ESTIMATING THE CONTRIBUTIONS OF GROWTH AND REDISTRIBUTION TO CHANGES IN POVERTY IN PAKISTAN

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Abstract. This paper investigates the contributions of growth and redistribution to changes in poverty in Pakistan. The study applies Datt and Ravallion (1992) and Kakwani (1997) techniques using data from various household surveys conducted by Federal Bureau of Statistics Pakistan between 1992-93 and 2005-06. The results show that the growth and redistribution effects counteracted each other to affect poverty throughout the period except during 1993-94 and 1996-97, where the both effects were negative implying that they reinforced each other to decrease poverty. Thus, the study implies that the growth alone cannot help reduce poverty particularly in periods during which inequality is deteriorating at the same time. The study concludes that economic growth and income distribution both play a significant role in alleviating poverty. It is, therefore, suggested that policies geared toward alleviating poverty must include strategies to improve income distribution along with sustainable economic growth.

I. INTRODUCTION

According to trickle down theory, all sections of population get benefits from economic growth which influenced economic thinking in the fifties and sixties. There is a view in this regard that the poor get benefits proportionally less than the non-poor from economic growth (Kakwani, Prakash and Son, 2000). Economic growth causes inequality either to increase or decrease or remain constant. Economic growth must result in reduction in poverty

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provided inequality did not deteriorate. But if during the growth process inequality increases, the poor benefit less than the non-poor. Contrary to this, if inequality decreases, the poor get more benefits than the non-poor. Under such situation the growth is regarded as pro-poor. Kakwani and Pernia (2000) define pro-poor growth as one that makes the poor able to actively participate in economic activity and get benefits from it significantly. If during the growth process, there is a sharp rise in inequality; poverty may increase instead of decreasing because the adverse impact of rising inequality offset the favourable impact of growth which implies that inequality effect may dominate the growth effect. Bhaghwati (1988) calls this situation 'immiserizing' growth. Hence it is instructive to ascertain the impact of growth and inequality separately on poverty. Unfortunately, the standard inequality measures such as Gini-coefficient are not useful here. It cannot be concluded that decrease (or increase) in inequality (by any measure meeting the criterion of Pigou-Dalton) will decrease (or increase) poverty. Even when a specific decrease (or increase) in inequality does mean decrease (or increase) in poverty, the change in inequality can be a poor guide to the quantitative impact on poverty.

There is a little work on the decomposition of changes in poverty into growth and redistribution effects in Pakistan. World Bank (2004) decomposed the change in only headcount ratio by applying Datt and Ravallion (1992) technique using the Household Income and Expenditure Surveys data from 1998-99 to 2001-02. Anwer (2007) also applied the same technique for decomposing the changes in only Headcount ratio for the periods 1998-99, 2001-02 and 2004-05. However, it is interesting to note that the sum of components - growth, redistribution and residual in the latter study did not equal to total change in poverty. It means that Ravallion technique has not been used in its true sense. Furthermore, it is also necessary to decompose the changes in poverty gap and squared poverty gap. Whereas Kakwani (1997) technique is concerned, it has never been employed in Pakistan. Thus, this study employs Datt and Ravallion (1992) as well as Kakwani (1997) techniques to decompose changes in poverty indices into growth and distributional effects.

The structure of the paper is as follows: Following introduction, section II offers a literature review on poverty, inequality and decomposition techniques. Section III discusses data and methodologies employed in the estimation of poverty, income inequality and decomposition of changes in poverty into growth and redistribution components. The decomposition results are presented in the section IV. Final section draws some conclusions.

II. LITERATURE REVIEW

The poverty has been estimated by different authors and institutions. The main work on poverty estimation includes Nasim (1973), Alauddine (1975), Kruik and Leeumen (1985), Mujahid (1978), Malik (1988), Zaidi (1992), Malik (1991), Amjad and Kemal (1997), FBS (2001, 2003), World Bank (2002, 2004, 2005, 2008), Anwer and Qureshi (2002), Jamal (2002, 2003), Cheema (2005), Anwer (2006), Planning Commission (2006, 2007) and Jan *et al.* (2008). All of these studies, except Kruik and Leeumen (1985) and Zaidi (1992), estimated absolute poverty line. These studies used different techniques such as arbitrary, Cost of Basic Needs (CBN) or Food Energy Intake (FEI) to estimate poverty lines. Some studies estimated poverty lines for each separate year, while some studies adjusted the same by Consumer Price Index (CPI) or Tornqvist Price Index (TPI). The work on inequality estimation consists of Nasim (1973), Alauddine (1975), Kruik and Leeuwen (1985), Ahmad (2000), FBS (2001, 2003), World Bank (2002, 2004, 2005, 2008) and Planning Commission (2006, 2007). Some of these studies took expenditure, whereas the others income as welfare indicator. Still some studies took households as a unit of analysis, while the others individual. In order to ascertain the true trend in poverty/inequality and to make them comparable, there should be same definition, unit of analysis and the appropriate price index.

With regard to decomposition of changes in poverty into growth and redistribution effects there is a little work in Pakistan. World Bank (2004) decomposed the change in only headcount ratio by applying Datt and Ravallion (1992) technique using the Household Income and Expenditure Surveys data from 1998-99 to 2001-02. Anwer (2007) also applied the same technique for decomposing the changes in only Headcount ratio for the periods 1998-99, 2001-02 and 2004-05. However, it is interesting to note that the sum of components — growth, redistribution and residual did not equal to total change in poverty. It means that Ravallion technique has not been used in its true sense. Furthermore, it is also necessary to decompose the changes in poverty gap and squared poverty gap. Whereas Kakwani (1997) technique is concerned, it has never been employed in Pakistan.

Datt and Ravallion (1992) decomposed variations in poverty into growth and redistribution components for India for the years 1977-78 to 1988 and with respect to Brazil for 1981 to 1988. This technique was followed by Bigsten *et al.* in Ethiopia, Assadzadeh and Paul in Iran, Dhongde in rural west Bengal, Esanov in Kazakhstan and Hammill in Central American States. Kakwani (1997) decomposed the change in poverty in Thailand. Then

it was followed by McCulloch in Zambia, Boccanfuso and Kanbore in Burkina and Senegal, and Dhongde in rural west Bengal.

III. DATA AND METHODOLOGY

DATA

This study utilizes the Household Income and Expenditure Survey (HIES) data for the years 1992-93, 1993-94, 1996-97, 1998-99, 2001-02, 2004-05 and 2005-06 collected by Federal Bureau of Statistics (FBS) Pakistan. Sample size determined by FBS is representative at national and provincial level with rural/urban break up. The detail of households covered during different years is reported in Table 1.

TABLE 1

Households Covered

Year	Sample size (Number of Households)		
	Rural	Urban	Pakistan
1992-93	9006	5586	14592
1993-94	9036	5632	14668
1996-97	8814	5447	14261
1998-99	9148	5523	14671
2001-02	9169	5536	14705
2004-05	8897	5807	14704
2005-06	9203	6234	15437

METHODOLOGY

1.   Measurement of Poverty

This study takes consumption expenditure as a welfare indicator and employs the calorie-based approach to estimate the poverty line using the Household Income and Expenditure Survey (HIES) data collected by Federal Bureau of Statistics (FBS) for the period 1998-99. Paasche Price Index (PPI)

estimated at the primary sampling unit level is used to adjust the price differentials across the regions. Different households differ in size and composition. One household may include more adult male members and the other may include more female members while still the other household may include more children. Following FBS (2001) and World Bank (2002) this study uses equivalent scales which give weight 0.8 to individuals who are less than 18 years old and 1 to individuals who are equal to or greater than 18 years old to reach per adult equivalent so that the expenditures of households be divided by this per adult equivalent and in this way true welfare levels of individuals is ascertained. These scales were used because they seem very close to the reality.

