



Estimating the contributions of Growth
and Redistribution towards changes in
poverty in Pakistan

by

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Introduction



- Trickle Down theory.
- The poor benefit less than the non-poor (Kakwani, et. al 2000).
- Growth brings in either increase/decrease inequality.
- Pro-poor growth.
- Immiserizing Growth.
- Some inequality measures are not useful here.
- Quantifying the role of growth and redistribution.
- Datt and Ravallion (1992) and Kakwani (1997).
 - Growth component.
 - Redistribution component.

Overview



- **Data.**
- **Construction of Poverty Line.**
- **Computation of:**
 - **Poverty .**
 - **Inequality.**
- **Decomposition of changes in poverty.**
- **Methodology used in the decomposition.**
- **Results and Discussions.**
- **Conclusion and Policy Recommendations.**

Data



Household Income and Expenditure Surveys(HIES)

years	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

Construction of Poverty Line



- Calorie-based approach.
- Consumption expenditure as a welfare indicator.
- Computation of Price difference at psu level.
- Household size and its composition.
- Requirement of calories and per adult equivalent nutrient based equivalence scale.
- Regression model was used.
- Updating of poverty line using composite price index.

Computation of Poverty



- FGT Poverty Index

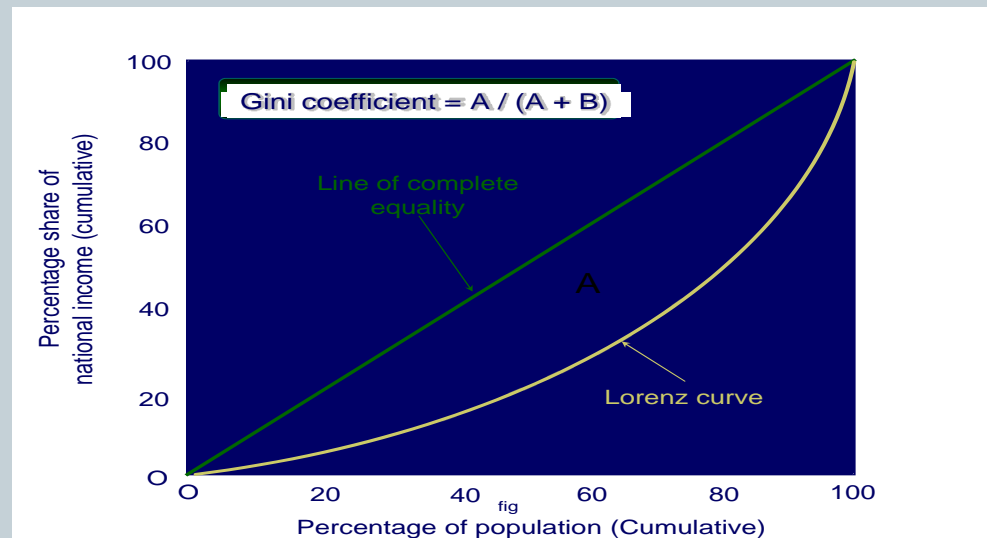
$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^q \left[(z - y_i) / z \right]^{\alpha}$$

If $\alpha=0$, P_{α} = Headcount ratio, if $\alpha=1$, p_{α} = Poverty Gap,
and if $\alpha=2$, then p_{α} = Squared Poverty Gap.

Computation of Inequality



- Gini-coefficient:



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

Decomposition of changes in poverty



- **What is decomposition of change in poverty?**
 - separation of growth and redistribution effects towards changes in poverty.
- **Why do we decompose?**
 - Traditional inequality measures are poor guide.
 - quantification of growth and distribution effects so that a proper policy can be adopted to fight against poverty.

Decomposition of changes in poverty



- Methodology: Ravallion and Datt (1992).

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

$$P(z, \mu_2, \psi_2) - P(z, \mu_1, \psi_1) = \underbrace{[P(z, \mu_2, \psi_1) - P(z, \mu_1, \psi_1)]}_{\text{Growth Component}} + \underbrace{[P(z, \mu_1, \psi_2) - P(z, \mu_1, \psi_1)]}_{\text{Inequality Component}} + \underbrace{[[P(z, \mu_2, \psi_2) - P(z, \mu_1, \psi_2)] - [P(z, \mu_2, \psi_1) - P(z, \mu_1, \psi_1)]]}_{\text{Residual}}$$

Decomposition of changes in poverty



- Methodology:

Kakwani (1997)

$$\begin{aligned} P(z, \mu_2, \psi_2) - P(z, \mu_1, \psi_1) &= \frac{1}{2} \left[\left[P(z, \mu_2, \psi_1) - P(z, \mu_1, \psi_1) \right] + \left[P(z, \mu_2, \psi_2) - P(z, \mu_1, \psi_2) \right] \right] \\ &\quad \text{Growth Component} \\ &\quad + \\ &\quad \frac{1}{2} \left[\left[P(z, \mu_1, \psi_2) - P(z, \mu_1, \psi_1) \right] + \left[P(z, \mu_2, \psi_2) - P(z, \mu_2, \psi_1) \right] \right] \\ &\quad \text{Inequality Component} \end{aligned}$$

$P_{12} = G_{12} + L_{12}$ where
 P_{12} is total poverty effect; G_{12} is growth effect and L_{12} is redistribution effect.



Results and Discussions

Poverty Lines



Poverty Lines adjusted by Composite Price Index

Years	Poverty line (Rs)
1992-93	372.51
1993-94	419.65
1996-97	590.34
1998-99	669.72
2001-02	722.55
2004-05	880.24
2005-06	953.63
Author's own calculation	

Poverty Estimates Over Time



Year	Headcount Ratio			Poverty Gap			Squared Poverty Gap		
	Rural	Urban	Pakistan	Rural	Urban	Pakistan	Rural	Urban	Pakistan
1992-93	27.74	20.03	25.55	4.63	3.46	4.30	1.19	0.90	1.11
1992-93	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	0.56	1.14

Author's own Calculation

Gini Coefficient Over Time



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

Author's own calculation

Decomposition of Changes in Poverty, 1992-93 to 1993-94



Poverty Indices	Region	Total Change in Poverty	Explained by				Residual*
			Growth		Redistribution		
			Ravallion	Kakwani	Ravallion	Kakwani	
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	-0.3	-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

*There is no residual in Kakwani technique.
Author's own calculation

Decomposition of Changes in Poverty, 1993-94 to 1996-97



Poverty Indices	Region	Total Change in Poverty	Explained by				Residual*
			Growth		Redistribution		
			Ravallion	Kakwani	Ravallion	Kakwani	
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	-0.3	-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

