

Summary of key findings and recommendation

The World Bank (WB) was invited to join a multi donor committee to independently validate the Planning Commission's estimates of poverty from the recent 04-05 PSLM survey and the trends between the 00-01 and 04-05. A validation exercise entailed fixing an appropriate base year estimate (which is crucial for 00-01 since GoP estimates vary from WB and PC estimates) and also validating the CPI inflation adjustment used by the planning commission to update the 00-01 poverty line. We summarize the results of this exercise below:

1. The base year chosen by PC to assess trends in poverty headcount is PIHS 2000-2001. The poverty headcount estimate for 2000-2001, using the official poverty line of Rs.748.56 (as quoted in GoP's PRSP document) would be 37.7% which differs significantly from the PRSP estimate of 32.1%. However, the official GoP poverty lines of 1998-99 and 2000-01, imply a higher inflation rate between the two surveys (11 percent) than the actual inflation rate based on CPI data during survey periods (7.3 percent). *If corrected, WB calculations yield a 2000-01 poverty line of around Rs.723 and a resulting poverty headcount of 34.4%¹.* This base year estimate is consistent with the PC poverty headcount estimate for 2000-01 of 34.5%. **The WB validates the base year (2000-01) poverty line of Rs. 723.4 and poverty headcount estimate for 00-01 of 34.4/34.5 percent.**
2. Updating the 2000-01 poverty line of Rs. 723.4, using inflation adjustments with CPI data, PC arrives at a poverty line of Rs.878.6 for 2004-05. This yields a poverty headcount in 2004-05 of 23.9%. The WB, using the same poverty line arrives at a headcount of 24.0%. Using the stated methodology, and the validated baseline estimates implies a decline in poverty headcount rate between 2000-01 and 2004-05 of 10.4 percentage points, which is close to the PC estimate of headcount decline of 10.6%. The extent of the reduction in poverty headcount is also validated by using an alternative poverty line (Basic Needs poverty line) with the same CPI inflation rate; this also suggests around 10.7 % reduction in poverty headcount.²
3. The WB team also conducted a validation exercise for the price inflation between 2000-01 and 2004-05. While the CPI adjustment suggests an inflation rate of 21.46 %, the Tornqvist Price Index (TPI), which is a household survey-based price index (Annex in the note briefly describes what the TPI is and the methodology), yields a much higher inflation rate of 29.6%. The impact on the poverty line (using TPI) is substantial; the 04-05 poverty line is Rs. 937.5. **Using TPI , the poverty headcount for 2004-05 is 29.2%, implying a decline in poverty headcount between 00-01 and 04-05 of 5.2 percentage points.**

Recommendation: We strongly recommend using the TPI based inflation to update the 00-01 poverty line for 04-05, which yields a poverty headcount of 29.2%; the resulting decline in poverty between 00-01 and 04-05 will therefore be 5.2 percentage points. The rationale for this is two fold: (a) the CPI does not cover rural areas whereas almost sixty percent of the population of Pakistan resides in rural areas- this can bias the inflation estimates. In this particular year it appears to have substantially "underestimated" the inflation rate; (b) reporting a 10 percentage point decline in a span of 3 or 4 years especially given the wide variation of estimated inflation rates will likely undermine the credibility of the published numbers and may result in false inferences of increased poverty in future rounds; for example, this will likely be the case if the next PSLM round yields a headcount estimate in the range of 24-29 percent.

¹ For the purposes of validation, all estimates in this preliminary note are based on spatial price index computed at PSU level guided by the PC methodology, with the exception of the extension of the WB poverty line and the associated estimates.

² Details are given in the note. For detail definition of "Basic Needs Poverty Line", see the World Bank Poverty Assessment (2002).

Analysis on Pakistan Social and Living Standards Measurement Survey (PSLM) 2004-05

The World Bank was invited as a member of a committee that was set up to arrive at a consensus on poverty estimates from the recent Pakistan Social and Living Standard Measurement Survey (PSLM) conducted in 2004-05. The main purpose of this task was to validate the estimates of the Planning Commission and collaborate with their team on all relevant data and methodological issues underpinning the recent data as well as the baseline year estimates.

