

Identifying the Pathways Out of Poverty: Evidence of Exit Time Poverty Estimations in Pakistan

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Abstract

Estimation of poverty exit time is imperative to map the progress towards numeric target of millennium development goals of halving extreme poverty and hunger by 2015. FGT class of poverty measures was supplemented with Watts Index, using hypothetical consistent broad based neutral growth of Poor's income at the rate of 4 percent per annum. Decline in poverty incidence and its depth is found significantly higher than average exit time, suggesting the focusing of poverty reduction policies in favor of "richest poor" and inequitable distribution of income among poor. Time required escaping poverty by different provinces declined at varying magnitude, except urban Sind and entire Baluchistan. Rural areas experienced more pronounced decline in average exit time as compared to its urban counterparts. It was noted that average poverty gap of urban population was found 20 percent thereby requiring 5.75 years for the average poor to move out of poverty. Moreover, 6.25 years were required to push average poor out of poverty both at national and rural levels if there is income growth of poor at the rate of 4 percent in the years to come.

Key words: Poverty incidence, poverty gap, inequality, average exit time

Introduction

The usefulness of a poverty measure is judged on its relevance to the hypothetical question and adherence to the poverty axioms given by Sen (1976) and Kakwani (1980). Headcount ratio simply illustrates the scale of poverty but does not indicate how poor the poor are. It also does not register changes when very poor becomes less poor or poor become even poor. Thus it fails to satisfy focus, monotonicity and transfer axioms, leading to perverse resource allocation when objective is to reduce poverty (Watts, 1968;

Sen, 1976; Foster and Sen, 1997; and Deaton, 2000). In order to satisfy monotonicity and transfer axioms, the analysis is extended beyond headcount ratio to poverty gap and squared poverty gap. Poverty gap takes us from counting of poor to the counting of shortfalls in their income or consumption, and identifies the least cost and perfectly targeted transfers to eliminate poverty. Squaring of poverty gap yields inequality sensitive measure – Squared poverty gap. Thus, poverty gap and squared poverty gap satisfy monotonicity and transfer axioms, respectively. These measures are superior on theoretical grounds but also have one weakness that they can be interpreted only in ordinal sense (Foster, 1994).

Exit time poverty measure is cardinal in nature as against the ordinal measures of depth and severity of poverty. This measure satisfies all the standard assumptions of poverty. It partially identifies the time span for the poor to come out of poverty under some assumed growth scenarios. This measure can be used for making a comparative analysis across time and region which is not appropriate for other measures of poverty. This measure intuitively explores the pro-poor growth aspects in an economy. Growth is anti-poor if exit time exceeding a specific threshold. The only drawback of this measure is that it encompasses short time period. For longer time periods, the estimate can not be used for policy analysis. Moreover, there may be robustness of the results of exit time poverty measure under high volatility of economic growth.

Millennium development goals have set numerical targets of halving extreme poverty and hunger by 2015. In their backdrop, there is dire need to have meaningful poverty analysis, identifying the time required to escape the poverty trap under sustainable and vulnerable growth scenarios. This can be achieved if FGT measures of poverty are supplemented with a cardinally meaningful measure - Average Exit Time Measure of Poverty. Accordingly, this research endeavor is aimed not only to track the

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poverty status but also to quantify the time required by poor of different regions in Pakistan to come out of poverty trap under consistent, broad based and even distributed income growth scenario. There is sparse empirical research of this nature found in the study of poverty in Pakistan and the results would give an insight for effective planning and pursuance of *ibid* target.

Materilas and Methods

The following procedures /statistical indices have been employed in this study:

The Data

This study encompasses the time horizon from 1998-99 to 2004-05 for estimating average exit time across regions and over time. The selected time period is important for being uniform in the sampling and data collection techniques as established with the help of World Bank. Moreover, the data sets are available for all the rural urban population in every province and respective divisions in the country. Primary time series data has been taken from the Household Integrated Economic Survey (HIES), conducted periodically by the Federal Bureau of Statistics (FBS), Statistics Division, Government of Pakistan. These surveys provide complete information about consumption of all food and non-food items at the household level. The primary data files contained population weights for each primary sampling unit designed to approximate nationally representative estimates of population.