*There is no residual in Kakwani technique.
Author's own calculation

Decomposition of Changes in Poverty, 1996-97 to 1998-99



Poverty Indices	Region	Total Change in Poverty	Explained by				Residual*
			Growth		Redistribution		
			Ravallion	Kakwani	Ravallion	Kakwani	
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	-0.7	-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	-0.1
	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

*There is no residual in Kakwani technique.
Author's own calculation

Decomposition of Changes in Poverty, 1998-99 to 2001-02



Poverty Indices	Region	Total Change in Poverty	Explained by				Residual*
			Growth		Redistribution		
			Ravallion	Kakwani	Ravallion	Kakwani	
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 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	0.4	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	-0.5	-0.06
	Urban	0.1	0.81	0.695	-0.48	-0.595	-0.23

*There is no residual in Kakwani technique.
Author' s own calculation

Decomposition of Changes in Poverty, 2001-02 to 2004-05



Poverty Indices	Region	Total Change in Poverty	Explained by				Residual*
			Growth		Redistribution		
			Ravallion	Kakwani	Ravallion	Kakwani	
Headcount Ratio	Pakistan	-10.4	-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	0.5	-0.12
	Urban	-0.48	-0.77	-0.87	0.49	0.39	-0.2

*There is no residual in Kakwani technique.
Author's own calculation

Decomposition of Changes in Poverty, 2004-05 to 2005-06



Poverty Indices	Region	Total Change in Poverty	Explained by				Residual*
			Growth		Redistribution		
			Ravallion	Kakwani	Ravallion	Kakwani	
Headcount Ratio	Pakistan	-0.86	-1.53	-1.59	0.79	0.73	-0.12
	Rural	-0.3	0.16	0.205	-0.55	-0.505	0.09
	Urban	-1.2	-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	-0.3	-0.12	-0.11	-0.2	-0.19	0.02

*There is no residual in Kakwani technique.
Author's own calculation

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



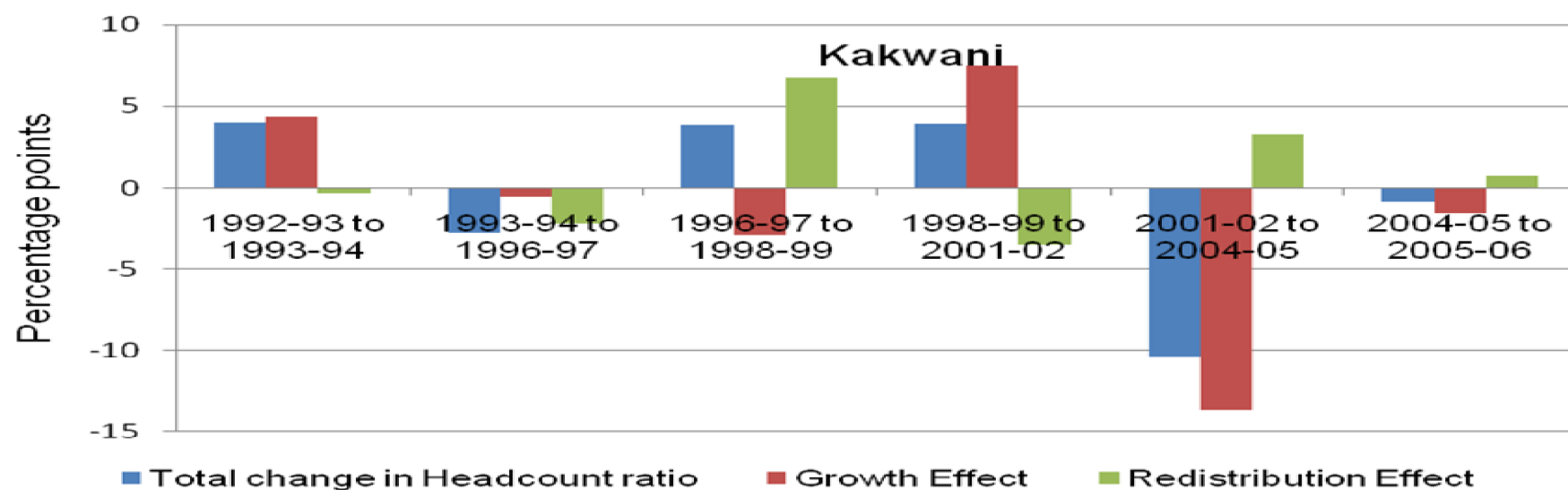
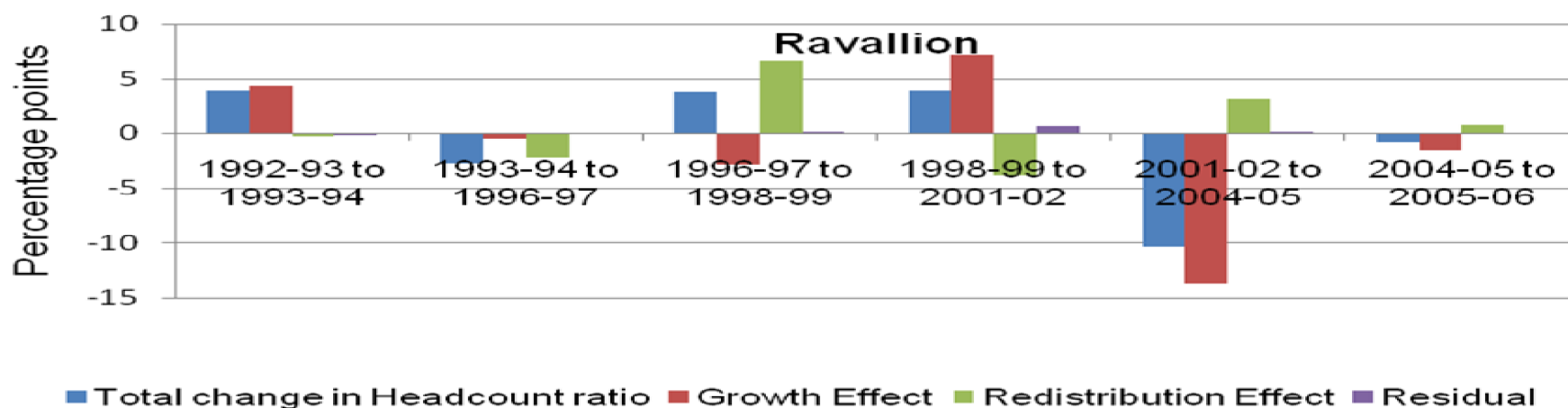
Poverty Indices	Region	Total Change in Poverty	Explained by				Residual*
			Growth		Redistribution		
			Ravallion	Kakwani	Ravallion	Kakwani	
Headcount Ratio	Pakistan	-2.36	-7.49	-7.325	4.8	4.965	0.33
	Rural	0.21	-0.28	-0.215	0.36	0.425	0.13
	Urban	-6.22	-10.15	-11.27	6.17	5.05	-2.24
Poverty Gap	Pakistan	-0.16	-1.53	-1.67	1.65	1.51	-0.28
	Rural	0.5	-0.05	-0.055	0.56	0.555	-0.01
	Urban	-1.28	-2.11	-2.445	1.5	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	0.5	0.365	-0.27