Requirements of calories are not the same for adults and children as well as males and females. This study adjusts the household size using the nutrient based equivalent scales (1985), developed by panning commission, Government of Pakistan (2002). This study estimates poverty line by running a log-log ordinary least squares regression on first three quintiles using 2350 calories per adult equivalent as suggested by the Planning Commission, Government of Pakistan. For the remaining years the same were obtained by adjusting the base poverty line by composite price index which is a combination of consumer price index (CPI) (non-food and non-fuel items) and Tornqvist price index (TPI) (food and fuel items). This index was used in Bangladesh by World Bank (2001). It is notable that this study utilizes Monthly CPIs calculated by FBS (1993-2006), information on interview in different months and TPI estimated from surveys data as well as the group weights of commodities and services of Government of Pakistan (2009) in developing a Composite Price Index. This study estimates first three measures of poverty popularized by Foster, Greer and Thorbecke (1984).

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left[(z - y_i)/z \right]^\alpha$$

If $\alpha = 0$, P_α = Headcount ratio, if $\alpha = 1$, p_α = poverty gap, and if $\alpha = 2$, then p_α = squared poverty gap. This study decomposes the changes in all these poverty measures into growth and redistribution effects.

2. Gini-Coefficient

An Italian statistician Corrado Gini developed an inequality measure called Gini-coefficient. It is defined as a ratio of the area between the diagonal and the Lorenz curve to the total area of half square in which the curve lies (Todaro, 2002).
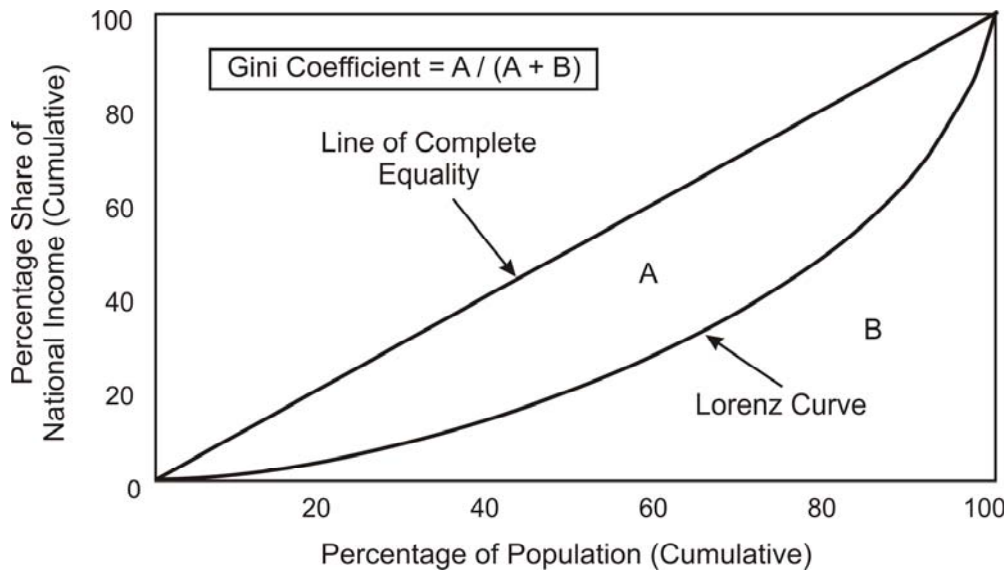
It can be calculated as follows:

$$Gini = \frac{2}{2n^2\bar{\bar{Y}}}\sum_{i=1}^{n}\ \sum_{j=1}^{n}\left|y_i - y_j\right|$$

Litchfield (1999)

Its value ranges between zero and one. The lower the value Gini-coefficient has the more equal the distribution of income is. The higher the value the Gini-coefficient has the more unequal the distribution of income is. Zero value of Gini-coefficient shows perfect equality (every person has equal income) and one value shows perfect inequality (one person has all the income).

3. Decomposition of Changes in Poverty Indices Over Time

This study decomposes the changes in the estimates of poverty measures into the effects of growth and redistribution following the techniques of Datt and Ravallion (1992) and Kakwani (1997). These are given below:

Dynamic Decomposition Method of Datt and Ravallion (1992)

The poverty indices may be written as a function of the poverty line (*z*), average consumption expenditure (*μ*), and parameter of Lorenz curve (*Ψ*):

$$P = P(z, \mu, \psi)$$

Datt and Ravallion (1992) decomposed the changes in poverty indices as follows:

$$P(z,\mu_2,\psi_2) - P(z,\mu_1,\psi_1) \;=\; [P(z,\mu_2,\psi_1) - P(z,\mu_1,\psi_1)] +$$

$$growth\ component$$

$$[P(z,\mu_1,\psi_2) - P(z,\mu_1,\psi_1)] +$$

$$inequality\ component$$

$$[\{P(z,\mu_2,\psi_2) - P(z,\mu_1,\psi_2)\} - \{P(z,\mu_2,\psi_1) - P(z,\mu_1,\psi_1)\}]$$

$$residual$$

Where p denotes poverty indices — Headcount ratio, poverty gap and squared poverty gap; z depicts poverty line which is held constant in both periods 1 and 2; μ_1 and Ψ_1 represent mean expenditure and inequality in expenditure in period 1 respectively; μ_2 and Ψ_2 show mean expenditure and inequality in expenditure in period 2 respectively.

The growth component measures the changes in the indices of poverty because of changes in average consumption expenditure while keeping the expenditure distribution constant. Inequality component calculates the changes in indices of poverty because of changes in distribution of expenditure while holding the mean expenditure fixed. There is a residual which depicts the interaction between growth and redistribution effects and equal to the difference between growth effects estimated at final and initial distributions or the difference between redistribution effects estimated at final and initial means.

Dynamic Poverty Decomposition Method of Kakwani (1997)

The Changes in poverty indices were decomposed into growth and inequality effects by Kakwani (1997) in the following way:

$$P(z,\mu_2,\psi_2) - P(z,\mu_1,\psi_1) \;=\; \frac{1}{2}[\{P(z,\mu_2,\psi_1) - P(z,\mu_1,\psi_1)\} + \{P(z,\mu_2,\psi_2) - P(z,\mu_1,\psi_2)\}]$$

$$growth\ component$$

$$+$$

$$\frac{1}{2}[\{P(z,\mu_1,\psi_2) - P(z,\mu_1,\psi_1)\} + \{P(z,\mu_2,\psi_2) - P(z,\mu_2,\psi_1)\}]$$

$$inequality\ component$$

All symbols carry the same explanations as in the decomposition of changes in poverty indices by Datt and Ravallion (1992) given above. It can be denoted as follows:

$$P_{12} = G_{12} + L_{12}$$

where P_{12} is total poverty effect; G_{12} is growth effect and L_{12} is distribution effect.

This decomposition is exact breakdown of the change in poverty indices into growth and redistribution components and there is no residual. In order to take into account the difference in prices between two periods, mean consumption expenditures — μ_1 and μ_2 is adjusted by the composite price index but poverty line is kept constant in each period.

The total change in poverty between two periods is a combination of two effects namely pure growth and pure inequality effects. The pure growth effect of the change in poverty is regarded as the proportional change in poverty when mean consumption expenditure varies but distribution of expenditure remains constant. The pure inequality effect is regarded as the proportional change in poverty when the distribution of expenditure changes but mean consumption expenditure is held constant.

IV. RESULTS AND DISCUSSIONS

Poverty and inequality estimates are presented in Tables 2 and 3 while the decomposition of changes in poverty results are provided in Table 4.