Welfare Indicator

Consumption aggregates have been used (as a proxy for incomes) to measure incidence of poverty. Poverty line defined by the Planning Commission of Pakistan in 2001 (2350 calories per adult per day as the absolute measure of poverty for whole country) is used for this analysis. In order to have consistent and comparable poverty estimates over time, the base poverty line was adjusted for 1998-99 and 2004-05, on the basis of inflationary changes (positive and negative) during these periods.

Measuring Poverty

There are a wide variety of statistical poverty measures. Chief among them is the FGT (Foster et al., 1984) class of poverty measures. The FGT indices satisfy a broad array of poverty axioms while specific members satisfy monotonicity and transfer axioms as well. The general formula of the FGT Class is:

$$P\alpha = \frac{1}{n} \frac{\sum_{i=1}^q (Z + Y_i)^\alpha}{Z}$$

Where:

n = total population

q = number of poor persons

Z= poverty line

Y_i = income or consumption (welfare indicator) below poverty line

α= reflects poverty aversion

If the value of α is zero, the answer shows head count ration (P₀). When it is equal to one, it shows poverty gap (P₁). Setting α =2, amounts to the measure of squared poverty gap (P₂).

FGT indices were further supplemented by the Watts Index (Watts, 1968) for mapping income distribution to the space of time. It is an attractive measure of poverty as it satisfies all important theoretical axioms such as focus, monotonicity and transfer, which the headcount ratio and poverty gap does not (Ravallion and Chen, 2001). Watts Index is distributionally sensitive (more sensitive to changes in low income than higher), decomposable into population weighted sum of poverty indices of regions or sub-groups and has appealing ordinal properties. Watts Index satisfies transfer and transfer sensitivity axioms.

Average Exit Time Poverty Measure (Tg)

This concept was developed by Kanbur (1987) and Morduch (1998). However, Morduch (1998) while employing this measure on Bangladesh and Bolivian data concluded that this measure is distributionally sensitive, additively decomposable, and cardinally meaningful and satisfies standard poverty axioms.

The Exit Time measure is a modification of the existing Watts measure (Watts, 1968). The modified formulaic expression is:

$$W = \frac{1}{N} \sum_{i=1}^q [\ln(Z) - \ln(Y_i)]$$

Tg = W/g

Where:

i = the individuals of the HIES population indexed from 1 to N in ascending order of income

q = number of poor persons

Z = poverty line

Y_i = consumption (welfare indicator) below poverty line

g = growth of income of poor population

Tg = The average exit time measure

Tg is simply a ratio of Watts measure to that of growth of income of poor population.

Morduch (1998) estimated this measure keeping growth rate constant. Accordingly, hypothetical steady growth rate of four percent (based upon past economic experiences and recent past performance of the economy) was used to estimate this measure over time as well as across regions. Growth is assumed to be distributionally neutral among poor and results are based on average and not the actual poverty gap. Increased pro-poor growth accompanied by its neutral distribution reduces average exit time and vice-versa.

Results and Discussion

Table 1 revealed that 6.25 years were required to push average poor (having average poverty gap $\leq 21\%$) out of poverty both at national and rural

levels during 1998-99, if there is consistent broad based even income growth of poor at the rate of 4 percent in future. Average poverty gap of urban population was found 20 percent, thus requiring 5.75 years for the average poor (having average poverty gap $\leq 20\%$) to move out of poverty. These statistics simply show inverse relationship between poverty gap and average exit time. During the interregnum period of 1999-2000 to 2001-02, GDP (at constant factor cost) grew at an average of 3.16 percent; average per capita income of broader sampled population declined by 4 percent at all the levels. While proportion of overall and rural average poverty gap remained unchanged even on the new enhanced poverty line contrary to marginal decline in urban areas. Overall poverty incidence increased by 18 percent with regional bifurcation of 14 percent and 20 percent in urban and rural areas, respectively (Table 2).