*There is no residual in Kakwani technique.
Author's own calculation

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

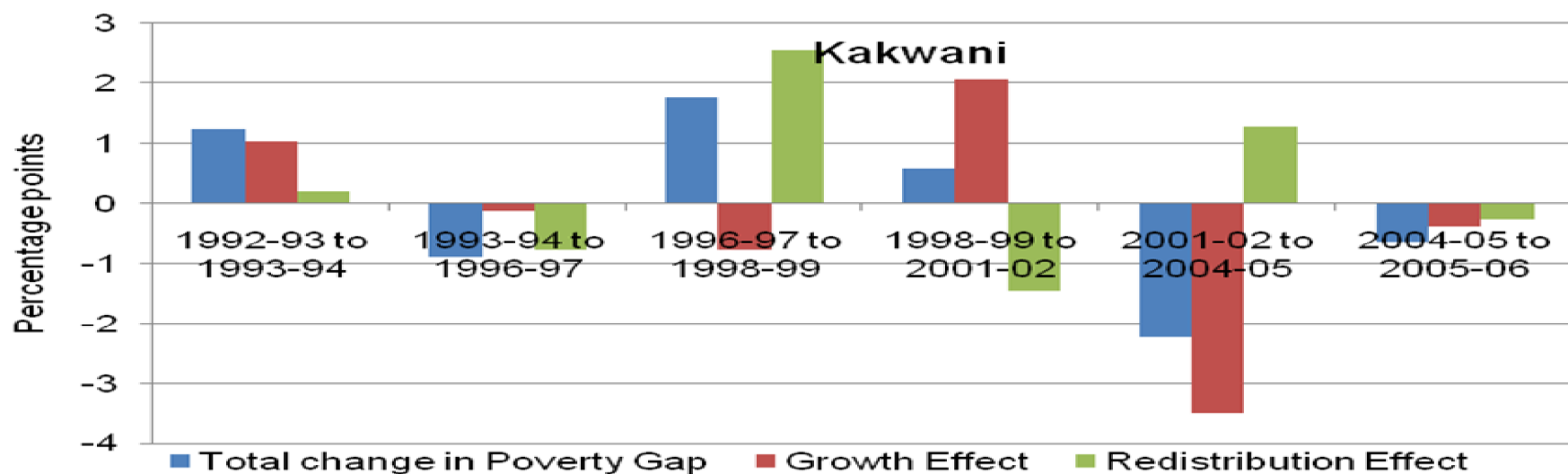
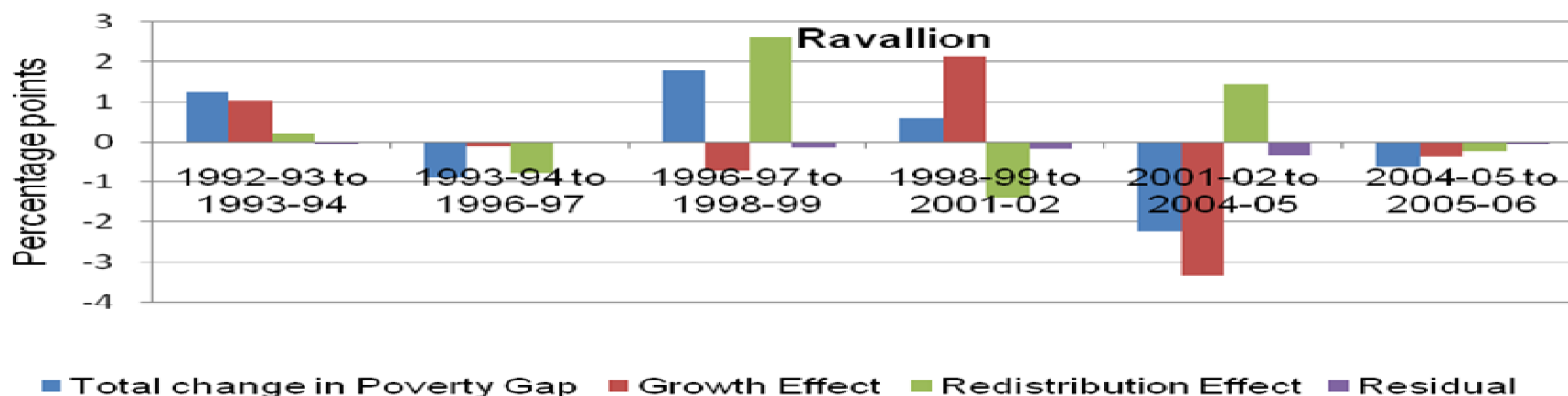


Figure 4.1: Decomposition of changes in Headcount ratio in Pakistan, 1992-93 to 2005-06



