points from 0.35 in 1987-88 to 0.41 in 2004-05. A major upward shift (from 0.35 to 0.40) in the Gini coefficient is recorded during the period of 1987-88 and 1998-99. Incidentally, this period is critical with reference to the Structural Adjustment Programme. Jamal (2003) also concluded that "overall poverty and inequality increased during the adjustment phase".

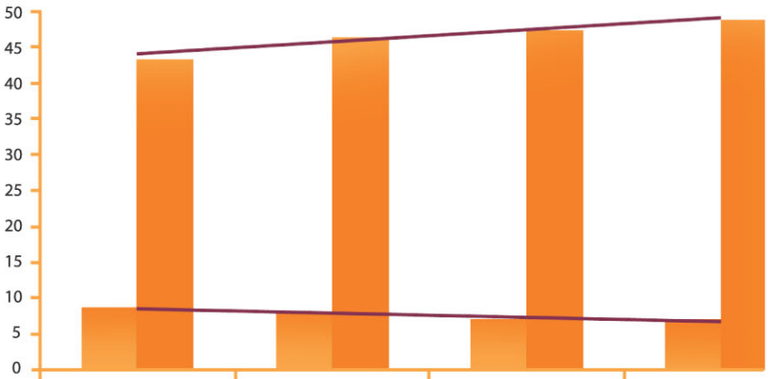
Similarly, the coefficient for urban areas has increased from 0.40 to 0.43 and for rural areas from 0.30 to 0.35 during the period. Comparatively, increase in the level of rural inequality is more distinct than the magnitude of urban inequality.

As the Gini coefficient is not sensitive at the extreme ends of the distribution, the lowest and highest quintile income shares are computed from the household data. Figures 2 and 3 provide information regarding the share of income accruing to the lowest 20 percent (i.e. the lowest quintile) and to the highest 20 percent (i.e. the highest quintile) of the population.

Statistics show that in 1987-88, the lowest quintile obtained just about 9 percent of the national income while the highest quintile obtained 44 percent of the income. By 2004-05, the share of the lowest quintile had further declined to 7 percent and that of the highest quintile increased to 49 percent. The divergent trend in the figure clearly indicates that the gap between the income shares of the poorest and richest is widening. The decline in income share of the lowest quintile and the increase in income share of the highest quintile have occurred in both urban as well as rural areas.

Figure-2

Lowest and Highest Per capita Income Quintile Share- National



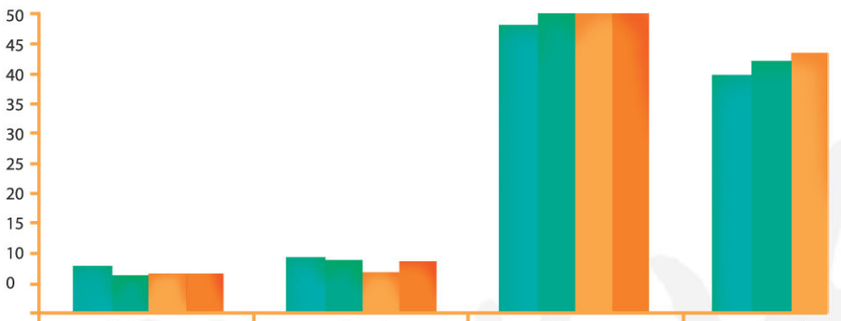
	1987-88	1998-99	2000-01	2004-05
Lowest 20 Percent	8.8	7.82	7	7.2
Highest 20 Percent	43.5	46.5	47.6	48.8

Lowest 20 Percent Highest 20 Percent

Sources: Estimated from HIES unit record data. (Various years)

Figure-3

Lowest and Highest Per Capita Income Quintile Share- Urban/ Rural



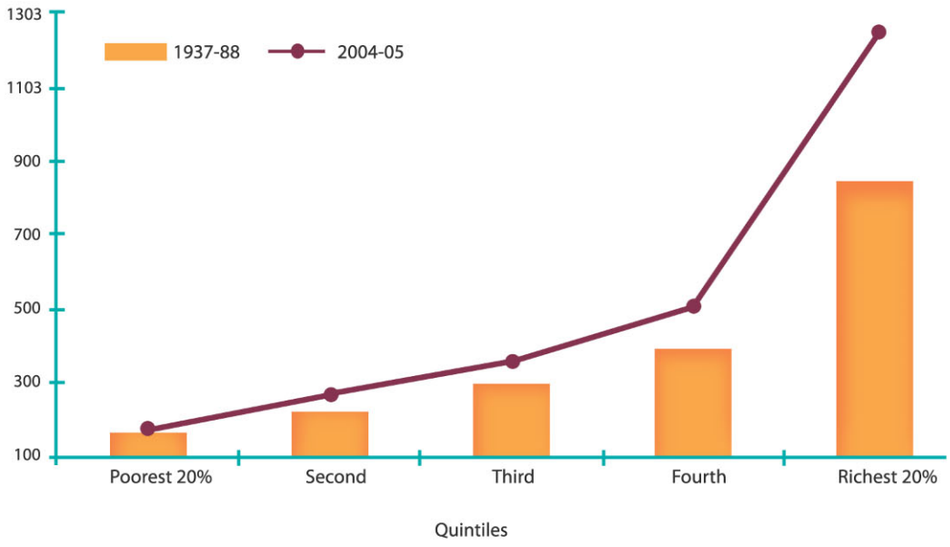
	Lowest 20 Percent		Highest 20 Percent	
	Urban	Rural	Urban	Rural
1987-88	7.8	9.6	47.8	40
1998-99	6.6	8.7	50.1	41.8
2000-01	6.6	8	50.3	43.2
2004-05	6.5	8.5	50.4	43.4

1987-88 1998-99 2000-01 2004-05

Sources: Estimated from HIES unit record data. (Various years)

The case of sustained widening gap between rich and poor is further strengthened by simply comparing growth in income by quintiles. Figure-4 plots average real income by quintiles of population for terminal periods (1987-88 and 2004-05). The broad difference (more than 4 times) in growth magnitude between the two extremes of population (poorest v/s richest) is a clear indication of the worsening income distribution.