Below, we briefly describe the data and provide some details on the methodology used for estimation of poverty and validation of trends between 00-01 and 04-05. We conclude with a brief section on poverty diagnostics which includes a spatial distribution of poverty (across provinces and rural/urban areas) as well as the basic growth incidence analyses and growth-inequality decomposition.

I. PSLM 2004-05: Data Description

The PSLM 2004-05 data that we received includes 14,708 households and covers four major provinces. The questionnaire of the PSLM survey has two components: modules from the Core Welfare Indicators Questionnaire (CWIQ) and a consumption module which is exactly the same as PIHS 2000-01³. The 14,708 households were selected from the CWIQ sample (76,520 households). The data set therefore is provincially representative with respect to both the consumption and the CWIQ data. PSLM 2004-05 started the field work from July 2004 and ended in June 2005. Typically, consumption data are collected uniformly across the survey period to minimize biases induced by seasonality. It appears that the PSLM 2004-05 covered very few households in July and August 04, and June 05.

II. Poverty line and poverty headcount rates for 2000-01

Using an official poverty line in 2000-01 of Rs. 748.56 per adult equivalent per month, the PRSP (December 2003) and the Economic Survey 2002-03 report a poverty headcount estimate in 2000-01 of 32.1 percent.

There are two important reasons why the above estimate cannot be validated.

First, the official poverty line of 2000-01 implies a higher inflation rate between PIHS 1998-99 and 00-01 (11 percent) than the actual inflation rate based on survey time periods (7.3 percent). To correct this problem, the poverty line for 2000-01 is computed by multiplying the official poverty line for 1998-99 (Rs. 673.54) by the true inflation rate (1.073), so that the poverty line remains fixed in real terms during the two surveys. This yields a poverty line of about Rs.723 for 2000-01, as opposed to around Rs. 748.56 as reported in the official documents.⁴

Second, the poverty estimates based on the official poverty line of Rs. 748.56 of 32.1% cannot be replicated. Using this poverty line, the poverty headcount would be 37.7%. On the other hand, the poverty estimates using Rs.723.4 as the adjusted poverty line, yields a headcount rate of 34.4%. This is also consistent with the PC estimate of 34.5% for 2000-01 (using Rs 723.4 as the adjusted poverty line). Intuitively, a higher poverty line of Rs 748.56, should yield a higher poverty headcount than the estimate based on Rs.723.4 if the underlying distribution of consumption is

³ Although the interview dates for the previous PIHS round suggest coverage from 01 to 02, the official FBS document refers to the survey as PIHS 00-01. WB documents which report analyses using PIHS 00-01 are using the same data that is otherwise referred to as PIHS 00-01 in official documents.

⁴ There is a small divergence between the World Bank estimated inflation rate for 2000-01 and the PC's estimated inflation rate for 2001. WB calculations arrive at Rs. 722.7, while the PC's 2000-01 poverty line is 723.4. For validation purposes, we use Rs. 723.4 for the 2000-01 poverty line. The estimates based on the poverty line of Rs. 722.7 are very close to the estimates using Rs.723.4 and will be provided upon request.

exactly the same. The only way it can be lower than 34.4/34.5% is if the distribution of consumption used by GoP is different. The documentation provided in Cheema (2005) suggests that the total number of households in the sample used for constructing the 2000-01 official estimate was lower than WB/PC by 738 households which could very well imply a different consumption distribution.

Given the reasons mentioned above, we will use the baseline poverty line of Rs.723.4 and the implied headcount rate of 34.4/34.5 in estimating the poverty trends between 2000-01 and 04-05.

III. Poverty Estimates for 2004-05:

(a) Poverty estimates and trend using official poverty line and CPI based inflation rate

Using the 2000-01 poverty line of Rs.723.4 as the base, the WB updated the poverty line adjusting for inflation between 00-01 and 04-05 based on CPI data. The PC estimate of the CPI based inflation rate is 21.46 percent which agrees with the WB calculation. The adjusted poverty line for 04-05 is Rs. 878.6. The implied poverty headcount using this method is 24.0%. This is also very close to the PC estimate of 23.9%. The WB estimate of poverty decline between 00-01 and 04-05 is 10.4 percentage points, again, similar to the PC estimate of 10.6 percentage points⁵.