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

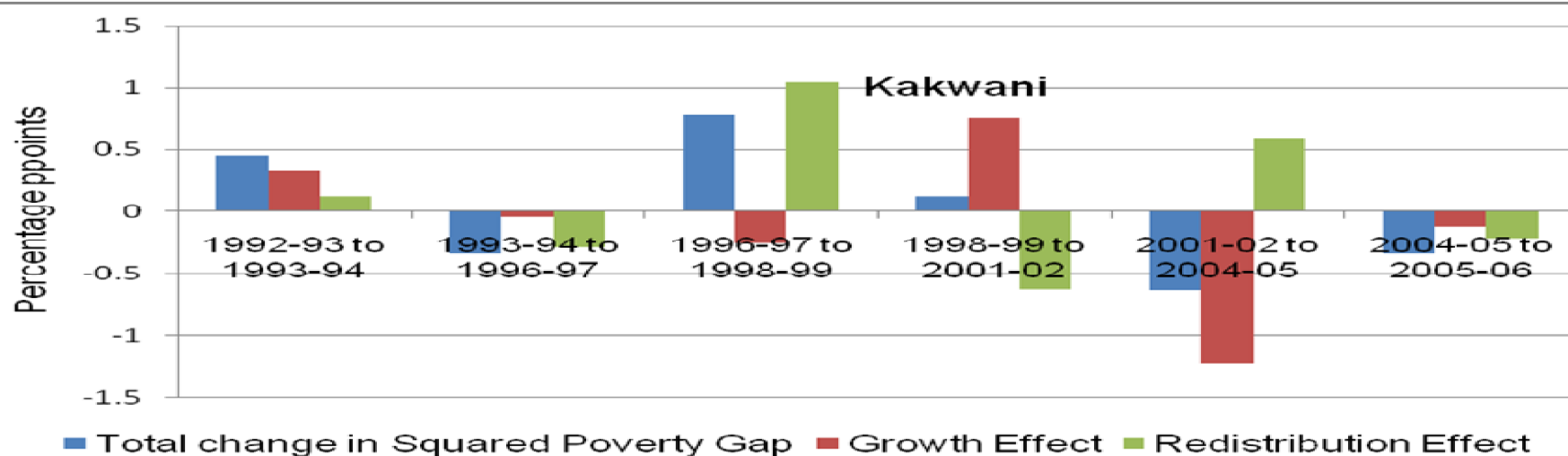
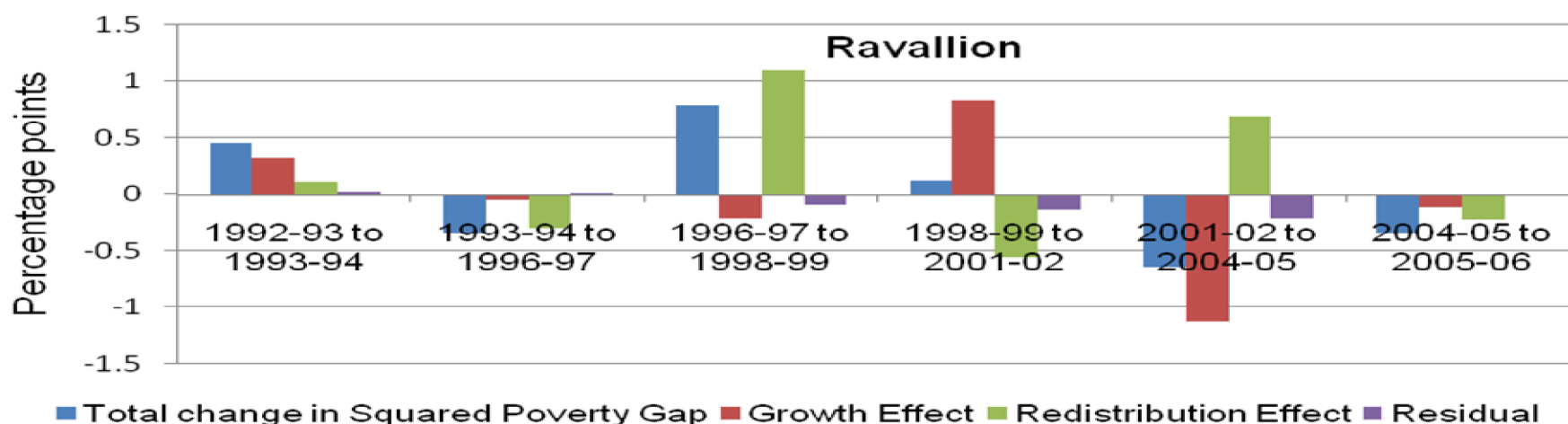
Figure 4.2: Decomposition of changes in Poverty Gap in Pakistan, 1992-93 to 2005-06



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



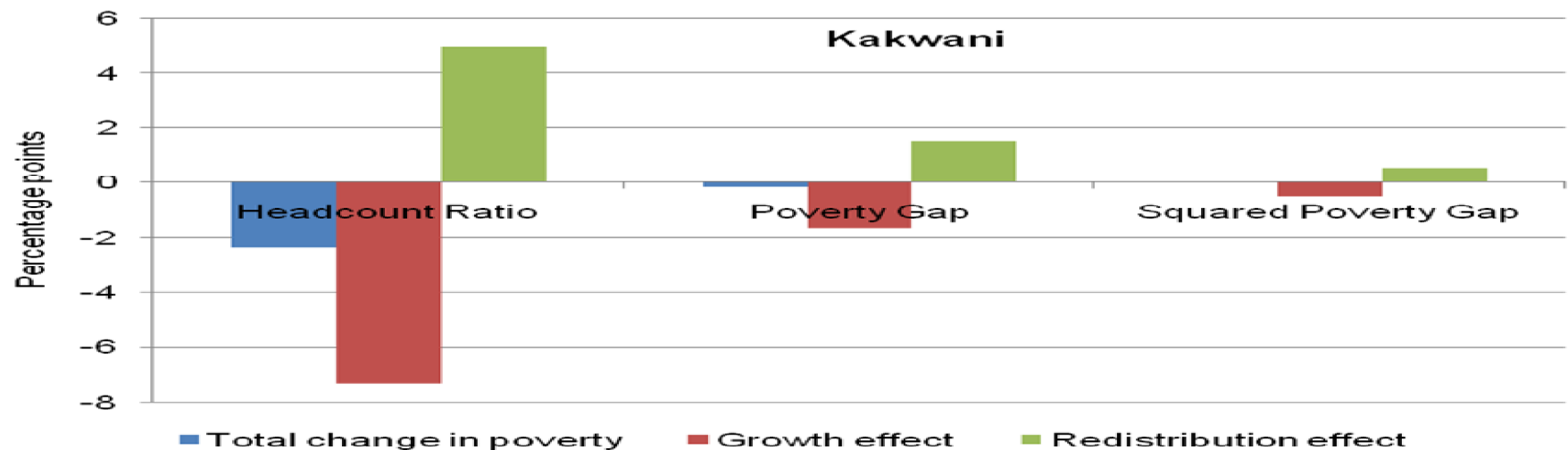
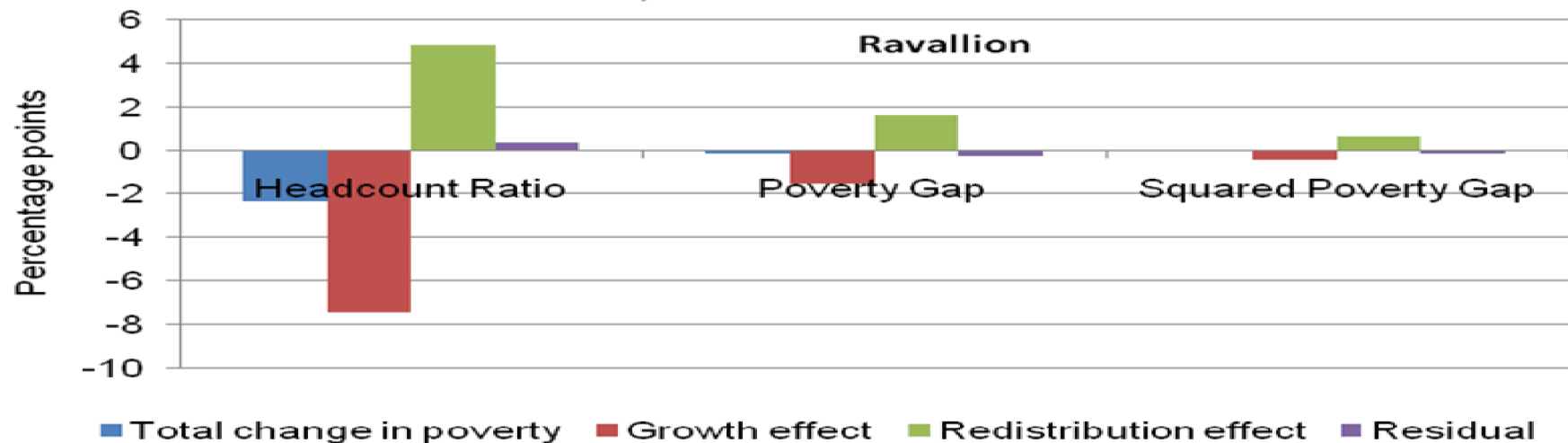
Figure 4.3: Decomposition of changes in Squared Poverty Gap in Pakistan, 1992-93 to 2005-06