Figure-4
Average per Capita Real Monthly Income By Quintiles
[1987-88 Prices]



Sources: Estimated from HIES unit record data. (Various years)

2.1.2 Provincial Scenario

A comparison of distributional measures across provinces shows that the household level income distribution has worsened in all provinces. A perusal of the Gini coefficients presented in Table-1 corroborates the above result. The coefficients for 1987-88 and 2004-05 respectively, are the highest for Punjab, followed by Sindh, NWFP and Balochistan[3].

3 Inequality is a relative measure and does not specify the absolute level of welfare or deprivation. The two concepts are, however, not exclusive and simply describe different conditions. In absolute terms, Balochistan is the poorest province with the highest incidence of poverty. However, despite the high level of absolute poverty, relative deprivation or inequality may not be very high if the difference in income levels among the population in the province is not large. The fact that Balochistan suffers from high absolute poverty but low income inequality and Punjab suffers from low absolute deprivation but high inequality implies that different policy interventions are required in the two provinces.

It appears that the level of overall inequality is more or less similar in Punjab and Sindh and both have increased by about the same percentage points. However, there are considerable differences in terms of regional and inter-temporal Gini estimates. For instance, inequality in urban Sindh significantly increased during the period 2000-01 and then declined in the period 2004-05. The trend in urban Punjab is quite different. Similarly, a sustained rising trend of inequality is observed in the case of rural Punjab while inequality in rural Sindh[4] declined in 2004-05. Barring Punjab, the rural Gini coefficient has declined in all provinces as evident in Table-1.

In NWFP, the overall inequality worsened after1987-88 and then improved in 2004-05. Inequality in urban NWFP however shows a rising trend after 2000-01. On the other hand, the magnitude of both urban and rural Gini coefficients for Balochistan for 2004-05 is lower in comparison with 2000-01. Rural income inequality in Balochisan is even less as compared with the Gini coefficients computed for 1987-88.

Table-1
Per Capita Income Inequality - Provincial *Gini* Coefficients

	1987-88	1998-99	2001-02	2004-05
Punjab	0.35	0.40	0.41	0.41
Urban	0.40	0.43	0.43	0.42
Rural	0.31	0.36	0.37	0.39
Sindh	0.34	0.42	0.45	0.41
Urban	0.38	0.40	0.45	0.42
Rural	0.22	0.36	0.33	0.26
NWFP	0.31	0.39	0.39	0.36
Urban	0.35	0.47	0.46	0.48
Rural	0.3	0.36	0.35	0.28
Balochistan	0.32	0.34	0.33	0.33
Urban	0.32	0.35	0.40	0.37
Rural	0.31	0.33	0.30	0.29

Sources: Estimated from Household Income and Expenditure Surveys (HIES)

4 See footnote above. Absolute poverty is also very high in rural Sindh.

2.2 Non-Income Dimensions of Inequality

During the past decade, there has been a growing movement to include more than an income perspective in the examination of inequality. It is argued that income inequalities may not be sufficient to adequately characterize the disparities between individual and/or groups. These concerns have received increasing notice among economists and a broad theoretical literature on the subject of multidimensional inequality is present.[5] Inequalities arise due to a range of economic, social and political factors. Besides income and earnings, some of the most important factors as highlighted by Justino (2003) include; access to land and other physical assets, discrepancies in the use of and access to health, and education and other social services. The research on multi-dimensional inequality suggests that policies aimed at reducing inequalities must consider all dimensions of inequality. Solely targeting differences in income may not be sufficient to eliminate other social and political inequalities that may be highly correlated with poverty and destitution and may exclude some individuals, groups or regions.

The following sub-sections briefly describe three dimensions of non-income inequalities in the context of Pakistan. These are: inequality in land ownership, extent of equity in the level of education of the household head or earners in the household, and regional inequality in terms of various socio-economic facilities and infrastructure availability.

2.2.1 Inequality in Land Ownership

The ownership of land is highly unequal in Pakistan and is considered to be one of the major causes of rural inequality and poverty. Inequality in land ownership and the structure of the agrarian economy has been a long-standing feature of Pakistan. Nearly half of all rural households in Sindh and Punjab do not own any agricultural land at all (SPDC, 2001), while the top 2.5 percent account for over 40 percent of all land owned. Figure-5 displays level of inequality in land ownership in terms of the Gini coefficient[6]. Overall, it seems that the Gini coefficient for inequality was stagnant at 0.63 during the last decade; however, provincial differences exist. The Gini coefficient estimate for Punjab has slightly decreased during 2000, while a slight increase in the Sindh province is observed. Gini estimates for NWFP and Balochistan provinces are quite high. Nonetheless, these two provinces are not significant in terms of agricultural production and landownership,