(b) Validating the trend using a different poverty line: Poverty estimates and trends using WB poverty line(s) and CPI based inflation rate

The WB has used a basic needs poverty line to estimate poverty in previous years⁶. The estimate using the basic needs approach in 00-01 is 37.7%.

As an independent validation of trends between 00-01 and 04-05, we extended the basic needs poverty line to 2004-05, using the CPI price inflation rate of 21.46. Table 1 summarizes poverty headcount rates based on official poverty line and WB basic needs poverty line. The higher estimates in both 00-01 and 04-05 are due to the fact that the Basic Needs induced poverty line is higher than the official poverty line.

Table 1: Comparison in poverty headcount rates and the trends

Poverty Headcount Rates	2000-01	2004-05	Difference
PC using official poverty line and CPI based inflation adjustment	34.5	23.9	10.6
WB (basic needs poverty line and CPI based inflation adjustment)	37.7	27.0	10.7

Source: The author's estimation based on PIHS 00-01 and PSLM 2004-05

However, the extent of poverty reduction implied by both methodologies is essentially the same - about 10.6 percentage points (see table 1). This validates the trends in poverty implied by the official poverty line. For the rest of the note we will only use the official poverty line rather than replicate the basic needs poverty line.

(c) Poverty estimates and trends using the official poverty line and Tornqvist Price Index (TPI)

We now validate the price inflation implied by CPI by constructing price indices based on PIHS 2000-01 and PSLM 2004-05, commonly known as "Tornqvist Price Index (TPI)" (see Annex 1

⁵ The divergence between PC's estimate and the WB's is less than 0.1 percentage points, which is attributed to small differences in definition in consumption aggregates and cleaning protocol before constructing price indices

⁶ There was no official poverty line until 2002/03. In order to estimate poverty and assess trends, the WB constructed a "basic needs" poverty line – used for previous reports of the World Bank, including the Poverty Assessment for Pakistan in 2002. The guiding principle behind this poverty line is to take the line "as the cost of achieving a minimum bundle of basic needs, in which calorific needs are included alongside other purchasable needs such as fuel, housing and clothing". This poverty line will be henceforth referred to as *Basic Needs poverty line*. (for details on this approach see WB 2002).

for details on TPI methodology). TPI has several advantages over CPI. TPI includes price information from both rural and urban areas while CPI price survey covers only 35 cities/71 markets. Since more than 60 percent of population in Pakistan is located in rural areas, the price indices using the CPI could be biased. TPI may also reflect consumption behavior of surveyed households more accurately since both weights and prices (unit values) come from the surveys. TPI does have its limitations; perhaps, the biggest one is its inability to include inflation rates of non-food items. Another drawback may be that the coverage of items in the survey is far narrower than the CPI.

Table 2 summarizes the results. First, TPI registers a significantly higher inflation rate than CPI implying a higher poverty line of Rs. 937.5 for 2004-05. The associated poverty headcount rate is 29.2%, (as opposed to 24.0 percent using CPI adjustment). This halves the extent of decline in poverty between the survey years.

Table 2: Comparison between TPI and CPI

	Inflation	Poverty line for 04-05	National poverty headcount rate for 2004-05	Reduction between 00-01 and 04-05
TPI	29.6%	937.52	29.2%	5.2%
CPI	21.5%	878.64	24.0%	10.4%

Source: Planning Commission and the author's calculation using PSLM 04-05

Despite the “cons” of the TPI documented above, the significant divergence between TPI and CPI based inflation raises a serious concern with regard to how accurately the CPI reflects rural price inflation. We attempted to estimate inflation rates using TPI for urban and rural samples separately and found that while the urban TPI converges to the CPI index for food items, the rural TPI is much higher than the urban TPI – suggesting that the CPI based adjustment especially underestimates the rural price inflation.