Decomposition of Changes in Poverty Indices over the whole period in Pakistan, 1992-93 to 2005-06



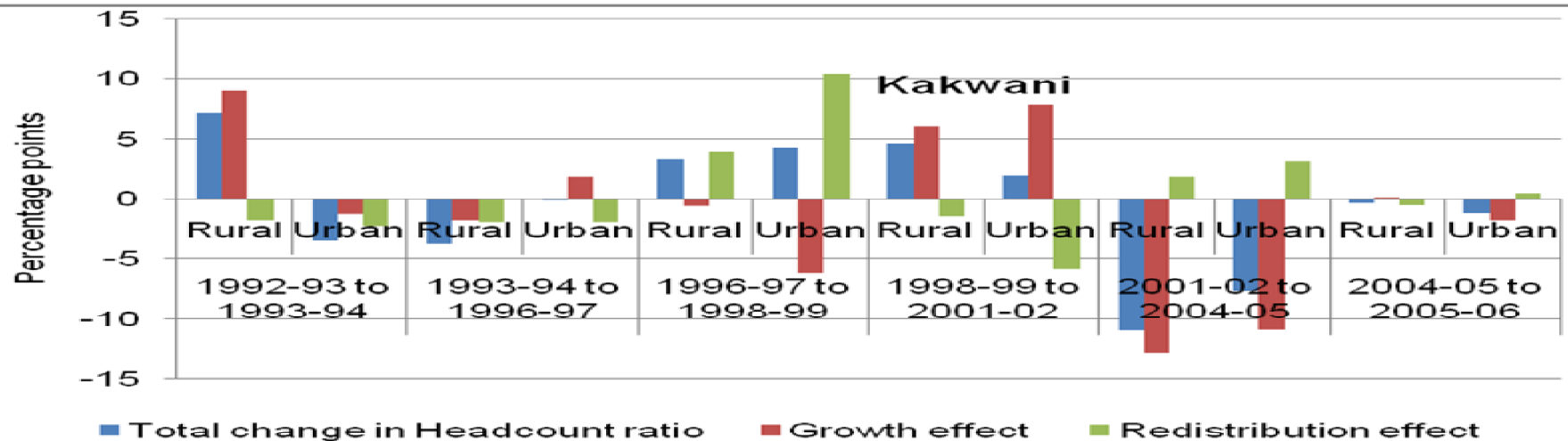
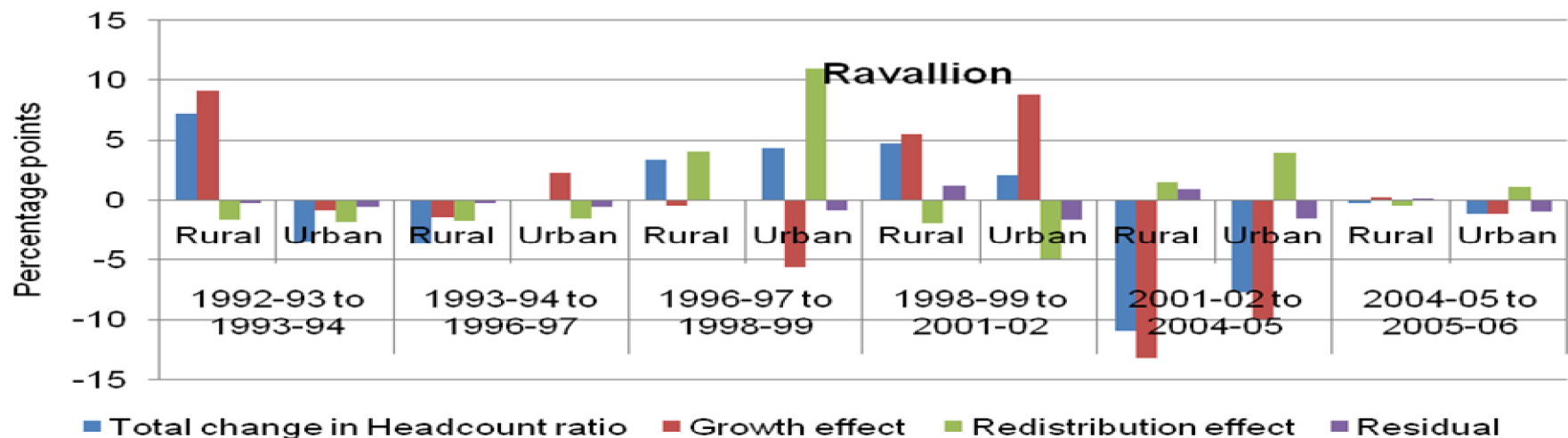
Figure 4.4: Decomposition of changes in poverty indices in Pakistan, 1992-93 to 2005-06