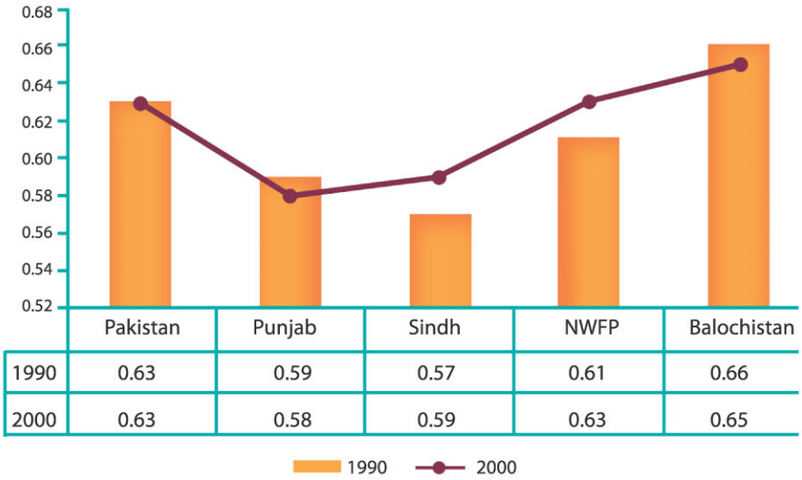
5 See for instance, Atkinson and Bourguignon (1982) and Maasoumi (1986)

6 Gini coefficients for this exercise are computed from the grouped data of Agricultural Censuses. Hence, the magnitudes of coefficients are lower as compared with the Gini computed from individual farm-level data. The standard formula for computing Gini for grouped data is furnished below.

$$Gini = \left| 1 - \sum_{i=1}^{N} (\sigma Y_{i-1} + \sigma Y_i)(\sigma X_{i-1} - \sigma X_i) \right|$$

where; N = Number of Categories
σ = Cumulative Distribution of Values
Y, X = Proportion of farms and land area owned respectively

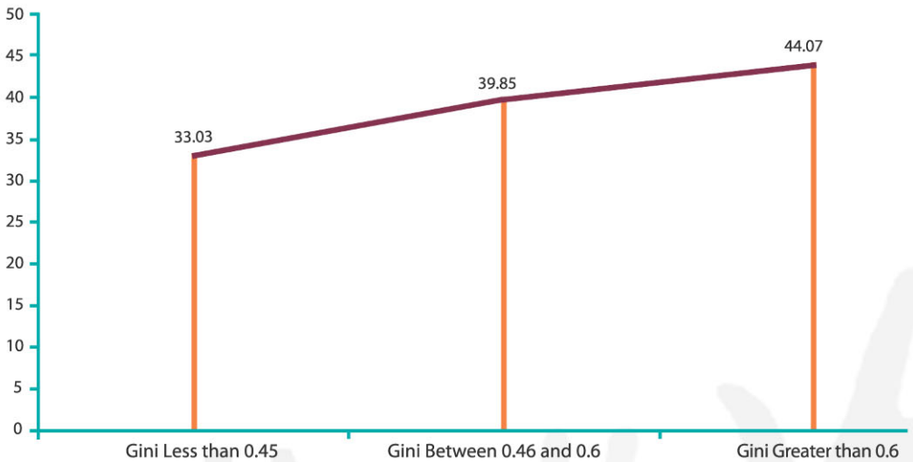
Figure-2
Lowest and Highest Per capita Income Quintile Share- National



	Pakistan	Punjab	Sindh	NWFP	Balochistan
1990	0.63	0.59	0.57	0.61	0.66
2000	0.63	0.58	0.59	0.63	0.65

Sources: Estimated from HIES unit record data. (Various years)

Figure-6
Inequality of Land Ownership and Estimated Poverty Incidence



Sources: Estimated from Pakistan Agriculture Censuses 2000 and HIES, 2000-01

Figure-6 portrays an interesting relationship between land inequality and rural poverty[7]. The analysis is conducted for 49 districts of Punjab and Sindh - the agricultural heartland of the country. Land inequality level for districts is measured through the Gini coefficient; low, medium and high land inequality are defined by Gini coefficient values of less than 0.45, 0.45 to 0.6, and greater than 0.6 respectively. District poverty is assessed in terms of incidence, i.e. the percentage of population below the poverty line[8].

7 For details and other interesting relationships between inequality and deprivation, see SPDC (2004)
8 See Jamal (2005)

Results show that higher land inequality is associated with higher levels of deprivation and poverty. As the value of the Gini coefficient rises from low to high, the incidence of poverty also rises. Poverty in districts where land inequality is high is about 11 percentage points higher than in districts where land inequality is relatively lower.

2.2.2 Inequality in Education Levels

The level of education is highly correlated with income earned. Thus inequality in this dimension is directly related with income inequality. Estimates of inequality in terms of the level of education of head of household or earners in household are displayed in Table-2. A perusal of the table clearly indicates high level of inequality among households, especially in rural areas. Overall, the value of the Gini coefficient is estimated to be 0.74 for 1987-88. Although the Gini estimate for 2004-05 is also very high (0.6), it is encouraging to see a declining trend in both urban as well as rural areas.

Table-2
Inequality in Years of Schooling
[Gini Coefficients]

	1987-88	2004-05
Head of Household		
National	.74	.60
Urban	.57	.45
Rural	.80	.67
Earners		
National	.71	.56
Urban	.55	.40
Rural	.76	.63

Source: Estimated from Household Income and Expenditure Surveys

2.2.3 *Uneven Regional Economic Development*

Regional inequality in terms of economic and infrastructure development is a dimension of overall inequality and significance is added to it when spatial and regional divisions align with political and ethnic tensions to undermine social and political stability. Jamal and Khan (2003) conducted a study on regional (district) inequality and provided inter-temporal changes in multi-dimensional spatial inequality during the early 1980's and the late 1990's. Following the approach adopted by Maasoumi (1989) and Hirscherg et al. (1991), the study developed a multi-dimensional Gini Index[9] that uses a set of 27 variables. These variables relate to measures of economic potential and achieved levels of income and wealth, mechanization and modernization of agriculture, housing quality and access to basic residential services, development of transport and communications, availability of health and education facilities, and labor force characteristics. The list of variables is reproduced in Table-3 for quick reference.