In summary, we strongly recommend using the TPI based inflation to update the 00-01 poverty line for 04-05, which yields a poverty headcount of 29.2%. This will imply a decline in poverty of 5.2 percentage points between 00-01 and 04-05.

IV. Basic diagnostics

Below we estimate poverty headcount across space- rural and urban, as well as the distribution across the four major provinces namely, Punjab, Sindh, NWFP and Balochistan. Table 3 highlights the rural – urban breakdown and trends between 1998-99 and 04-05.⁷ There are three important observations: (a) Poverty headcount in both rural and urban areas has unambiguously decreased between 00-01 and 04-05, with a higher decline in the rural headcount. (b) By and large, 04-05 has reversed the negative poverty trend between 98-99 and 00-01, (c) Both the poverty gap and the squared poverty gap has reduced suggesting both the depth and extent/severity of poverty has improved between 00-01 and 04-05.

Table 3: Poverty Statistics (%) by rural and urban areas

		98-99	2000-01	2004-05
Poverty Headcount Rate	National	30.0	34.4	29.2
	Urban	21.0	22.8	19.1
	Rural	33.8	39.1	34.0
Poverty Gap	National	6.3	7.0	6.1
	Urban	4.3	4.6	3.9
	Rural	7.1	8.0	7.2
Squared Poverty Gap	National	2.0	2.1	2.0
	Urban	1.3	1.4	1.2
	Rural	2.2	2.4	2.3

Source: Staff estimation based on PIHS 98-99, 00-01 and PSLM 04-05

⁷ This table uses the following poverty lines: the official poverty line for 98-99, updated using CPI based inflation for 2000-01 (the PC and Economic Survey differ here, we agree with the PC estimate of 00-01). Using 2000-01 as the base, the updating for 04-05 is done using TPI.

Updating the 1998-99 official poverty line with TPI indices

In the above, we used the PC poverty lines for both 1998-99 and 2000-01, and update the 2000-01 poverty line with the TPI inflation rate for the 2004-05 poverty line, in order to focus on the change between 00-01 and 04-05. Henceforth, we update the PC poverty line for 1998-99 with TPI inflation rate for both 2000-01 and 2004-05 for consistency and comparability with TPI across the three survey years. Since the TPI based inflation rate for 2000-01 is almost the same (slightly lower than the CPI based inflation rate), the poverty headcount rates in table 4 are slightly lower than those in table 3, for example, the national poverty headcount rates for 2000-01 and 2004-05 in table 3 are 34.4% and 29.2%, respectively, while those in table 4 are 33.3% and 28.3%.

Table 4: Poverty Statistics (%) by rural and urban

		98-99	2000-01	2004-05
Poverty Headcount Rate	National	30.0	33.3	28.3
	Urban	21.0	22.0	18.4
	Rural	33.8	37.9	32.9
Poverty Gap	National	6.3	6.7	5.9
	Urban	4.3	4.4	3.7
	Rural	7.1	7.6	6.9
Squared Poverty Gap	National	2.0	2.0	1.9
	Urban	1.3	1.3	1.1
	Rural	2.2	2.3	2.2

Source: Staff estimation based on PIHS 98-99, 00-01 and PSLM 04-05

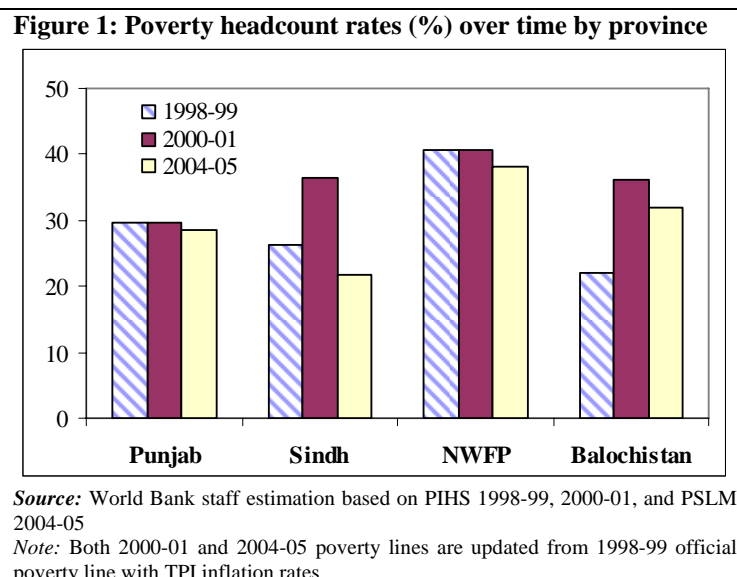
Note: Both 2000-01 and 2004-05 poverty lines are updated from 1998-99 official poverty line with TPI inflation rates