Table 1. Regional trends of average exit time poverty in Pakistan

Region	1998-1999			2001-2002			2004-2005		
	Overall	Urban	Rural	Overall	Urban	Rural	Overall	Urban	Rural
Pakistan	6.25	5.75 (47.92)	6.25 (52.08)	6.00	5.50 (46.81)	6.25 (53.19)	5.50	5.25 (48.84)	5.50 (51.16)
Punjab	7.00 {31.11}	6.50 (47.27)	7.25 (52.73)	6.75 {29.67}	6.50 (48.15)	7.00 (51.85)	6.00 {28.57}	5.50 (47.83)	6.00 (52.17)
Sindh	5.75 {25.56}	4.00 (40.00)	6.00 (60.00)	6.25 {27.47}	4.50 (40.91)	6.50 (59.09)	5.25 {25.00}	5.00 (48.78)	5.25 (51.22)
NWFP	5.50 {24.44}	6.00 (53.33)	5.25 (46.67)	5.25 {23.08}	4.75 (47.50)	5.25 (52.50)	5.00 {23.81}	4.75 (48.72)	5.00 (51.28)
Baluchistan	4.25 {18.89}	3.75 (46.88)	4.25 (53.13)	4.50 {19.78}	4.50 (50.00)	4.50 (50.00)	4.75 {22.62}	4.00 (44.44)	5.00 (55.56)

(): Proportionate contribution of urban & rural areas to overall average exit time of poverty.

{ } : Inter-Provincial contribution to overall average exit time of poverty.

During first interregnum period (1998-99 to 2001-02), overall headcount ratio increased at all the levels (Table 2) but the average exit time for overall and urban Pakistan declined by 4 percent (Table 3). Decline in Watts Index and average exit time, contrary to poverty index (P_0) may be due to partly fall in poverty gap resulted from inflow of vulnerable group positioned on or slightly above the poverty line and improvement in income/consumption inequality among poor

of the country. It is worth mentioning that overall income inequality as measured by the Gini coefficient also declined at all its levels during 1998-99 to 2001-02. These statistics explicitly confirm the notion of "rising poverty does not necessarily increase the time required to move out of poverty, rather poverty gap and income distribution are also important correlates of exit time".

Table 2. Regional dynamics of incidence of absolute poverty in Pakistan

Region	% change between 1998-1999 & 2001-2002			% change between 2001-2002 & 2004-2005			Difference of Difference		
	Overall	Urban	Rural	Overall	Urban	Rural	Overall	Urban	Rural
Pakistan	18.81	14.60	20.06	-40.66	-40.77	-39.91	-21.85	-26.17	-19.84
Punjab	2.30	-0.86	3.35	-33.98	-37.56	-32.94	-31.68	-38.41	-29.59
Sindh	49.33	61.80	47.02	-52.26	-50.83	-51.57	-2.93	10.97	-4.55
NWFP	12.12	21.84	9.51	-34.18	-41.08	-29.70	-22.06	-19.24	-20.19
Baluchistan	54.95	23.18	66.26	-49.72	-41.12	-51.46	5.23	-17.95	14.80

All the poverty indices including average exit time exhibited substantial but varying decline during 2001-02 to 2004-05. Average per capita consumption increased over 30 percent in all the regions. Average poverty gap of the poor at overall and rural areas declined by 2 percent each, while 1 percent decline was observed in

case of urban areas. Proportionate contribution of rural area to overall average exit time declined over the period of time indicating relatively increased improvement of poverty indices in rural Pakistan (Table 1). Decline in poverty was manifolds than decline in average exit time (Tables 2 and 3).

Table 3. Regional dynamics of average exit time poverty in Pakistan

Region	% change between 1998-1999 & 2001-2002			% change between 2001-2002 & 2004-2005			Difference of Difference		
	Overall	Urban	Rural	Overall	Urban	Rural	Overall	Urban	Rural
Pakistan	-4	-4.3	0	-8.33	-4.54	-12	-12.33	-8.89	-12
Punjab	-3.57	0.00	-3.45	-11.11	-15.38	-14.29	-14.68	-15.38	-17.73
Sindh	8.70	12.50	8.33	-16.00	11.11	-19.23	-7.30	23.61	-10.90
NWFP	-4.55	-20.83	0.00	-4.76	0.00	-4.76	-9.31	-20.83	-4.76
Baluchistan	5.88	20.00	5.88	5.56	-11.11	11.11	11.44	8.89	16.99

The temporal comparison of six years revealed that average exit time of poor estimated in 1998-99 declined by 12 percent at overall and rural levels till 2004-05, while it was 9 percent at urban level (Table 3). Overall and rural per capita rise in consumption expenditure (32 and 34 percent, respectively) was found higher than urban areas (29 percent). The perusal of Table 2 in conjunction with Table 3 exposed the larger decline in P_0 at all the levels than average exit time of poor during 1998-99 to 2004-05. This showed that poverty reduction policies were focused on headcount ratio to pull the “richest poor” out of poverty than those benefiting the “poorest of poor and poor”, via increased per capita consumption expenditure. Boom and bust conditions have been observed in the economy during the whole span of study; however, GDP (at constant factor cost) grew at an average of 5.1 percent per annum. This showed that overall

average growth remained greater than hypothesized growth rate of 4 percent but its

distribution was not fair and inequality among poor did not improve considerably.