Table-3
Development Indicators used to Measure Multi- dimensional Inequality

Income and Wealth	***Labour Force***
Value added in Manufacturing Sector	*Urban Industrial Labor Force*
Value of major Crops	*Urban Employed Labour Force*
Livestock per Rural Person	*Rural Employed Labour Force*
Bank Branches	
Number of Cars	***Transport and Communication***
	Households with TV
Modernization of Agriculture	*Mettaled\Unmettaled Roads*
Fertilizer Consumption as Percentage of Cropped Area	***Education***
Irrigated Area as Percentage of Cropped Area	*Literacy Ratio (Male\Female)*
Number of Tractors	*Primary Enrollment Rate (Male\Female)*
	Secondary Enrollment Rate (Male\Female)
Housing	*Teacher-Pupil Ratio (Primary\Secondary)*
Persons per Room	***Health***
Pucca Material Used in Walls	*Number of Doctors*
RCC\RBC (Roof)	*Number of Nurses*
Households with Gas Connection	*BHU\RHC Beds per Rural Capita*
Households with Electricity Connection	*Hospitals/Dispensaries Beds per Capita*
Households with Inside Water Connection	

Note: For detailed description of these variables, see Jamal and Khan (2003)

9 The multidimensional *Gini* coefficient is computed as follows:

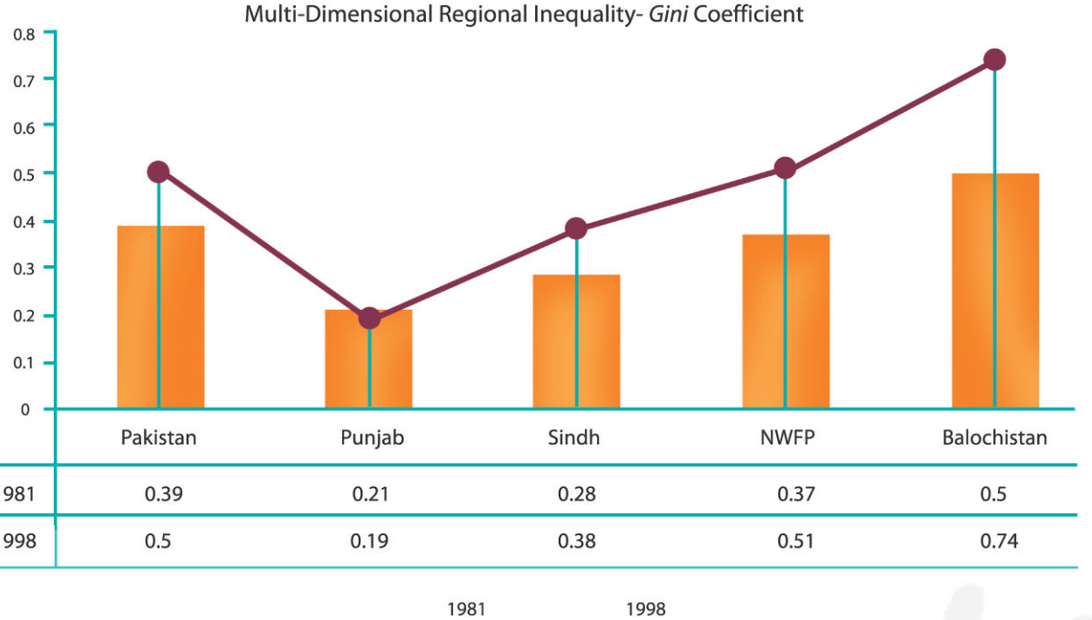
$$G = 1 + (1/n) - [\,(2/n)\,\Sigma\, r_i\, \rho_i\,]$$

where;

$S_i = X_i / \Sigma X_i$ (Share of a district in an attribute)
$\rho_i = S_i / \Sigma S_i$ (Distribution of aggregate attributes)
r_i = Rank of ρ_i

Figure-7 displays multidimensional Gini coefficients for the early 80's (1981) and the late 90's (1998). According to the figure, intra-provincial (district) inequality in 1981 was the highest in Balochistan (0.5), followed by NWFP (0.37) and Sindh (0.28), and was the lowest in Punjab (0.21). The national multi-dimensional Gini coefficient increased by about 28 percent from 0.39 to 0.5. Inequality also increased in all the provinces, except Punjab where it decreased by about 10 percent from 0.21 to 0.19. The highest upsurge was observed in Balochistan. The figure also confirms that no change occurred in the ranking of provinces by the late 1990s.