(a) Spatial distribution of poverty:

Below we estimate poverty headcount across space- rural and urban, as well as the distribution across the four major provinces namely, Punjab, Sindh, NWFP and Balochistan. Table 3 highlights the rural –urban breakdown and trends between 1998-99 and 04-05. There are three important observations: (a) Poverty headcount in both rural and urban areas has unambiguously decreased between 00-01 and 04-05, with a higher decline in the rural headcount. (b) By and large, 04-05 has reversed the negative poverty trend between 98-99 and 00-01, (c) Both the poverty gap and the squared poverty gap has reduced suggesting both the depth and extent/severity of poverty has improved between 00-01 and 04-05.

The provincial distribution of poverty in 04-05, as well as the trends between 98-99 and 04-05 are also quite revealing (see Figure 1 and table A.1 in the annex).

The best performer in terms of poverty headcount reduction between 00-01 and 04-05 is Sindh, followed by Balochistan, NWFP and Punjab. Sindh has registered a dramatic reduction - almost 15 percentage points with nearly 20 percentage points in rural Sindh. Note that Sindh also exhibits the highest volatility in the headcount ratio across the three survey years: the worst outcome in 00-01 is a year of severe drought while the best outcome in 04-05 is a year that registers exceptionally high agricultural growth especially for the major crops (ES: 04-05).

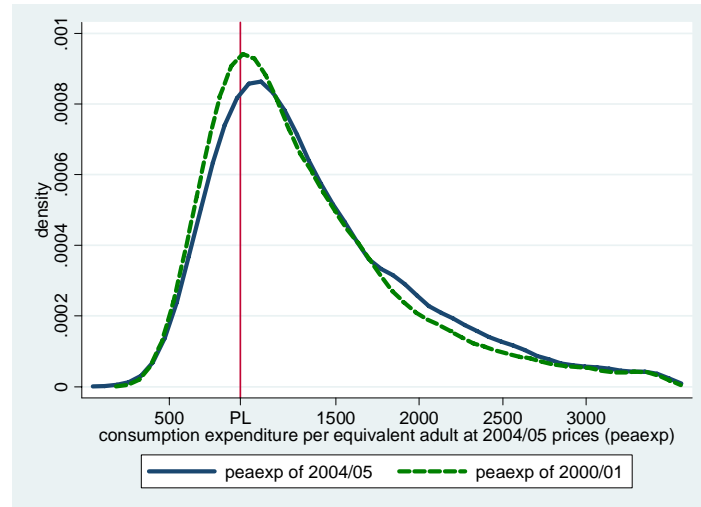


Detailed analyses of these patterns and trends would be very valuable for policy purposes.

(b) Linking Growth and Poverty:

Figure 2 reveals that compared to 00-01, the consumption distribution has improved substantially in 04-05. It also provides a visually compelling explanation for the observed poverty reduction: an enormous clustering of population around the poverty line means that even small changes in consumption/income can affect poverty headcount ratios dramatically. This is the case in Pakistan, where the improvement in consumption distribution in 04-05 has led to a sizeable decline in poverty.