TABLE 2

Poverty Estimates Across Region from 1992-93 to 2005-06

Year	Headcount Ratio			Poverty Gap			Squared Poverty Gap		
	Rural	Urban	Pak-istan	Rural	Urban	Pak-istan	Rural	Urban	Pak-istan
1992-93	27.74	20.03	25.55	4.63	3.46	4.30	1.19	0.90	1.11
1993-94	34.92	16.54	29.49	6.64	2.92	5.54	1.89	0.75	1.56
1996-97	31.23	16.47	26.71	5.56	2.58	4.65	1.48	0.64	1.22
1998-99	34.58	20.76	30.54	7.37	4.12	6.42	2.32	1.24	2.00
2001-02	39.22	22.72	34.45	8.02	4.52	7.01	2.44	1.34	2.12
2004-05	28.25	15.01	24.05	5.64	2.91	4.77	1.77	0.86	1.48
2005-06	27.95	13.81	23.19	5.13	2.18	4.14	1.43	0.55	1.14

Source: Author's own calculation

Table 2 shows that there was increasing trend in headcount ratio between 1992-93 through 2001-02 except between 1993-94 and 1996-97 in Pakistan. The similar trend was observed for poverty gap and squared poverty gap. The main reason for the increase in poverty measures between 1992-93 and 1993-94 was that the performance of the agriculture sector remained negative in the previous year 1991-92. Whereas the main reason for the reduction in poverty estimates during 1993-94 and 1996-97 was

rising growth rate in agriculture sector in the preceding year 1995-96. It is interesting to note that over the period from 1996-97 to 1998-99, despite the positive growth rates in all sectors of the economy, poverty estimates showed increase. The reason was that the rising inequality outweighed the growth effect resulting in increase in poverty. The increasing trend in the estimates of all poverty measures was also observed during 1998-99 and 2001-02, but here the reason was drought and negative growth rate of agriculture sector. From 2001-02 through 2005-06 decreasing trend was shown by all poverty measures estimated in this study. The reasons were positive growth rates in agriculture and manufacture sectors. The table also depicts that the rural areas experienced more severe poverty than the urban areas throughout the period.

TABLE 3

Gini-Coefficient Over Time Across Region in Pakistan

Year	Rural	Urban	Pakistan
1992-93	0.2388	0.3170	0.2685
1993-94	0.2344	0.3071	0.2709
1996-97	0.2265	0.2877	0.2585
1998-99	0.2521	0.3583	0.3012
2001-02	0.2366	0.3217	0.2749
2004-05	0.2518	0.3381	0.2969
2005-06	0.2438	0.3473	0.3000

Source: Author's own calculation

Table 3 shows that the inequality depicted a fluctuating trend from 1992-93 to 2001-02 in Pakistan. After this, there was continuously increasing trend up to 2005-06. The table also depicts that inequality was higher in urban areas as compared to rural areas.

DECOMPOSITION OF POVERTY CHANGES INTO GROWTH AND REDISTRIBUTION

This study decomposes the changes in the estimates of poverty indices into growth and redistribution components following the methodologies of Ravallion and Datt (1992) as well as Kakwani (1997) in Pakistan. The decomposition results are presented in Table 4.

TABLE 4

Decomposition of Changes in Poverty in Pakistan
following Ravallion and Datt (1992) and Kakwani (1997)

| Poverty Indices | Period/ Region | Total Change in Poverty | Explained by | | | | Resi-dual* |
| | | | Component of Growth | | Component of Redistribution | | |
			Raval-lion	Kak-wani	Raval-lion	Kak-wani	
1992-93 to 1993-94							
Headcount Ratio	Pakistan	3.94	4.36	4.28	–0.26	–0.34	–0.16
	Rural	7.18	9.11	8.99	–1.69	–1.81	–0.24
	Urban	–3.49	–0.93	–1.255	–1.91	–2.235	–0.65
Poverty Gap	Pakistan	1.24	1.05	1.035	0.22	0.205	–0.03
	Rural	2.01	2.25	2.185	–0.11	–0.175	–0.13
	Urban	–0.54	–0.27	–0.255	–0.30	–0.285	0.03
Squared Poverty Gap	Pakistan	0.45	0.32	0.33	0.11	0.12	0.02
	Rural	0.70	0.71	0.695	0.02	0.005	–0.03
	Urban	–0.15	–0.08	–0.08	–0.07	–0.07	0
1993-94 to 1996-97							
Headcount Ratio	Pakistan	–2.78	–0.55	–0.535	–2.26	–2.245	0.03
	Rural	–3.69	–1.57	–1.735	–1.79	–1.955	–0.33
	Urban	–0.07	2.18	1.86	–1.61	–1.93	–0.64
Poverty Gap	Pakistan	–0.89	–0.13	–0.12	–0.78	–0.77	0.02
	Rural	–1.08	–0.44	–0.43	–0.66	–0.65	0.02
	Urban	–0.34	0.33	0.315	–0.64	–0.655	–0.03
Squared Poverty Gap	Pakistan	–0.34	–0.05	–0.045	–0.30	–0.295	0.01
	Rural	–0.41	–0.14	–0.135	–0.28	–0.275	0.01
	Urban	–0.11	0.11	0.095	–0.19	–0.205	–0.03
1996-97 to 1998-99							
Headcount Ratio	Pakistan	3.83	–2.96	–2.9	6.67	6.73	0.12
	Rural	3.35	–0.53	–0.6	4.02	3.95	–0.14
	Urban	4.29	–5.68	–6.15	10.91	10.44	–0.94
Poverty Gap	Pakistan	2.54	–0.70	–0.77	2.61	2.54	–0.14
	Rural	1.81	–0.18	–0.19	2.01	2.00	–0.02
	Urban	1.54	–1.02	–1.375	3.27	2.915	–0.71
Squared Poverty Gap	Pakistan	0.78	–0.21	–0.26	1.09	1.04	–0.10
	Rural	0.84	–0.06	–0.065	0.91	0.905	–0.01
	Urban	0.6	–0.27	–0.44	1.21	1.04	–0.34
1998-99 to 2001-02							
Headcount Ratio	Pakistan	3.91	7.17	7.47	–3.86	–3.56	0.6
	Rural	4.64	5.48	6.045	–1.97	–1.405	1.13
	Urban	1.96	8.67	7.81	–4.99	–5.85	–1.72

Poverty Indices	Period/ Region	Total Change in Poverty	Explained by				Resi- dual*
			Component of Growth		Component of Redistribution		
			Raval- lion	Kak- wani	Raval- lion	Kak- wani	
Poverty Gap	Pakistan	0.59	2.14	2.06	–1.39	–1.47	–0.16
	Rural	0.65	1.72	1.71	–1.05	–1.06	–0.02
	Urban	0.40	2.26	2.025	–1.39	–1.625	–0.47
Squared Poverty Gap	Pakistan	0.12	0.82	0.75	–0.56	–0.63	0.14
	Rural	0.12	0.65	0.62	–0.47	–0.50	–0.06
	Urban	0.10	0.81	0.695	–0.48	–0.595	–0.23
2001-02 to 2004-05							
Headcount Ratio	Pakistan	–10.40	–13.71	–13.645	3.18	3.245	0.13
	Rural	–10.97	–13.29	–12.84	1.42	1.87	0.90
	Urban	–7.71	–10.03	–10.85	3.96	3.14	–1.64
Poverty gap	Pakistan	–2.24	–3.34	–3.505	1.43	1.265	–0.33
	Rural	–2.38	–3.25	–3.315	1.00	0.935	–0.13
	Urban	–1.61	–2.42	–2.595	1.16	0.985	–0.35
Squared Poverty Gap	Pakistan	–0.64	–1.12	–1.225	0.69	0.585	–0.21
	Rural	–0.67	–1.11	–1.17	0.56	0.50	–0.12
	Urban	–0.48	–0.77	–0.87	0.49	0.39	–0.20
2004-05 to 2005-06							
Headcount Ratio	Pakistan	–0.86	–1.53	–1.59	0.79	0.73	–0.12
	Rural	–0.30	0.16	0.205	–0.55	–0.505	0.09
	Urban	–1.20	–1.22	–1.755	1.09	0.505	–1.07
Poverty Gap	Pakistan	–0.63	–0.36	–0.375	–0.24	–0.255	–0.03
	Rural	–0.51	0.04	0.035	–0.54	–0.545	–0.01
	Urban	–0.73	–0.37	–0.38	–0.34	–0.35	–0.02
Squared Poverty Gap	Pakistan	–0.34	–0.12	–0.12	–0.22	–0.22	0
	Rural	–0.34	0.02	0.015	–0.35	–0.355	–0.01
	Urban	–0.30	–0.12	–0.11	–0.20	–0.19	0.02
1992-93 to 2005-06							
Headcount Ratio	Pakistan	–2.36	–7.49	–7.325	4.80	4.965	0.33
	Rural	0.21	–0.28	–0.215	0.36	0.425	0.13
	Urban	–6.22	–10.15	–11.27	6.17	5.05	–2.24
Poverty Gap	Pakistan	–0.16	–1.53	–1.67	1.65	1.51	–0.28
	Rural	0.50	–0.05	–0.055	0.56	0.555	–0.01
	Urban	–1.28	–2.11	–2.445	1.50	1.165	–0.67
Squared Poverty Gap	Pakistan	0.03	–0.44	–0.515	0.62	0.545	–0.15
	Rural	0.24	–0.02	–0.02	0.26	0.26	0
	Urban	–0.35	–0.58	–0.715	0.50	0.365	–0.27

*There is no residual in Kakwani technique.