Figure-7
Multi-Dimensional Regional Inequality- *Gini* Coefficient

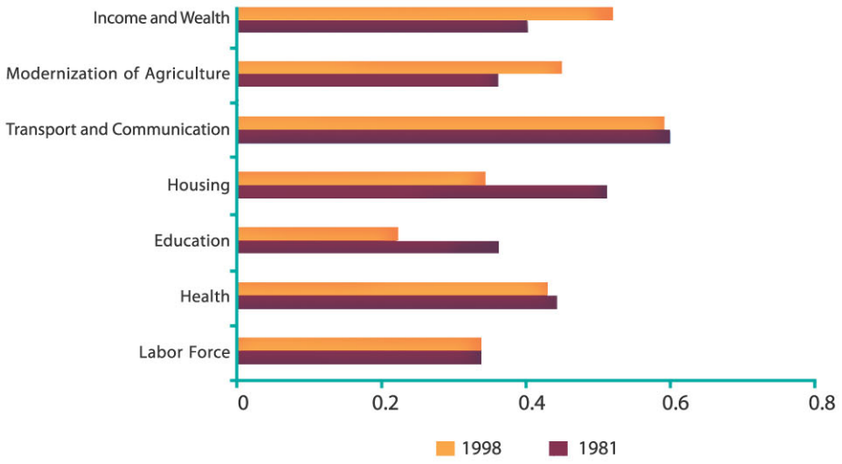


	Pakistan	Punjab	Sindh	NWFP	Balochistan
1981	0.39	0.21	0.28	0.37	0.5
1998	0.5	0.19	0.38	0.51	0.74

Sources: Jamal and Khan (2003)

Multidimensional Gini coefficients by sectors are reported in Figure-8. The highest intra-provincial sectoral inequality is found in the Transport and Communication sector, which has persisted through 1981 till 1998. Inequality has declined in the Education and Housing sectors, with the Gini coefficients declining by about one-third from 0.36 to 0.23 and from 0.51 to 0.34 respectively. Inequality has also increased in the Modernization of Agriculture and Income and Wealth sectors, with the Gini coefficients rising from 0.36 to 0.41 and from 0.4 to 0.52 respectively. The level of inequality has remained more or less constant in the Health and Labour Force sectors. The provincial magnitudes of multi-dimensional sectoral Gini coefficients are presented in Table-4.

Figure-8
Multi-Dimensional Sectoral Inequality
[National Multi-Dimentional *Gini* Coefficients]



Sources: Jamal and Khan (2003)

Table-4
Provincial Multi-Dimensional Sectoral Inequality
[*Gini* Coefficients]

	Punjab		Sindh		NWFP		Balochistan	
Sectors	**1981**	**1998**	**1981**	**1998**	**1981**	**1998**	**1981**	**1998**
Income and Wealth	0.18	0.28	0.23	0.27	0.46	0.51	0.66	0.72
Modernization of Agriculture	0.22	0.23	0.15	0.35	0.40	0.39	0.35	0.66
Transport and Communication	0.49	0.38	0.64	0.60	0.46	0.63	0.71	0.64
Housing	0.41	0.24	0.46	0.28	0.40	0.30	0.59	0.37
Education	0.21	0.15	0.20	0.13	0.22	0.24	0.42	0.22
Health	0.38	0.36	0.39	0.32	0.35	0.39	0.55	0.48
Labor Force	0.12	0.24	0.22	0.22	0.40	0.29	0.32	0.37

Sources: Jamal and Khan (2003)

According to the table, the change in the sectoral inequality rankings between 1981 and 1998 is significant and varied across provinces. Inequality in terms of Income and Wealth sector increased in all the provinces, ranging from about 11 percent in NWFP to 55 percent in Punjab. Except for NWFP, inequality in agriculture also increased in all the provinces, with there being the sharpest increase in Sindh. The Gini coefficient there increased by 133 percent. Inequality in housing declined in all the provinces, with the Gini coefficient falling between 25 and 40 percent. Inequality in the Education and Health sectors also declined in all the provinces, except in NWFP. The sharpest decline in inequality was in education which occurred in Punjab, where the Gini coefficient fell by about 70 percent. The declines in inequality in health were also somewhat more modest. The direction of change in inequality in the Communications and Labour Force sectors were also mixed across the provinces.

3. The Determinants of Income Inequality

Income distribution or inequality may be empirically explained or examined from various perspectives. Some authors focus on testing a specific proposition, for example Thornton (2001) examined whether the Kuznets' hypothesized inverted U-shaped relationship between inequality and the level of development is supported by data. A number of studies attempt to examine the effects of a broad range of factors on

inequality, including government spending, dualism (especially as it relates to agriculture), level of development, etc. For instance, Odedokun and Jeffery (2001) conclude that, "factors identified as having affected income distribution include the level of economic development attained, regional factors, size of government budget and the amount of it devoted to subsidies and transfers, phase of economic cycle, share of agricultural sector in total labour force, as well as human and land resources endowment". Most of these studies were based on multi-country data sets due to the non-availability of sufficient time-series observations for a singly county. However, studies having time series data are preoccupied with determining the effects of selected macroeconomic variables (such as inflation and unemployment level) on income distribution. For instance, Blejer and Guerrero (1990) found that underemployment, inflation, and government spending worsen income distribution while productivity gains, the real interest rate, and the real exchange rate improve distribution. Similarly, Auten and Carroll (1999) examined the effects of fiscal policy, especially tax rate, on inequality.

In the case of Pakistan, Jamal (2006) attempted to identify macro and structural variables that may influence the Gini coefficient, particularly variables that can be manipulated at the policy level to affect income distribution and poverty. The discussion regarding macroeconomic determinants and empirical findings of this study are presented below.

Besides income (per capita GDP), the following variables were used to explore the relationship with income distribution. It was found repeatedly that high inflation (particularly above a level of about 10 percent) hurts the poor and deteriorates income distribution. Further, inflation may be a good proxy for macroeconomic and fiscal stabilization in an economy which are also prerequisites for growth. Therefore changes in food prices are used as a determinant of income inequality. Development expenditure, especially on social services is also important for improving income distribution. More public expenditure on health and education certainly increases the human capital endowment of the poor and hence affects empowerment. A negative relationship is thus hypothesized between development expenditure and inequality estimates.