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



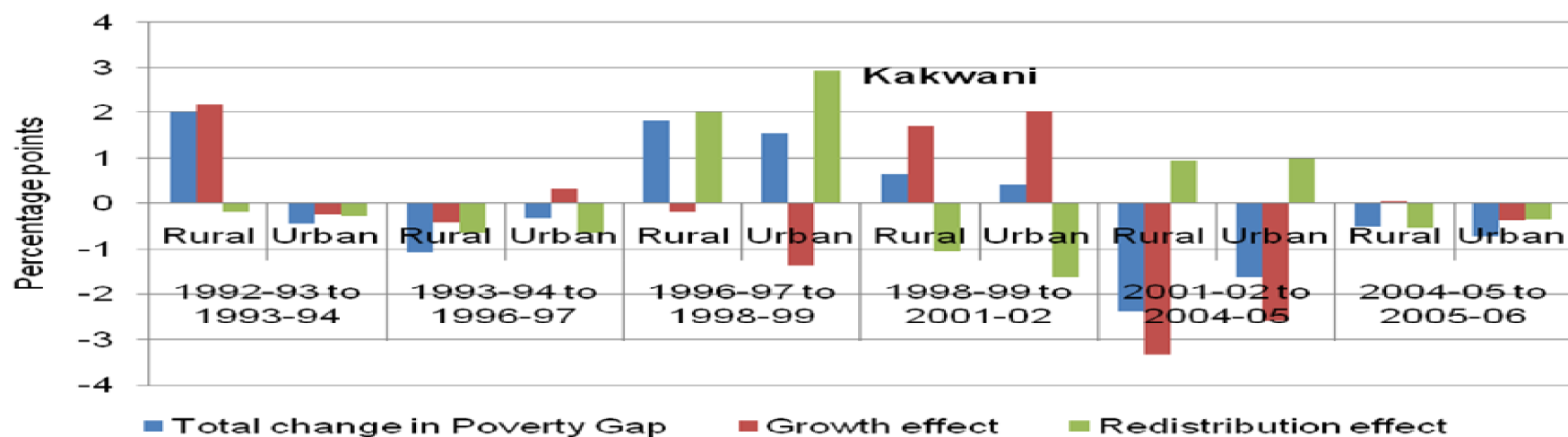
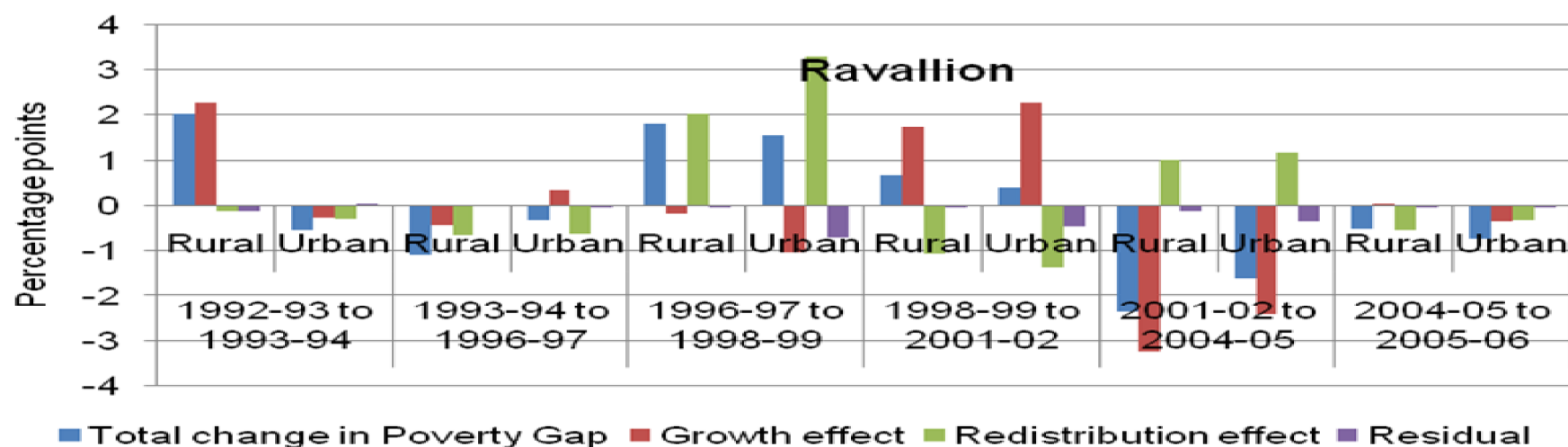
Figure 4.5: Decomposition of changes in Headcount ratio by rural/urban Pakistan, 1992-93 to 2005-06



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



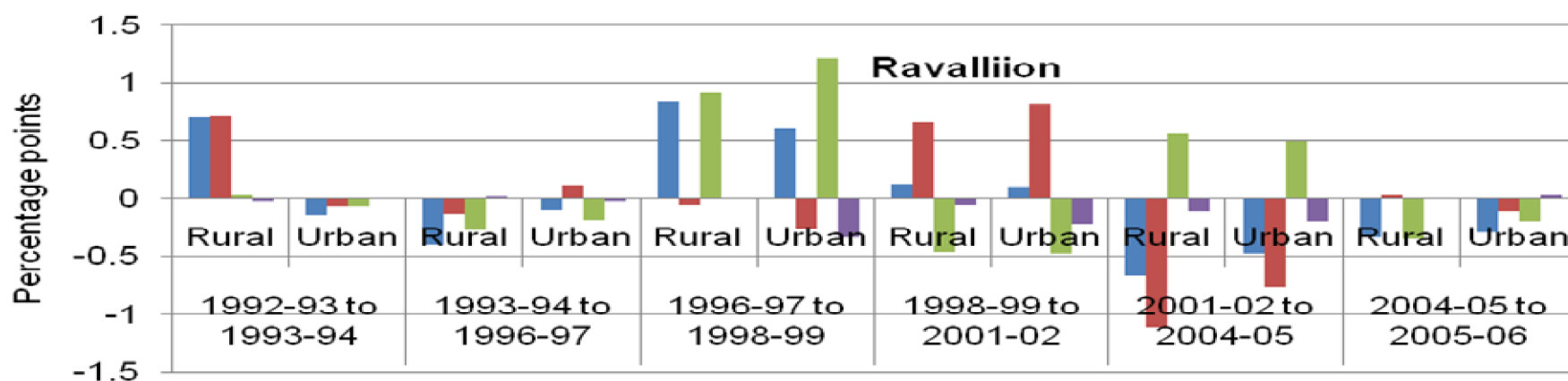
**Figure 4.6: Decomposition of changes in Poverty Gap
by rural/urban Pakistan, 1992-93 to 2005-06**