Source: Author's own calculation

Analysis of decomposition of changes in the estimates of all poverty measures shows that some time redistribution and growth effects counteracted and some time they reinforced each other to affect poverty in Pakistan. During 1992-93 and 1993-94 the growth and redistribution effects counteracted each other to affect poverty in terms of headcount ratio, but reinforced for poverty gap and squared poverty gap. For the headcount ratio the growth component was positive indicating that the decline in mean expenditure contributed to the increase in poverty, while the redistribution component was negative showing that the improvement in distribution counteracted to lessen the adverse effect of growth on poverty. Negative sign of redistribution effect suggests that incidence of poverty would have increased more than what is observed if the distribution had not improved. By component according to Ravallion technique growth component accounted for 4.36 percentage points to the increase in poverty, while redistribution component accounted for 0.26 percentage points to mitigate the adverse effect of the former. There was residual equal to –0.16 percentage points. The growth effect was positive enough to outweigh the favourable effect of improved distribution resulting in increase in headcount ratio.

According to Kakwani technique, distributionally neutral growth accounted for 4.28 percentage points in the poverty enhancement, whereas the redistribution effect accounted for 0.34 percentage points to reduce the adverse impact of the former. There was no residual. Thus according to both techniques the growth component was dominant over the redistribution component causing poverty to increase (*see* Figure 1 at Appendix). The result depicts improvement in distribution of expenditure during the period. This result suggests that conventional inequality indices are poor guide to the way shifts in distribution can affect the estimates of poverty indices. For example, Gini-coefficient showed an increasing trend during the period (*see* Table 3). On the contrary, Shifts in distribution did have favourable impact on the headcount ratio, which was not captured by Gini-coefficient.

But the decomposition of changes in poverty in terms of poverty gap and squared poverty gap depicts that during the same period the growth and redistribution effects were positive indicating that the decline in mean expenditure and deterioration in distribution reinforced each other to increase poverty (*see* Figures 2 and 3 at Appendix). Positive sign of redistribution suggests that poverty would have increased much less if the redistribution had not deteriorated. The negative sign of redistribution component for the headcount ratio and positive one for the poverty gap and squared poverty gap suggests that the poor became better off, whereas the poorest worse off. The

decline in mean expenditure was the result of negative agriculture growth during 1992-93. Excessive rains and floods damaged severely the major crops. Leaf curl virus attacked cotton crops. All these factors contributed to the negative growth in major crops resulting in negative growth in agriculture sector.

During 1993-94 and 1996-97 for all poverty measures both Ravallion and Kakwani's techniques of decomposition show that both the growth and redistribution components were negative indicating that both components reinforced each other to reduce poverty (*see* Figures 1 to 3 at Appendix). Under such situation, the growth is regarded as pro-poor (Kakwani and Pernia, 2000). The bulk of the reduction in poverty was brought about by redistribution component. The increase in mean expenditure was brought about by growth in agriculture sector. But during 1996-97 through 2004-05 growth and redistribution components counteracted each other to affect poverty. During 1996-97 and 1998-99 although the growth was poverty reducing, yet a sharp deterioration in distribution led to net increase in poverty in terms of all poverty measures after offsetting the favourable effects of increase in mean expenditure (*see* Figures 1 to 3 at Appendix). Bhagwati (1988) regards such situation as 'immiserizing' growth. Strong positive sign of redistribution component reflects that poverty would have decreased instead of increasing if the redistribution had not worsened. Whereas between 1998-99 and 2001-02 adverse growth in mean expenditure was the driving force to increase poverty after outweighing the favourable effects of improved distribution (*see* Figures 1 to 3 at Appendix). Negative sign of redistribution suggests that poverty would have increased much more if the distribution had not improved. These results are consistent with those of World Bank (2004). The latter study decomposed the change in only headcount ratio.

Between 2001-02 and 2004-05 for all poverty measures growth component was negative, while redistribution was positive. It implies that the increase in mean expenditure contributed to the reduction in poverty, while the deterioration in distribution counteracted to lessen the favourable impact of the former. During this period growth effect dominated the redistribution one and resulted in reduction in poverty (*see* Figures 1 to 3 at Appendix). Agriculture and manufacturing sectors contributed towards the increase in mean expenditure.

During 2004-05 and 2005-06 both techniques demonstrate that for the headcount ratio growth component contributed to decrease poverty, but change in distribution counteracted to lessen the favourable impact of the

former on poverty. The growth component was dominant over the redistribution one resulting in decrease in poverty (*see* Figure 1 at Appendix). For the poverty gap and squared poverty gap both components reinforced each other to reduce them. Both techniques show that growth contributed more to reduce poverty gap as compared to redistribution, but for the squared poverty gap change in distribution led more to decrease it than the increase in mean expenditure (*see* Figures 2 and 3 at Appendix). The result demonstrates improvement in distribution of expenditure for the poverty gap and squared poverty gap. This result suggests that a conventional inequality index may be a poor guide to the way shifts in distribution can affect the estimates of measures of poverty. For example, Gini-coefficient showed increase in inequality during the period (*see* Table 3). On the contrary, shifts in distribution did have a favourable impact on the poverty gap and squared poverty gap, which was not captured by the inequality index. The sign of redistribution effect was positive for the headcount ratio, but negative for poverty gap and squared poverty gap. It may imply that the poor became worse off, while the poorest better off. The increase in mean expenditure was the result of favourable growth in manufacturing sector.

Over the period as a whole, 1992-93 to 2005-06 both techniques produced the same results for the headcount ratio and squared poverty gap, but different ones for the poverty gap (*see* Figure 4). Both techniques showed that growth effect led to a net decrease in headcount ratio, while redistribution effect brought about a net increase in squared poverty gap. But for the poverty gap according to Ravallion technique, though the distributional shift (+1.65 percentage points) dominated the favourable growth effect (–1.53 percentage points), yet poverty decreased. There was residual (–0.28%). Thus, combined effect of growth and residual contributed to the poverty reduction. But according to Kakwani technique there was clear picture regarding the contributions made by growth and redistribution to affect poverty. Growth effect (–1.67 percentage points) dominated the distributional shift (+1.51 percentage points) resulting in net reduction of 0.16 percentage points. The favourable growth rate in manufacturing sector contributed more toward increasing the mean expenditure than that of agriculture sector.

DECOMPOSITION OF CHANGES IN POVERTY AT RURAL/URBAN LEVEL

The analysis of decomposition of changes in poverty at regional level during 1992-93 and 1993-94 shows that in the rural area a sharp decline in mean

expenditure led to net increase in poverty in terms of poverty incidence and poverty gap after offsetting the favourable impact of change in distribution on poverty, but in case of squared poverty gap the both effects reinforced each other to increase it while in urban area both growth and redistribution effects reinforced each other to decrease poverty (*see* Figures 5 to 7 at Appendix). In urban area bulk of the reduction in headcount ratio and poverty gap was brought about by shifts in distribution according to both techniques, while for the squared poverty gap increase in mean expenditure brought about more reduction as compared to distributional shift.