A major redistribution policy is to make the tax structure pro-poor. It is hypothesized that there is a direct link between a progressive tax structure[10] and equity. Investments, especially in infrastructure, have a major impact on making economic growth pro-poor. Growth in investments is also essential for reducing rate of unemployment and under-employment in the economy. Public investment, by providing infrastructure, plays an important role in reducing poverty and increasing the share of people at the bottom of the income distribution. Two elements of economic structure are included in the analysis: first, the manufacturing to agriculture wage[11] gap and secondly, the manufacturing to agriculture terms of trade[12]. Keeping the economic structure of the country in mind, it is expected that the increase in these ratios will worsen the income distribution and will have a positive relationship with the Gini coefficient[13].

Table-5 exhibits estimated elasticities of macro variables with respect to Gini coefficient[14].

Table-5
Macro Determinants of *Gini* Coefficient

Explanatory Variables	Elasticities	t-Statistic	Significance
GDP Per capita	0.081	3.59	0.0027
Inflation (Food Prices)	0.088	10.49	0.0000
Manufacturing to Agriculture Wage Gap	0.023	3.71	0.0021
Direct to Indirect Tax Ratio	-0.024	-5.20	0.0001
Development Expenditure on Social Services	-0.015	-2.07	0.0566
Investment	-0.037	-2.35	0.0329
Manufacturing to Agriculture Terms of Trade	0.046	1.90	0.0768

Note: For detailed regression specification and results, see Jamal (2006)

The results indicate that average growth worsens distribution and is unlikely to aid in reducing poverty without explicit distribution policies. Powerful evidence of the fact that the nature of growth in Pakistan is 'inequality-increasing' is supported by the fact that an increase in per capita income also raises inequality, with a one percent increase in per capita income raising inequality by 0.081 percent. Food prices (inflation) emerge as the most important determinant of inequality as measured by magnitude of the estimated elasticity.

The analysis shows that a one percent rise in food prices increases inequality by 0.088 percent. Raising direct tax revenues, investment, and development expenditure on social services by one percent each is likely to reduce inequality by 0.024, 0.037, and 0.015 percent respectively. Further, improving agricultural terms of trade and agricultural wages are also likely to reduce inequality by 0.046 and 0.024 percent respectively.

10 The ratio of Direct taxes to Indirect taxes is used as a proxy for progressivity.
11 Sectoral wage is computed as the sectoral value added divided by sectoral labor force.
12 This is the ratio of manufacturing implicit GDP deflator to that of agriculture implicit GDP deflator.
13 Some other possible candidates for explaining inequality, like economic and food subsidies, remittances, unemployment rate etc. were also tested, but not turned out statistically significant.
14 This was a time-series regression analysis. Gini coefficients were interpolated for missing years. For methodology see Jamal (2006).

4. The Impact of Income Inequality on Poverty Incidence

Poverty elasticity with respect to growth depends on the specific poverty measure being used (Kakwani, 1993), the degree of inequality of the income distribution (Revallion, 1997) as well as the specific characteristics of growth episodes, i.e. whether growth is inequality increasing or decreasing. As such, the degree of poverty is hypothesized to be a function of two factors: the average income level of the country and the extent of income inequality.

In general, an increase in average income (growth) reduces poverty. However, measuring the effect of inequality on poverty is slightly more complex than this because inequality can change in infinite ways. It is hard to say anything about the growth-poverty relationship in general when the distribution is allowed to change during growth. Intuitively, progressive distributional change is likely to reduce poverty but this result cannot be generalized without additional assumptions regarding distribution. Kakwani (1993) developed a formula for the inequality elasticity of poverty under the assumption of an equal proportionate change in the Lorenz curve. Under this assumption, it is possible to express the inequality elasticity of poverty as elasticity with respect to the Gini coefficient. Using the assumption of equal proportionate change in the Lorenz curve, Jamal (2006) estimated[15] elasticity of poverty (headcount) with respect to income inequality (Gini) and growth (per capita GDP). The following two sub-sections based on Jamal (2006) and SPDC (2004), provide brief descriptions of econometric results and simulation.

4.1 Relationship between Poverty Incidence and Income Inequality

Time series data on per capita income, poverty incidence (headcount or population below the poverty line) and Gini coefficient are used to estimate the relationship. Square of Gini coefficient is also added to capture the disproportional impact of inequality on poverty[16]. As consumption and income data are collected occasionally from Household Income and Expenditure Surveys, poverty and inequality series are interpolated before estimation. Moreover, a consistent time series of poverty is developed to avoid inter-temporal methodological biases[17]. Table-6 portrays econometric results of the relationship between poverty and income inequality.

The results from the econometric analysis show the importance of income distribution in determining absolute poverty level. The poverty elasticity with respect to an average Gini coefficient is estimated as 3.27, while the estimated poverty elasticity with respect to income is 1.25. The higher elasticity of poverty with respect to the Gini coefficient implies that distribution is more important as a poverty predictor than income and confirms the role of inequality in the prevalence of and/or increase in poverty.

15 The results were also reported in SPDC (2004). Various scenarios regarding the relationship between poverty, inequality and growth are discussed in the report.
16 Ideally Atkinson class of measures or extended Gini should be used with high value of inequality aversion parameters to represent the level of society concern about inequality. Nonetheless, this was not possible due to non-availability of time-series raw data.
17 The data and methodological details for interpolation and construction of consistent poverty estimates are provided in Jamal (2006).