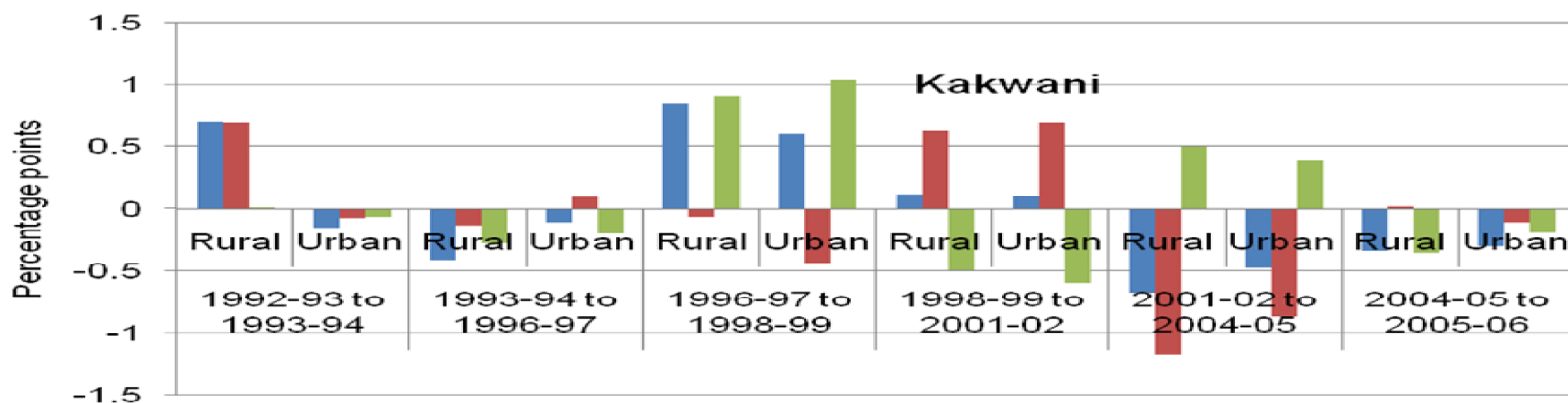
Decomposition of Changes in Squared Poverty Gap by Rural/Urban Pakistan, 1992-93 to 2005-06



Figure 4.7: Decomposition of changes in Squared Poverty Gap by rural/urban Pakistan, 1992-93 to 2005-06



■ Total change in Squared Poverty Gap ■ Growth effect ■ Redistribution effect ■ Residual

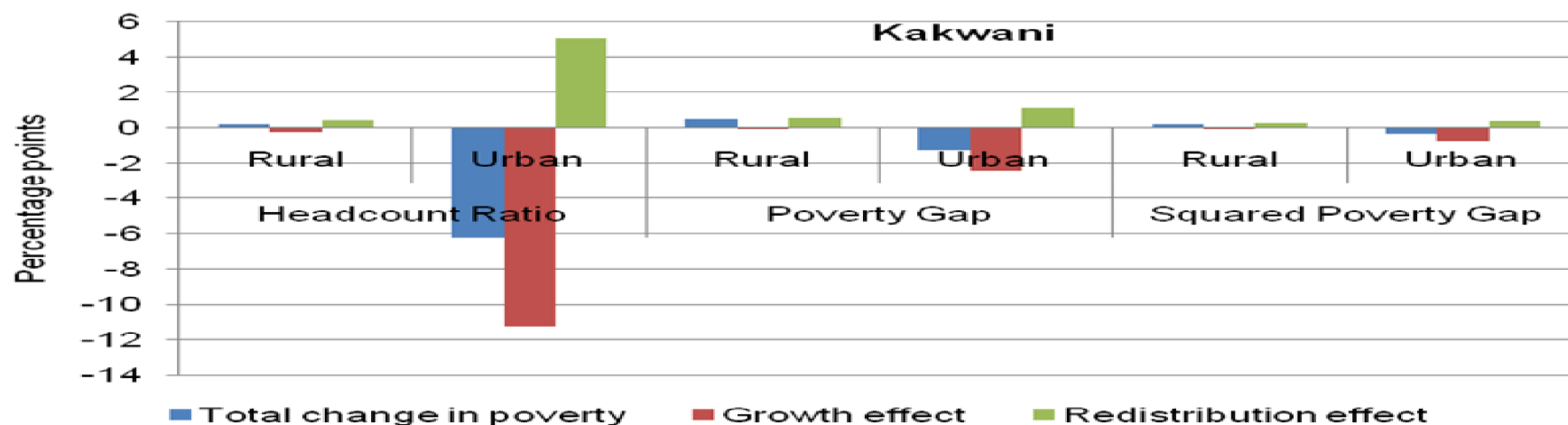
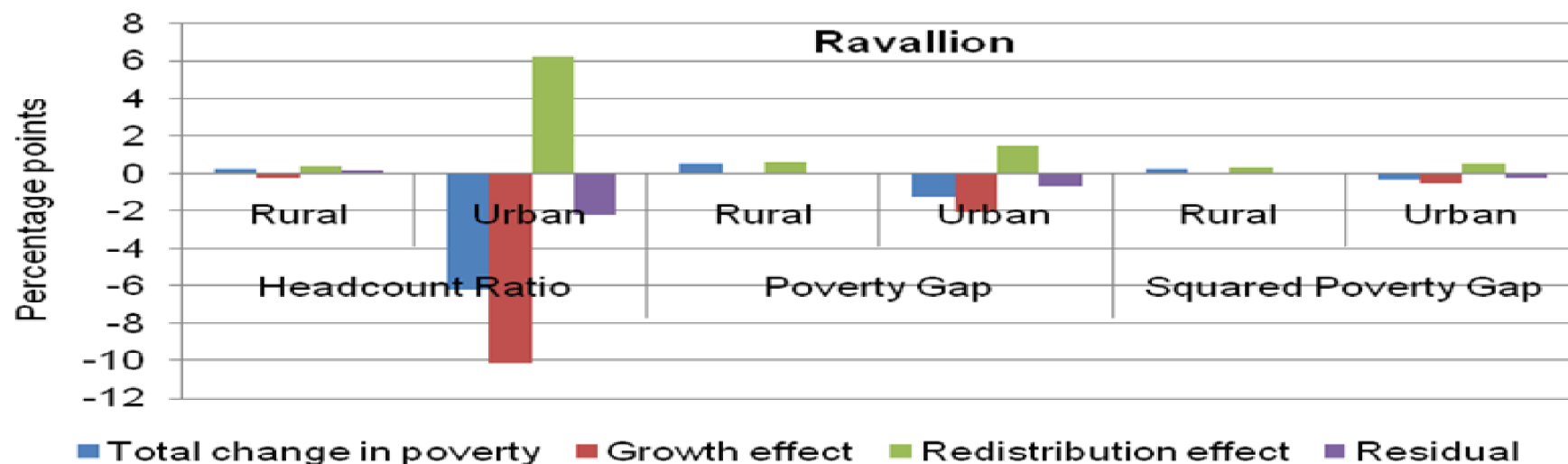


■ Total change in Squared Poverty Gap ■ Growth effect ■ Redistribution effect

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



Figure 4.8: Decomposition of changes in poverty indices in rural/urban Pakistan, 1992-93 to 2005-06



Results



- **1992-93 to 1993-94**

I. Regarding headcount ratio, Ravallion and Kakwani techniques show that the adverse growth dominated the improved distribution significantly (+4.36, -0.26 % points) and (+4.28, -0.34 % points) respectively.

II. But they reinforced each other for poverty gap and squared poverty gap((+1.05, +0.22 % points) and(+0.32, +0.11 % points)) and ((+1.035, +0.205 % points) and(+0.33, +0.0.12 % points)) respectively.