But during 1993-94 and 1996-97 the increase in mean expenditure and change in distribution reinforced each other to decrease poverty in terms of all poverty measures in rural area, while in urban area the growth and redistribution components counteracted each other to affect poverty. Decomposition by Ravallion technique in urban area for the headcount ratio produced different results from that of Kakwani technique. According to Ravallion technique, though the adverse growth (+2.18 percentage points) dominated the improved distribution (–1.61 percentage points), yet poverty decreased. There was residual (–0.64%). Thus combined effect of redistribution and residual contributed to the poverty reduction. But according to Kakwani technique there was clear picture regarding the contributions made by growth and redistribution to affect poverty. Distributional shift (–1.93 percentage points) dominated the adverse growth effect (+1.86 percentage points) resulting in net reduction of 0.07 percentage points. But for the poverty gap and squared poverty gap in urban area both techniques demonstrate that shifts in distribution brought about net decrease in them after offsetting the adverse effects of decline in mean expenditure (*see* Figures 6 and 7 at Appendix).

Between 1996-97 and 1998-99 in both rural and urban areas worsening in distribution led to an increase in all poverty rates after offsetting the favourable impact of increase in mean expenditure according to both techniques (*see* Figures 5 to 7 at Appendix). But during 1998-99 and 2001-02 in rural and urban areas adverse growth effect outweighed the favourable impact of improvement in distribution and resulted in net increase in all poverty indices (*see* Figures 5 to 7 at Appendix). It is notable that in urban area the improvement in distribution negated much of the effect of adverse growth. While in rural area though the growth was less adverse, smaller redistribution effect implied that poverty increased more in rural area as compared to urban area. These results are consistent with those of World Bank (2004). Over the period from 2001-02 to 2004-05 in both rural and urban areas growth effect was poverty reducing, whereas distributional shift

was poverty enhancing. The growth effect was dominant over the redistribution one and resulted in reduction in poverty in terms of all poverty indices (*see* Figures 5 to 7 at Appendix).

Between 2004-05 and 2005-06 in rural area improvement in distribution of expenditure brought about net decrease in poverty after offsetting the adverse effect of decline in mean expenditure caused by negative growth in major crops, while in urban area for the headcount ratio a sharp rise in mean expenditure led to net reduction in poverty after outweighing the impact of worsening in distribution on poverty (*see* Figures 5 at Appendix). For the poverty gap and squared poverty gap both effects reinforced each other to reduce them. Shifts in distribution of expenditure contributed more as compared to increase in mean expenditure (*see* Figures 6 and 7 at Appendix). The results in urban area for the poverty gap and squared poverty gap show improvement in distribution of expenditure during the period. This result suggests that inequality indices are poor guide to the way the shifts in distribution may affect poverty. For example, Gini-coefficient depicted increasing trend in urban area. On the contrary, changes in distribution did have favourable impact on poverty indices, which was not captured by the inequality indices.

The analysis of decomposition at rural/urban level over the period as a whole, 1992-93 to 2005-06 depicts that in rural area the distributional changes brought about net increase in all of poverty measures after offsetting the favourable impact of growth on poverty, whereas in urban area growth effect led to net decrease in them after outweighing the adverse impact of distributional change (*see* Figure 8 at Appendix).

V. CONCLUSION AND POLICY IMPLICATIONS

The study examines the contributions of growth and redistribution to changes in poverty in rural/urban and overall Pakistan using the household income and expenditure surveys data collected by Federal Bureau of Statistics (FBS) Pakistan. The study applies Datt and Ravallion (1992) and Kakwani (1997) techniques. The results depict that the growth is an important factor for the alleviating poverty provided inequality does not deteriorate. If inequality worsens during the growth process, some part of the growth is offset. When there is sharp rise in inequality, it is quite possible that it outweighs the favourable effects of growth resulting in increase in poverty.

The policy implication is that growth *per se* cannot be depended on for the reduction of poverty. In order to achieve the objective of poverty

reduction, it is suggested that a two-prong strategy focusing economic growth coupled with a simultaneous improvement in income distribution be adopted.