Figure 2: Distributions of consumption expenditure per equivalent adults at 2004-05 prices

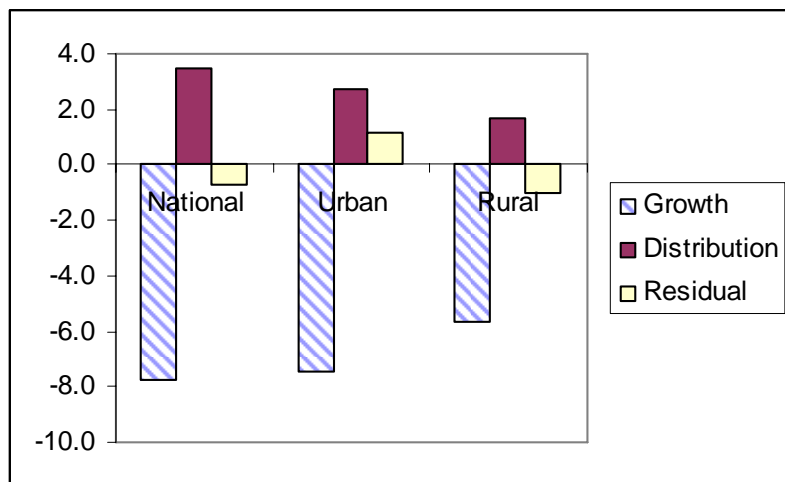


Source: Staff estimation using PIHS 2000-01 and PSLM 2004-05

Growth-Inequality

Decomposition: A growth-inequality decomposition of poverty headcount change between 00-01 and 04-05 is instructive. The “growth effect” of an increase in average consumption is found to be a substantial decline in poverty headcount for Pakistan. The “redistribution effect”, namely the contribution of a change in inequality of consumption to poverty headcount change, is a rise in the headcount. On balance, the two opposing effects lead to the observed decline in poverty headcount for all of Pakistan (Figure 3). This is in sharp contrast to a similar exercise between 98-99 and 00-01, where the impact of growth and inequality on poverty went in the opposite direction.

Figure 3: Growth and Inequality Decomposition

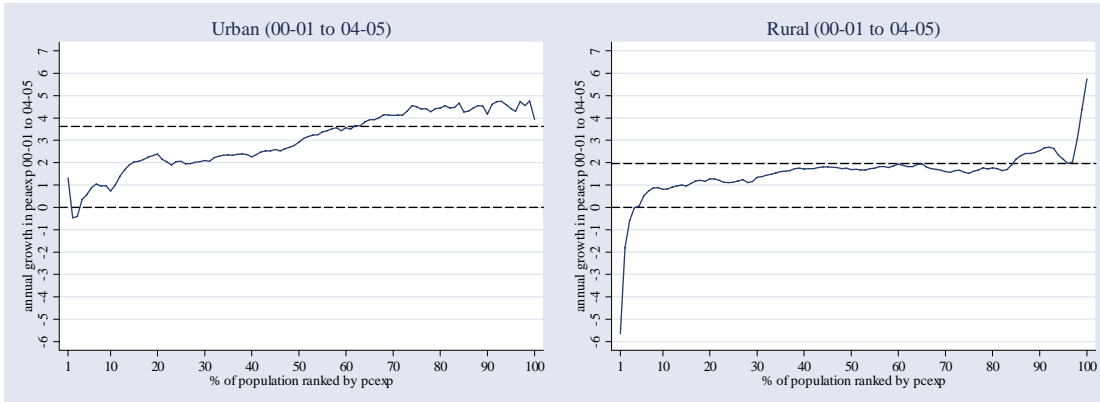


Source: Staff estimation based on PIHS 2000-01 and PSLM 2004-05
 Note: Poverty lines are updated from 1998-99 with TPI inflation rates

Growth Incidence Curve: Has the increase in consumption been “pro-poor” over the period of 00-01 and 04-05? This can be seen from the shape of growth-incidence curves (GICs) constructed for urban and rural areas of Pakistan, which maps average annual growth rate of per adult equivalent consumption expenditure for each centile over the period 00-01 to 04-05

In both urban and rural areas, growth in per adult equivalent consumption is found to be positive for all except the poorest centiles (the bottom 5 percent of the population). The slope of the GIC

for rural areas indicates that the increase in consumption has been higher for the topmost centiles than for the middle and lower centiles with the largest increase occurring in the extreme right tail of the distribution. In urban areas, the GIC is positive for almost all centiles with no pronounced gains for the richest or poorest centiles. Overall, almost all centiles of the population gained from growth with the rich gaining the most. This is reflected in a rise in the consumption inequality over this period.