III. The negative sign of distribution effect for the headcount ratio, but positive one for the poverty gap and squared poverty gap implies that the poor became better off, but the poorest worst off.

- **1993-94 to 1996-97**

The both effects reinforced each other to decrease poverty estimates.

Pro-poor growth (Kakwani & Pernia, 2000).

Results



- **1996-97 to 1998-99**

The deterioration in distribution outweighed the favourable impact of growth for all poverty measures and resulted in increasing poverty. Bhagwati (1988) regards such situation as Immiserising growth.

- **1998-99 to 2001-02**

The adverse growth dominated the favorable impact of distribution and led to net increase in poverty.

- **2001-02 to 2004-05**

The growth effect led to net decrease in poverty outweighing the adverse impact of distribution.

Results



- **2004-05 to 2005-06**

I. Regarding headcount ratio, Ravallion and Kakwani techniques depict that the growth effect outweighed the adverse effect of distribution (-1.53,+0.79 % points) and (-1.59, +0.73) respectively.

II. But they reinforce each other to decrease poverty gap and squared poverty ((-0.36,-0.24) and (-0.12, -0.-0.22)) and ((-0.375, -0.255) and (-0.12, -0.22)).

III. The positive sign of distribution effect for the headcount ratio, but negative one for the poverty gap and squared poverty gap means that the poor became worst off, but the poorest better off.

- **1992-93 to 2005-06**

The favourable growth effect dominated the adverse effect of worsening in distribution and caused poverty to decrease.

Conclusion and Policy Implications



- 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.



THANKS

Talat Anwer (2007) and Ravallion technique (1992)



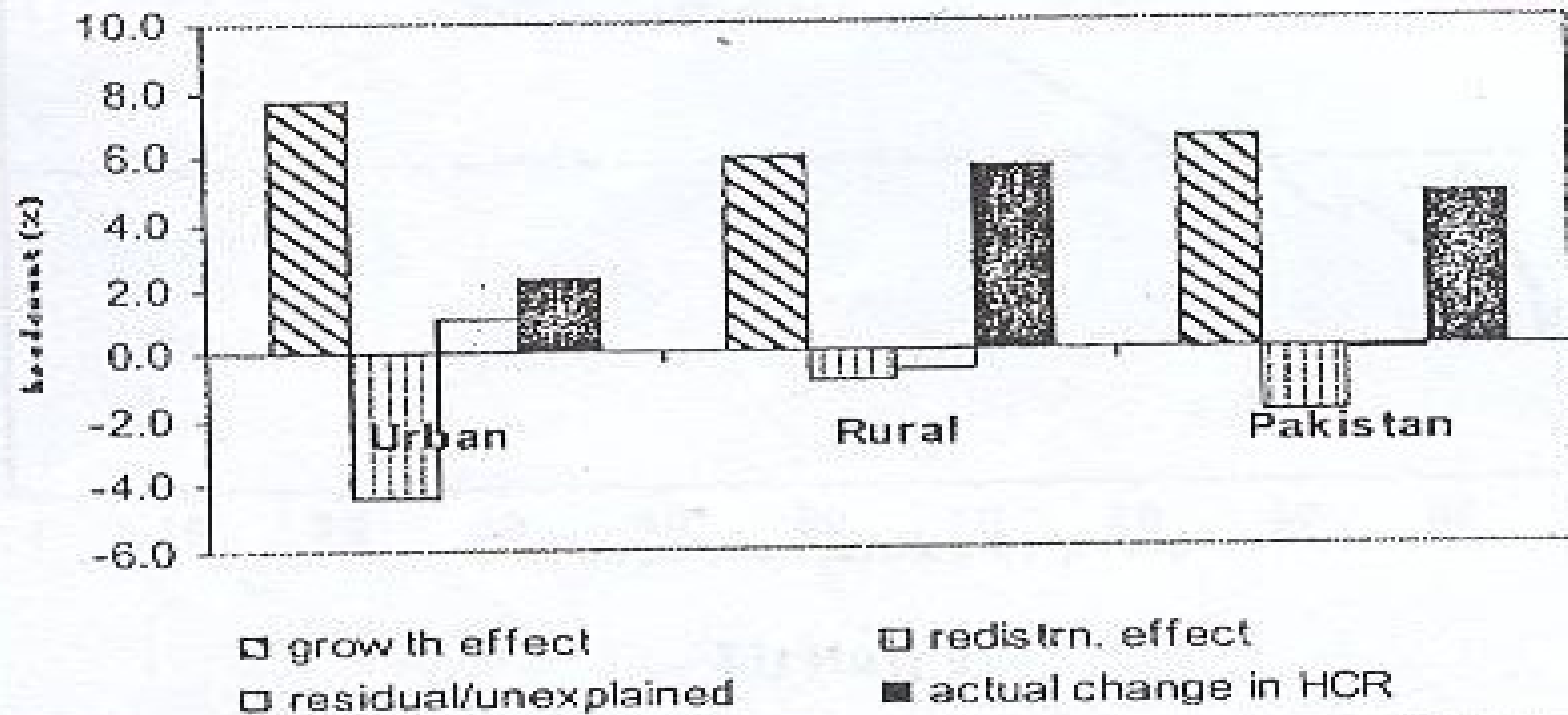
Period	Region	Total Change in Poverty		Explained by		Residual
				Growth	Redistribution	
1998-99 to 2001-02	Pakistan	3.83	(3.39)*	5.66	-2.05	-0.22
	Urban	1.77	(3.75)	4.58	-1.82	0.99
	Rural	4.59	(3.19)	6.12	-2.23	-0.7
2001-02 to 2004-05	Pakistan	-10.56	(-11.56)	-12.48	1.42	-0.5
	Urban	-7.79	(-5.97)	-8.06	1.18	0.91
	Rural	-11.16	(-13.02)	-14.29	2.2	-0.93
1998-99 to 2004-05	Pakistan	6.69	(-5.47)	-5.9	-0.18	0.61
	Urban	5.98	(-5.94)	-4.54	-1.42	0.02
	Rural	6.54	(-4.66)	-6.47	0.87	0.94

*Within brackets are the sums of three components.

World Bank (2004)



Fig. 7: Growth-Inequality Decomposition of Change in Headcount from 1998-99 to 2001-02: NWFP



Decomposition of headcount ratio by Datt & Ravallion (1992) for rural India



Period	Total change in poverty	Growth component	Redistribution component	Residual
1977-8 to 83	-8.97	-2.58	-6.51	0.12
1983 to 86-7	-8.08	-8.61	0.19	0.34
1986-7 to 88	1.19	1.46	0.27	-0.54
1977-8 to 88	-15.86	-9.74	-6.05	-0.07