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FIGURE 1

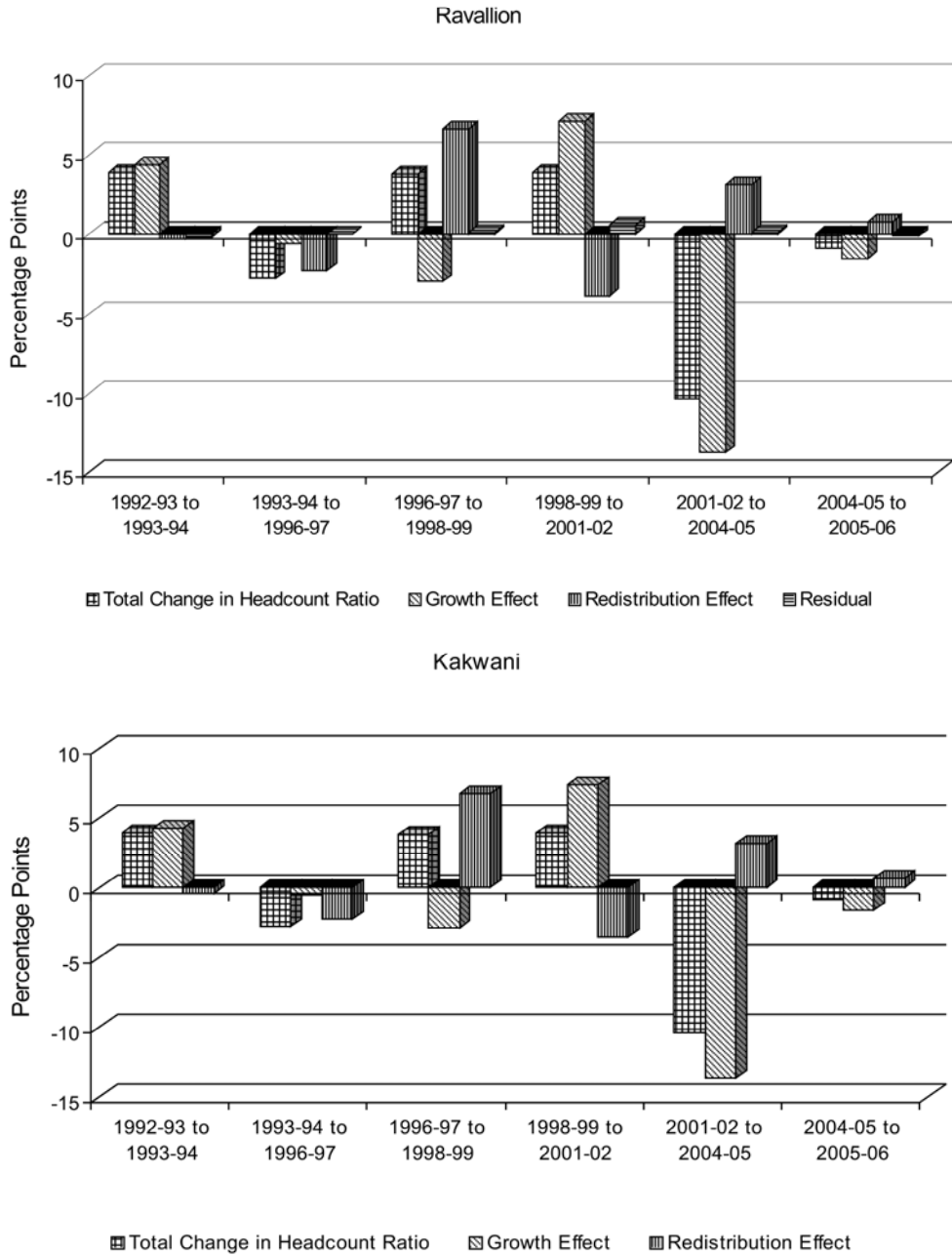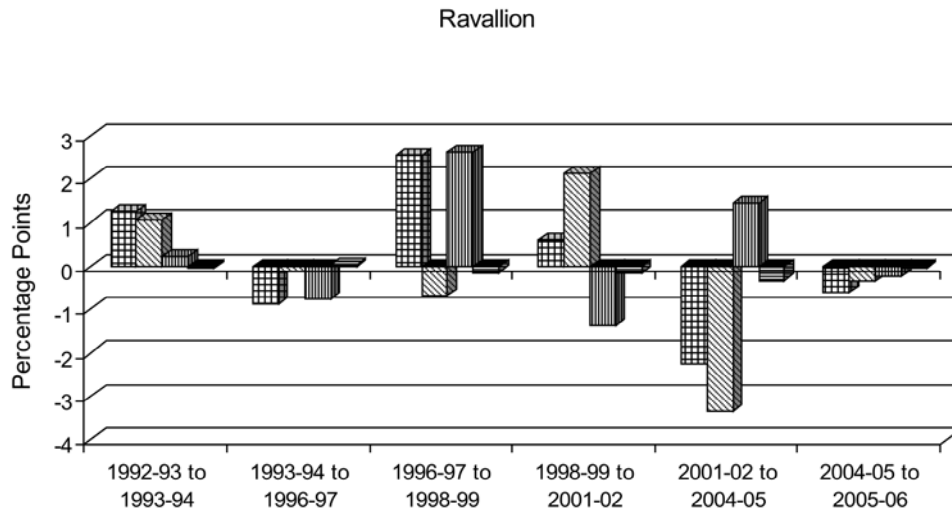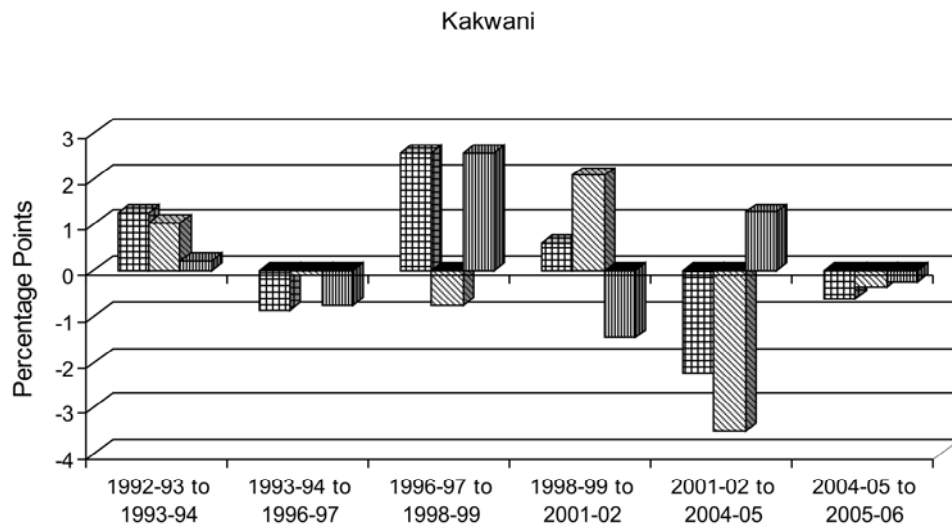Decomposition of Changes in Headcount Ratio
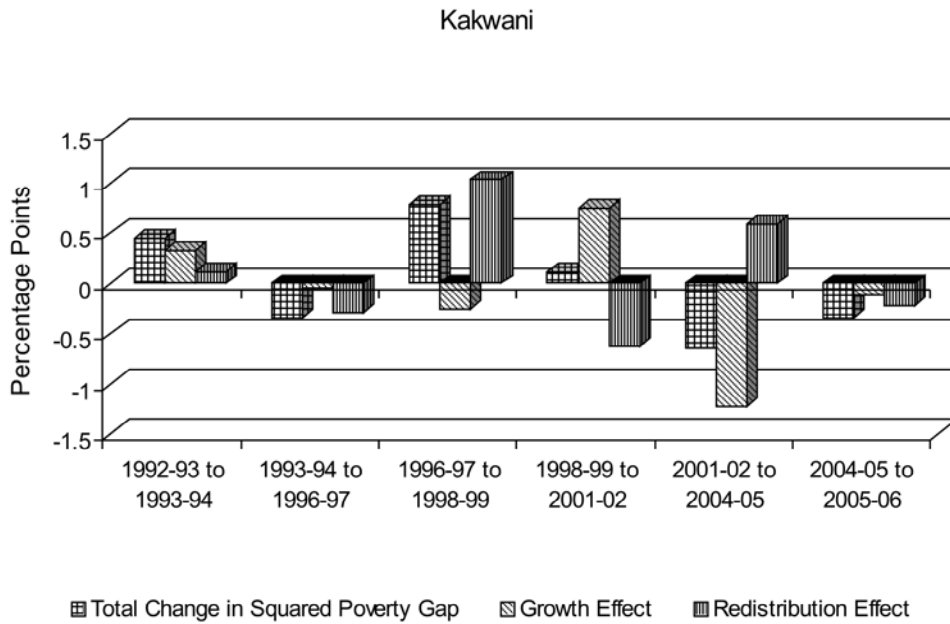in Pakistan, 1992-93 to 2005-06

Ravallion

Kakwani

FIGURE 2

Decomposition of Changes in Poverty Gap
in Pakistan, 1992-93 to 2005-06

Ravallion

Kakwani

FIGURE 3

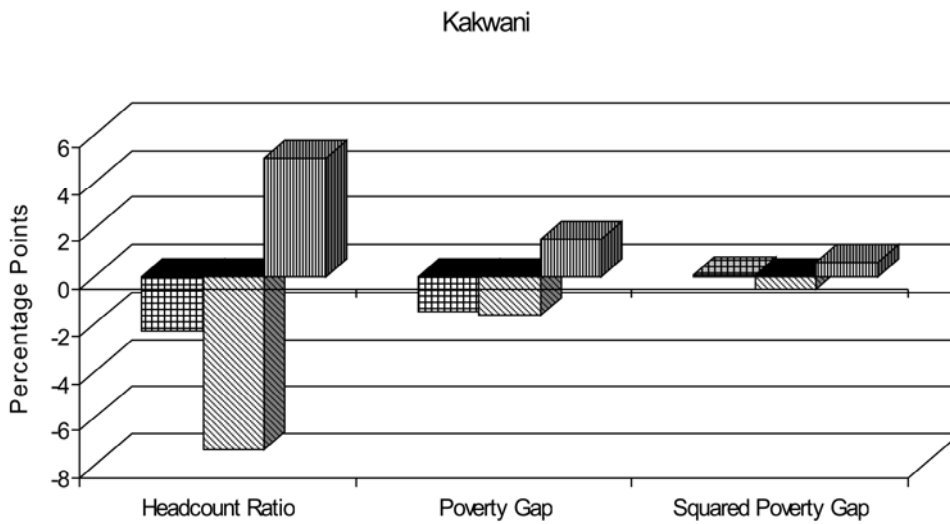Decomposition of Changes in Squared Poverty Gap
in Pakistan, 1992-93 to 2005-06

Ravallion

⊞ Total Change in Squared Poverty Gap   ▨ Growth Effect   ▥ Redistribution Effect   ▦ Residual