Inter-Provincial Dynamics of Average Exit Time

Punjab, the most populous province required the largest time to push the average poor out of poverty at all the levels during 1998-99, followed by Sindh, NWFP and Baluchistan, respectively (Table 1). In 2001-02, average per capita monthly consumption expenditure declined at all the levels in different provinces, except rural Punjab and urban areas of Sindh and Baluchistan. Results suggest the fallout of adverse drought spell especially on rural areas of Sindh and Baluchistan provinces, via poor growth performance of agriculture sector (Cheema, 2005). During this period, P_0 and P_1 worsened in all provinces at all their levels, except urban Punjab. However, inequality

exhibited declining trends at varying magnitude in all provinces, except overall and urban Sindh. Thus, average exit time declined or remained unchanged in some parts of Punjab and NWFP provinces, while it increased in the other provinces.

During 2001-02 to 2004-05, headcount ratio and poverty gap declined in all provinces at all their levels, due to increased per capita consumption attributed by an overall improved performance of the economy. However, diverse trends were observed in average exit time across different provinces. Average exit time declined at all the levels in Punjab, while mixed trends were observed in the other provinces (Table 3). If we look at the proportionate contribution of different provinces to average exit time, Punjab is still main contributor but rate of fall in its share over time is higher than rest of the provinces.

The temporal comparison of six years revealed decline in average exit time of poor at all the levels of Punjab and NWFP. Sind province also exhibited decreasing trends except its urban areas, while it worsened at all the levels in Baluchistan (Table 3). Regional dynamics revealed the following trends in various poverty indices and average exit time:

(1) In Punjab headcount ratio, poverty gap and average exit time exhibited declining trend at all the levels. Decline in average exit time is almost half than decline in headcount ratio. Result showed that poverty reduction policies were largely focused to reduce the number of “richest poor” than to reduce the depth and severity of poverty.

(2) In Sindh, rural headcount ratio and average exit time declined both, while all the poverty indices worsened considerably in its urban areas. Resultantly, average exit time for urban Sindh increased to almost one-fourth while 11 percent decline was observed in rural Sindh. Results showed that poverty reduction policies in Sindh not only failed to reduce the number of poor considerably but poverty gap and income distribution also worsened in overall and urban Sindh.

(3) In NWFP, all the poverty indices and average exit time declined considerably. Headcount ratio and average exit time declined just about in the same proportion, representing the fact that poverty reduction policies benefited all the segments of the poor equally.

(4) In Baluchistan, all the poverty indices worsened at overall and rural levels while marginal improvement was observed in the urban areas. However, average exit time

deteriorated at all the levels with varying magnitude.

(5) Proportionate contribution of Punjab, Sindh and NWFP to overall average exit time has decreased, while it increased in case of Baluchistan.

Conclusion

During whole span of study, overall average per capita consumption expenditure increased by 32 percent while headcount ratio and poverty gap declined by 22 and 28 percent, respectively. Overall and rural average exit time declined only by 12 percent, while it was around 9 percent for urban poor despite the fact that overall average income growth rate remained above the hypothesized annual income growth rate of poor. At provincial levels; time required to escape poverty decreased at varying magnitude, except urban Sind and whole Baluchistan. This decline was more pronounced in rural areas as compared to its urban counterparts, suggesting more equitable distribution of consumption (proxy of income) due to bulk deployment of rural population in homogeneous informal agriculture sector.

Overall decline in headcount ratio and poverty gap has been manifolds than average exit time attributed to inequitable resource distribution among different categories of poor. Poverty alleviation strategies should be framed with reference to exit time poverty indices. This calls for developing heterogeneous policy dossier for each region separately giving priority to rural areas where exit time span is relatively longer than that of the urban regions.

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