Table-6
Determinants of Poverty
Dependent Variables: Log (Headcount)

Explanatory Variables	Coefficient	t-Statistic	Significance
GDP Per Capita	-1.25	-6.03	0.0000
GINI (%)	51.01	15.67	0.0000
Squared GINI (%)	24.42	13.02	0.0000
Constant	40.04	38.28	0.0000
R-squared	0.988	F-statistic	548.79
Adjusted R-squared	0.986	Probability (F-Statistics)	0.0000
Durbin-Watson stat	1.438	Number of Observations	24

Note: All vairables are in logrithmic form and statistically significant.
LM and ARCH tests are applied and found no evidence of serial correlation.

4.2 Poverty Simulations to Achieve MDG Target

The Integrated Social Policy and Macroeconomic (ISPM) 266-equations model of the Social Policy and Development Centre (SPDC) is employed to simulate poverty and inequality under various assumptions and scenarios. The ISPM model incorporates the social, fiscal, and macroeconomic dimensions of the economy under one interrelated system. It provides the basic framework for analyzing the implications of numerous economic measures on the long-term development of Pakistan's social sectors. The model also contains poverty and inequality modules .

The United Nations Development Programme's Millennium Development Goals (MDGs) target to reduce poverty to half by the year 2015. In Pakistan's case, this translates into reducing the incidence of poverty to 15 percent by 2015. Figure-9 presents the impact of various growth rates on poverty incidence.

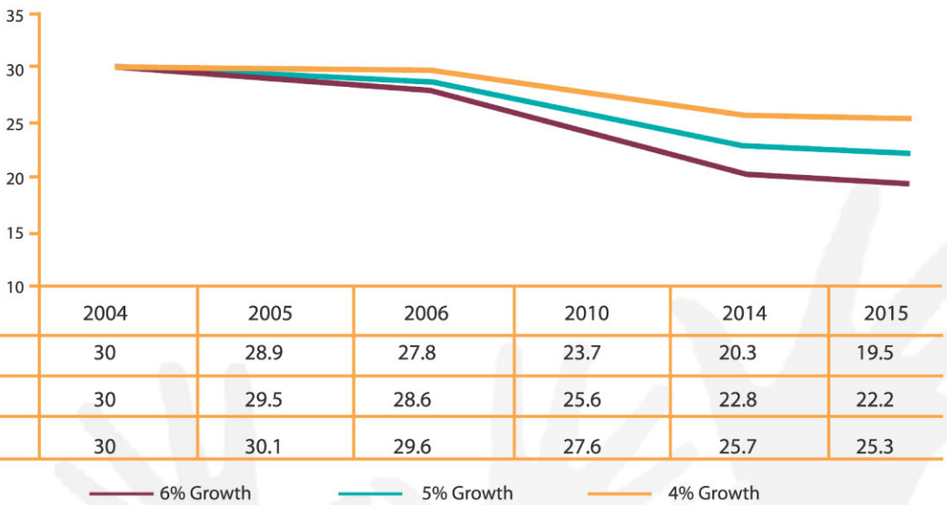
Projecting up to 2015, the model simulations show that if the GDP growth rate continued to be maintained at 6 percent per annum and measures were adopted to hold the Gini coefficient constant at the 2004 level of 0.417, poverty incidence would probably decline to 19.5 percent by 2015. However, with the Gini coefficient held constant at 0.417, lower GDP growth rates of 5 and 4 percent are likely to result in a higher incidence of poverty at 22.2 and 25.3 percent respectively in 2015.

If the objective is to ensure that poverty incidence of 15 percent is achieved by 2015, alternative choices emerge. First, if the Gini coefficient is not held constant and the trend in the growth rate assumed, then reducing poverty incidence to 15 percent by 2015 would require a GDP growth rate of 13.2 percent per annum.

Table-7 presents the simulation results of various combinations of growth and inequality to achieve the target of MDG. According to the table, if the GDP growth rate is assumed to be 6 percent, reducing poverty incidence to 15 percent in 2015 would require the Gini coefficient to be lowered to 0.402. Further, if the GDP growth rate is lower at 5 percent, reducing poverty incidence to 15 percent would require the Gini coefficient to be reduced to 0.392 by 2015. Finally, if the GDP growth rate is to be still lower at 4 percent, reducing poverty incidence to 15 percent would require the Gini coefficient to be even lower at 0.380.

These choices are indeed difficult. It would appear that achieving an average 13 percent annual GDP growth rate over the next decade is economically unrealistic, while the redistribution measures that are required to reduce inequality are politically challenging. At the same time, allowing poverty to escalate any further amounts to curtailing purchasing power and arresting growth and risking social and political unrest as well.

Figure-9
Project Poverty Incidence
Gini Coefficient held constant at 2004 level of 0.417



	2004	2005	2006	2010	2014	2015
6% Growth	30	28.9	27.8	23.7	20.3	19.5
5% Growth	30	29.5	28.6	25.6	22.8	22.2
4% Growth	30	30.1	29.6	27.6	25.7	25.3

Sources: SPDC Macroeconomic Model Simulations

Table-7
Poverty Inciedence Under Alternative Inequality Scenarios

GDP Growth Rate			
	6 Percent	5 Percent	4 Percent
	Inequality *(Gini)* Level Required in Terminal year		
	0.402	0.392	0.380
Years	Projected Percentage of Population Below Poverty Line		
2004	30.0	30.0	30.0
2005	28.1	28.3	28.3
2006	26.3	26.4	26.2
2010	20.4	20.2	19.8
2014	15.9	15.9	15.8
2015	15.0	15.0	15.0

Sources: SPDC Macroeconomic Model Simulations

The analysis presented above establishes the insufficiency of growth alone as a vehicle for poverty reduction, and consequently, the inevitability of engaging with the task of reducing inequality. Of course the big question is how best to improve the distribution of income.