Kakwani

⊞ Total Change in Squared Poverty Gap   ▨ Growth Effect   ▥ Redistribution Effect
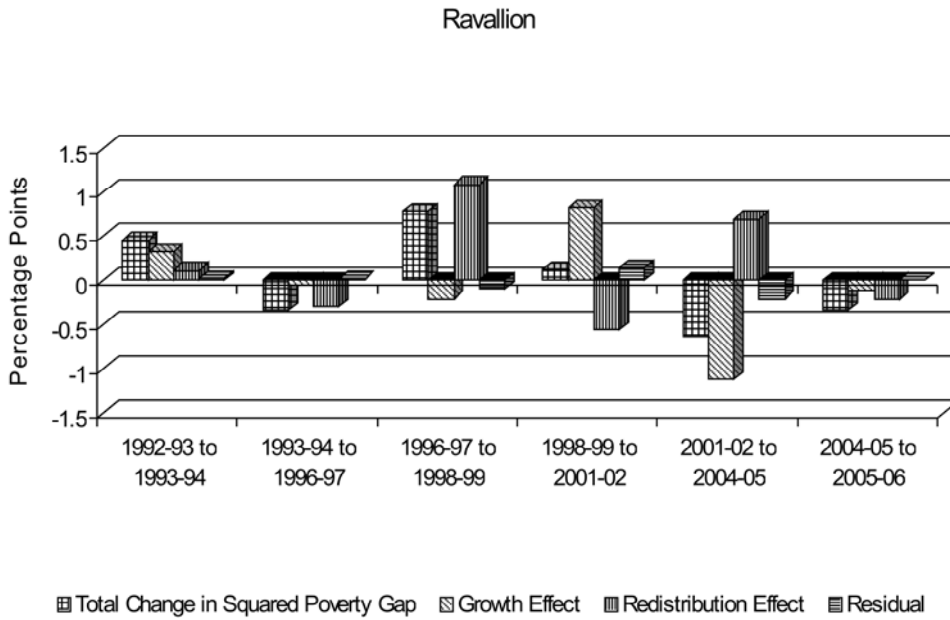
FIGURE 4

Decomposition of Changes in Poverty Indices
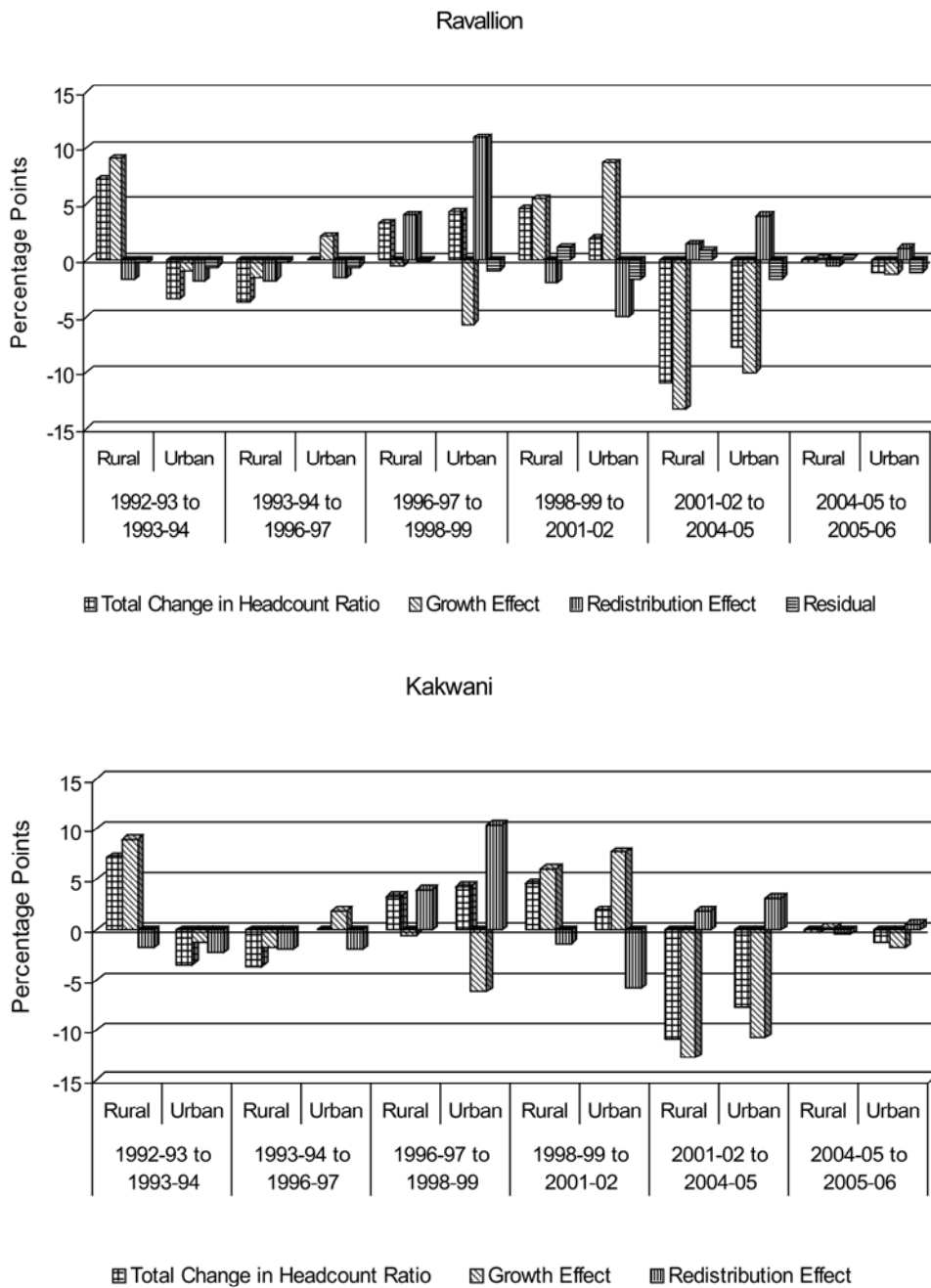in Pakistan, 1992-93 to 2005-06
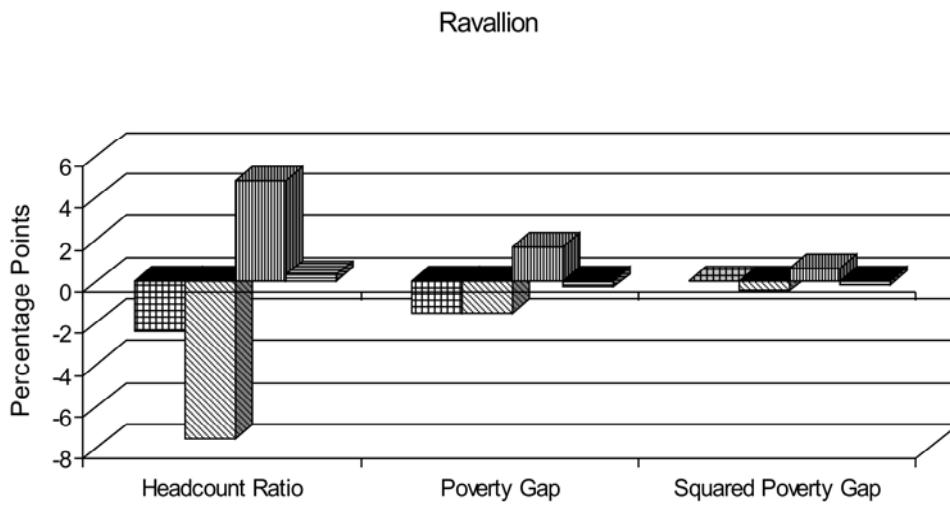
FIGURE 5

Decomposition of Changes in Headcount Ratio
by Rural/Urban Pakistan, 1992-93 to 2005-06

Ravallion

☒ Total Change in Headcount Ratio   ☒ Growth Effect   ☒ Redistribution Effect   ☒ Residual

Kakwani

☒ Total Change in Headcount Ratio   ☒ Growth Effect   ☒ Redistribution Effect

FIGURE 6

Decomposition of Changes in Poverty Gap
by Rural/Urban Pakistan, 1992-93 to 2005-06

Ravallion

⊞ Total change in Poverty gap   ▨ Growth effect   ▥ Redistribution effect   ☷ Residual