Annex 1: Choice of price indices to update poverty lines—CPI or Tornqvist Price Index (TPI)

The household survey based price index is computed as a Tornqvist index, which is a weighted geometric index where: (a) Weight of every commodity k in the index is the simple average of the weights of commodity k in base and final periods; (b) Weight of commodity k in either period is the average of the shares of commodity k in the total expenditure of each household in that period. In contrast to (a), the CPI for every year is computed as a Laspeyres index, which uses fixed weights of the base period, which in the case of Pakistan is 2000-01. The use of Laspeyres' index with weights fixed at the base year level is likely to lead to overestimation of the effect of price increase on welfare, when the CPI is used to deflate the poverty lines, since it does not allow for substitution in consumption in response to inflation. Moreover, the fact that the weights are fixed according to the consumption bundle of 2000-01 implies that the CPI does not capture any change in consumption pattern that may have occurred over time due to changing tastes.

The CPI also differs from the TPI in the context of point (b) above. In the case of CPI, the weight of commodity k in a period is equal to its share in the total consumption expenditure in that period. Since the better-off consumers are likely to spend more, this method will weight the price index in favor of the consumption pattern of the wealthy – a property that has been termed as “plutocratic”. In contrast, the TPI is by construction a “democratic” measure, since by taking the simple average of all shares, it gives all households equal importance in the weights used to compute the price indices. Incidentally, the CPI will always be a plutocratic measure – not being a household survey, it has no information on the share of a commodity in the expenditure of every household, but can discern the share of a commodity in total consumption expenditure from price and quantity information available from the market surveys conducted for the purpose. The question of which type of price indices better represents the “true” change in cost of living does not have a conclusive answer. Some of the salient points to consider in comparing between the two measures are listed below.

- ❑ The TPI uses a more current consumption bundle from the surveys, and also takes into account substitution in consumption, unlike the CPI (see (a) above).
- ❑ In the context of (b) above, democratic measures including TPI are more suitable to measure changes in living standard of the poor than plutocratic measures, e.g., CPI.⁸
- ❑ The TPI uses information on prices and budget shares from both urban and rural areas while the CPI uses the information from urban areas only. If the inflation rate varies a lot between urban and rural areas, the CPI might be misleading.
- ❑ One drawback of TPI is that it can only incorporate homogenous goods like food items and fuels. Since a price index to adjust poverty lines must include a broader list of items, an adjustment is made to extrapolate from the food price index calculated from the surveys. This procedure, for this analysis, involves using the ratios of price indices between different commodity groups from the CPI, which introduces an element of arbitrariness into the TPI measure.
- ❑ TPIs might provide a wrong picture on inflation rate if two or more distinct goods are included within a single commodity. This possibility may not be negligible in PIHS 2000-01 and PSLM 2004-05 surveys since TPIs include 75 items whereas CPI includes over 300 items.

Source: Deaton and Tarozzi (2000); Deaton et al (2004)

⁸ Note that even a TPI using such “democratic” weights – although more representative of prices faced by the poor than the CPI – would be different from indexes calculated specifically for the poor.

Table A.1: Poverty Headcount Rates for Province with rural-urban breakups (if Survey Based Price Indices are used for 2000-01 and 2004-05)

	1998-99			2000-01			2004-05		
	Urban	Rural	Overall	Urban	Rural	Overall	Urban	Rural	Overall
Punjab	23.7	32.2	29.8	22.1	32.8	29.7	20.5	32.3	28.6
Sindh	15.3	34.5	26.2	19.9	47.1	36.5	13.6	28.1	21.9
NWFP	26.1	43.3	40.8	29.0	42.8	40.8	24.7	40.7	38.1
Balochistan	25.2	21.6	22.1	26.3	38.2	36.1	21.2	34.6	31.8
National	21.0	33.8	30.0	22.0	37.9	33.3	18.4	32.9	28.3

Source: World Bank staff estimation based on PIHS 1998-99, 2000-01 and PSLM 2004-05

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