The exercise is notional and its limitations are obvious particularly with respect to the impact of political developments. However, the results provide powerful conclusions and highlight the role of income inequality in poverty reduction.

5. Key Findings at a Glance

This research presents the magnitude of income and non-income inequalities and also evaluates the role of income inequality in poverty reduction. A summary of key findings is furnished in Table-8.

Table-8
Key Findings

1.	**Per Capita Income Inequality – measured by Gini Coefficient**	**1988**	**2005**	
	National	0.35	0.41	↑
	Urban	0.40	0.43	↑
	Rural	0.30	0.35	↑
2.	**Income Inequality – measured by per capita Income Quintile Shares**	**1988**	**2005**	
	National			
	Highest 20 Percent of Population	43.5	48.8	↑
	Lowest 20 Percent of Population	8.8	7.2	↓
	Urban			
	Highest 20 Percent of Population	47.8	50.4	↑
	Lowest 20 Percent of Population	7.8	6.5	↓
	Rural			
	Highest 20 Percent of Population	40.9	43.4	↑
	Lowest 20 Percent of Population	9.6	8.5	↓
3.	**Inequality in land ownership – measured by Gini Coefficient**	**1990**	**2000**	
	Pakistan	0.63	0.63	
	Punjab	0.59	0.58	↓
	Sindh	0.57	0.59	↑
	NWFP	0.61	0.63	↑
	Balochistan	0.66	0.65	↓
4.	**Inequality in Years of Schooling of Head of Household – measured by Gini Coefficient**	**1988**	**2005**	
	National	0.74	0.60	↓
	Urban	0.57	0.45	↓
	Rural	0.80	0.67	↓
5.	**Multidimensional Regional Inequality – measured by Gini Coefficient**	**1981**	**1998**	
	Pakistan	0.39	0.50	↑
	Punjab	0.21	0.19	↓
	Sindh	0.28	0.38	↑
	NWFP	0.37	0.51	↑
	Balochistan	0.50	0.74	↑

6.	**Determinants of Income Inequality– measured by Gini Coefficient**			
	***Gini* elasticity with respect to :**			
	Positive Determinants – Increase Inequality		**(%)**	
	GDP Per capita		**0.081**	
	Inflation (Food Prices)		**0.088**	
	Manufacturing to Agriculture Wage Gap		**0.023**	
	Manufacturing to Agriculture Terms of Trade		**0.046**	
	Negative Determinants – Decrease Inequality			
	Direct to Indirect Tax Ratio		**-0.024**	
	Development Expenditure on Social Services		**-0.015**	
	Investment (Public plus Private)		**-0.037**	
7.	**Income ,Poverty and Inequality Nexus**			
	Elasticity of Poverty (Headcount) with respect to:			
	Income – Per Capita GDP		**1.25**	
	Income Inequality – Gini Coefficient		**3.27**	
8.	**Poverty Simulation (holding Gini constant at 2004 level of 0.417)**			
	Expected Poverty Incidence in 2015 with:			
	6% GDP Growth		**19.5**	
	5% GDP Growth		**22.2**	
	4% GDP Growth		**25.3**	

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Appendix - A

Brief on Inequality Measures

A number of inequality measures have been indicated in the literature to summarize size distribution of any welfare indicator. Usually these indices or measures are classified into two categories; normative measures which are based on some explicit formulation of welfare function and positive measures which do not use the concepts of social welfare explicitly. However, the distinction between these two types of measures is somewhat misleading as all positive measures can be justified in normative terms. The lack of explicit specification of the welfare function in positive measures generated discussions about some axiomatic approaches to compare and analyze these measures to make the underlying assumption clear. Thus each measure of inequality is evaluated in terms of a set of axioms which are based on some concepts of social welfare or ideas of equality.

The Pigou Dalton transfer sensitivity is an important criterion to examine the welfare aspect of inequality measures. Under this axiom, any transfer from a poorer person to a richer person other things remaining the same always increases the magnitude of inequality measure. The axiom of Income Scale Independence requires the inequality measure to be invariant to uniform proportional changes. If an individual's income changes by the same proportion then inequality should not change. The principle of Population Size Independence requires that inequality measures be invariant to replication of population. It means that two identical distributions should not alter inequality index. The Anonymity or Symmetry condition requires that the inequality measure be independent of any characteristics of individual other than their income or the welfare indicator whose distribution is being measured.

The most widely used single measure of inequality is the Gini coefficient which satisfies all above axioms. The Gini Index provides a measure of resource inequality within a population. It is the most popular measure of inequality and summarizes the extent to which actual distribution of resource differs from a hypothetical distribution in which each person/unit receives an identical share. The Gini is defined in a number of ways. A tedious manipulation reveals that it is exactly one-half of the relative mean difference, which is defined as the arithmetic average of the absolute value of differences between all pairs in the distribution. Following Kakwani (1980), the Gini is computed as follows:

$$Gini = \left[\frac{1}{2\mu}\right]\left[\frac{1}{n(n-1)}\right]\left[\sum_{i=1}^{n}\sum_{j=1}^{m}|X_i - X_j|\right]$$

Where is the average level of welfare variable X. Gini is a dimensionless index scaled to vary from a minimum of zero to a maximum of one; zero representing no inequality and one representing the maximum possible degree of inequality.

However, a limitation of the Gini coefficient as a measure of inequality is that it is most sensitive to the middle part of income distribution than to that of extremes because it depends on the rank order weights of income recipients and on the number of recipients within a given range. Thus to capture small changes in extreme parts of income distribution, quintile income shares are also computed to supplement the estimates of Gini coefficient.