Kakwani

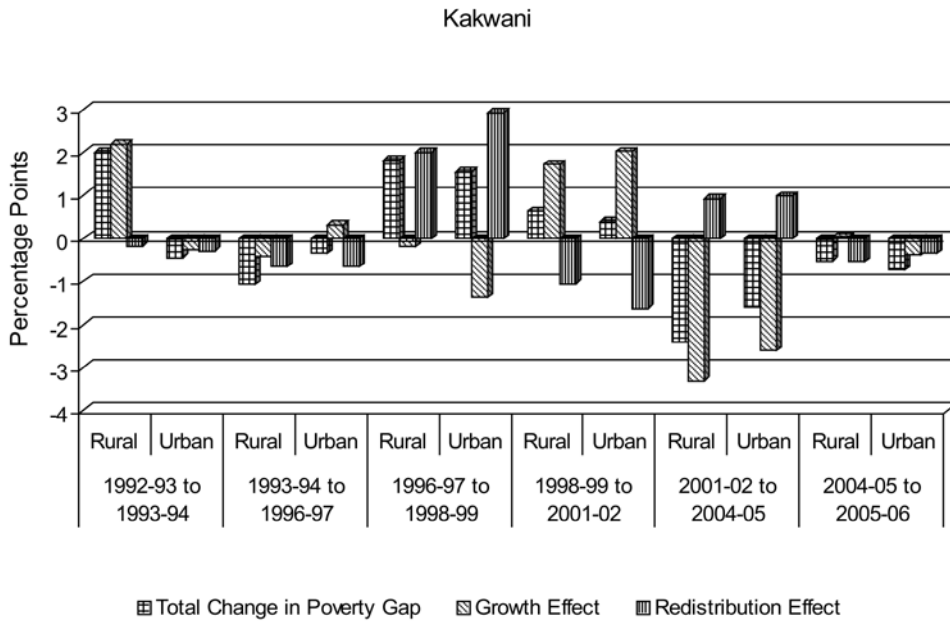⊞ Total Change in Poverty Gap   ▨ Growth Effect   ▥ Redistribution Effect
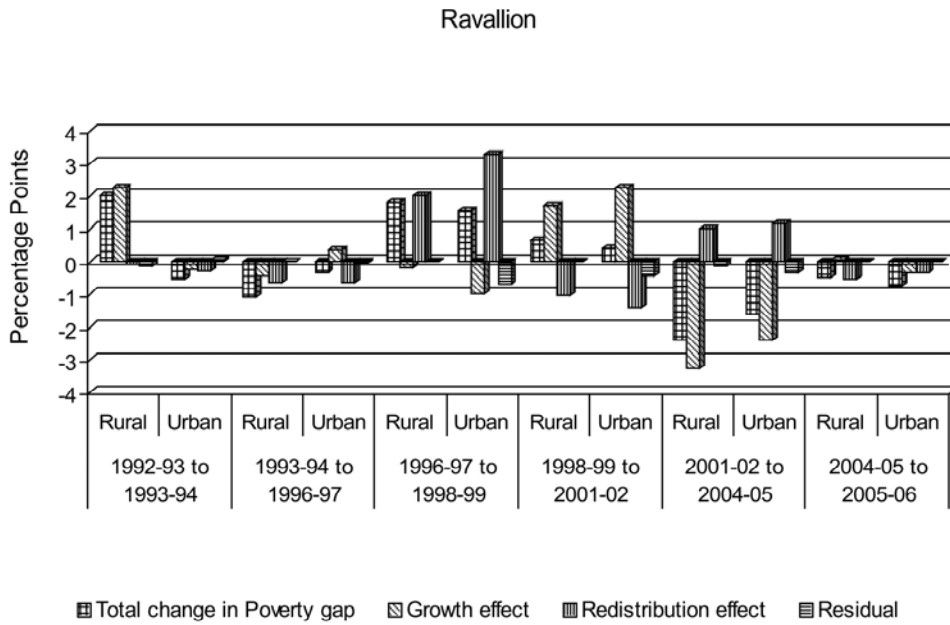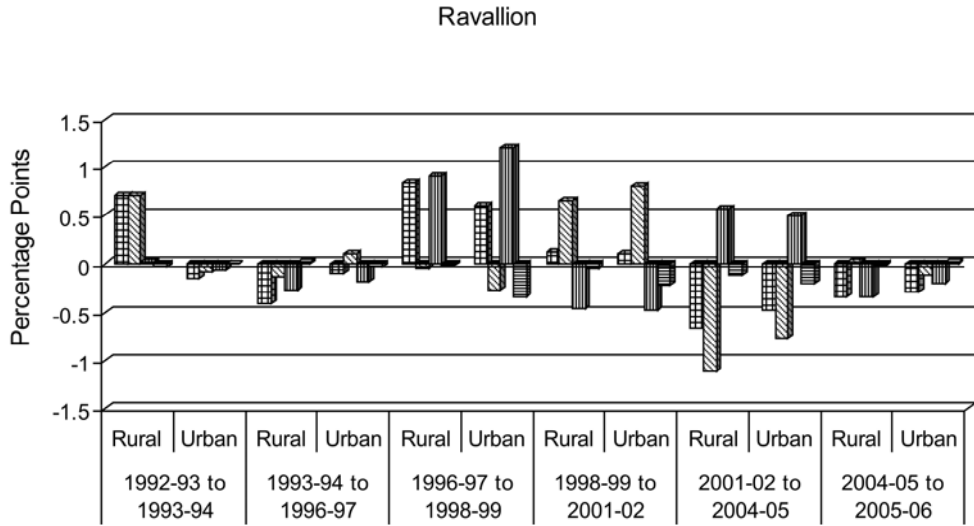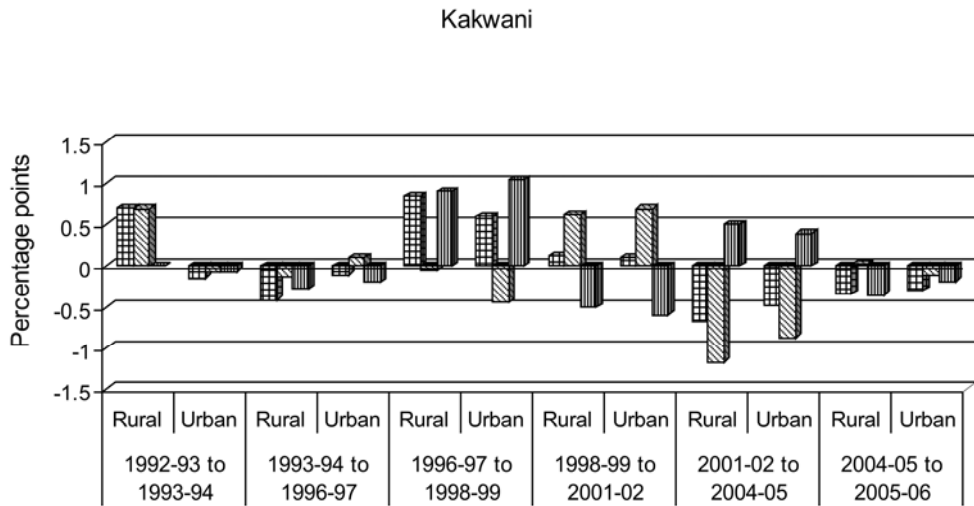
FIGURE 7

Decomposition of Changes in Squared Poverty Gap
by Rural/Urban Pakistan, 1992-93 to 2005-06

Ravallion

⊞ Total Change in Squared Poverty Gap ▧ Growth Effect ▥ Redistribution Effect ▤ Residual

Kakwani

⊞ Total Change in Squared Poverty Gap ▧ Growth Effect ▥ Redistribution Effect

FIGURE 8

Decomposition of Changes in Poverty Indices
by Rural/Urban Pakistan, 1992-93 to 2005-06

Ravallion

⊞ Total Change in Poverty Indices   ▧ Growth Effect   ▥ Redistribution Effect   ▤ Residual

Kakwani

⊞ Total Change in Poverty Indices   ▧ Growth Effect   ▥ Redistribution Effect