

Hina, Nazli; Whitney, Edward; Mahrt, Kristi

**Working Paper**

## Poverty trends in Pakistan

WIDER Working Paper, No. 2015/136

**Provided in Cooperation with:**

United Nations University (UNU), World Institute for Development Economics Research (WIDER)

*Suggested Citation:* Hina, Nazli; Whitney, Edward; Mahrt, Kristi (2015) : Poverty trends in Pakistan, WIDER Working Paper, No. 2015/136, ISBN 978-92-9256-025-6, The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki, <https://doi.org/10.35188/UNU-WIDER/2015/025-6>

This Version is available at:

<https://hdl.handle.net/10419/129443>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

WIDER Working Paper 2015/136

## Poverty trends in Pakistan

Hina Nazli,<sup>1</sup> Edward Whitney,<sup>2</sup> and Kristi Mahrt<sup>3</sup>

December 2015

**Abstract:** The official estimates of poverty in Pakistan have shown a remarkable and consistent decline in the poverty headcount during the previous decade. This paper examines trends in poverty between 2001 and 2011 using the official food energy intake and the cost of basic needs approaches, both of which are modified to allow poverty lines to vary over time and space. The latter estimates provide utility-consistent poverty lines through the imposition of revealed preference conditions in maximum entropy adjustments. Evidence from both methods suggests that poverty incidence increased rather than declined as indicated in the official estimates.

**Keywords:** poverty measurement, utility consistency, spatial variation, Pakistan

**JEL classification:** I32, D12, O53, R20

**Figures and Tables:** at the end of the paper.

**Acknowledgements:** The authors would like to acknowledge Channing Arndt for his technical and conceptual guidance with the software code applied herein and Sohail Malik and Paul Dorosh for their guidance on poverty analysis in Pakistan.

---

<sup>1</sup>Pakistan Strategy Support Program of International Food Policy Research Institute, Pakistan; <sup>2</sup>International Food Policy Research Institute (IFPRI), Washington, DC and UC Davis, CA, United States; <sup>3</sup>Independent contractor; corresponding author: [emwhitney@ucdavis.edu](mailto:emwhitney@ucdavis.edu)

This study has been prepared within the UNU-WIDER project '[Reconciling Africa's Growth, Poverty and Inequality Trends: Growth and Poverty Project \(GAPP\)](#)'.

Copyright © UNU-WIDER 2015

ISSN 1798-7237 ISBN 978-92-9256-025-6

Typescript prepared by Ayesha Chari for UNU-WIDER.

UNU-WIDER gratefully acknowledges the financial contributions to the research programme from the governments of Denmark, Finland, Sweden, and the United Kingdom.

The World Institute for Development Economics Research (WIDER) was established by the United Nations University (UNU) as its first research and training centre and started work in Helsinki, Finland in 1985. The Institute undertakes applied research and policy analysis on structural changes affecting the developing and transitional economies, provides a forum for the advocacy of policies leading to robust, equitable and environmentally sustainable growth, and promotes capacity strengthening and training in the field of economic and social policy-making. Work is carried out by staff researchers and visiting scholars in Helsinki and through networks of collaborating scholars and institutions around the world.

UNU-WIDER, Katajanokanlaituri 6 B, 00160 Helsinki, Finland, [wider.unu.edu](http://wider.unu.edu)

The views expressed in this publication are those of the author(s). Publication does not imply endorsement by the Institute or the United Nations University, nor by the programme/project sponsors, of any of the views expressed.

## 1 Introduction

A large number of studies have attempted to estimate the incidence of poverty in Pakistan since the government started collecting nationally representative data on household expenditures in 1963–64. Early studies (Allaudin 1975; Naseem 1973) computed poverty lines on the basis of arbitrarily fixed per capita income or expenditure required by a household to fulfil its minimum food needs. By the mid-1970s and through the early 1990s, the focus of work shifted to estimating the extent of as well as the trends in poverty in terms of the absorption of a minimum diet based on nutritional requirements. Most of the studies conducted during this period computed poverty lines on the basis of the food energy intake (FEI) method that relies on the required daily allowance (RDA) of calorie intake<sup>1</sup> (Ahmad and Allison 1990; Ahmad and Ludlow 1989; Akhtar 1988; Allaudin 1975; de Kruijk and Leeuwen 1985; Ercelawn 1989, 1990; Irfan and Amjad 1984; M.H. Malik 1988; S.J. Malik 1993, 1994; Naseem 1973, 1977).

Poverty estimates are generally quite sensitive to the choice of various factors such as minimum calories required, scale of measurement (per capita or per adult equivalent), and the use of welfare measure (income or expenditure). Since these early studies do not apply a uniform methodology, the poverty measures are not comparable and cannot be used to determine poverty trends over time (Arif 2006; Cheema 2005; GoP 2008a, 2008b; S.J. Malik 2005). Studies conducted from the 1990s onwards attempt to prepare a consistent time series so that poverty trends can be examined (Anwar and Qureshi 2002; Anwar et al. 2005; Arif et al. 2000; Cheema 2005; S.J. Malik 1993, 1994, 2005; Malik et al. 2014b; Jafri 1999; SPDC 2005; World Bank 2002). The results of these studies indicate that Pakistan experienced high levels of poverty in the 1960s which declined considerably during the 1970s and 1980s; the 1990s witnessed a sharp increase in poverty, and this increasing trend continued until 2001–02.

Starting from 1998–99, the government of Pakistan began estimating official poverty lines using the FEI methodology applied to the Household Integrated Economic Survey (HIES) for that year. Subsequent poverty lines were derived by scaling the previous year's line by the inflation rate as determined by the consumer price index (CPI) (Cheema 2005). The resulting estimates of poverty rates are problematic in a number of ways. First and most notably, the resulting poverty headcount estimates have shown a remarkable and consistent decline in poverty since 2001–02. This result is in stark contrast to evidence of deteriorating trends derived from other measures of welfare, even those based on the same data sources. For instance, Jamal (2012) and Malik et al. (2014b) re-estimated the poverty line and found not only a considerably higher incidence of poverty in 2010–11 but also a rising trend in poverty after 2004–05. Second, Malik et al. (2014b) point out that, owing to a variety of factors, the CPI may not represent the true cost of living for those living near the poverty line and thus the subsequent poverty lines may not accurately reflect living standards. Third, as discussed in Beck et al. (2015), inflating a fixed poverty line over time rather than re-estimating flexible poverty lines in each survey year ignores the substitution effects in consumption that may occur from variation in relative prices of essential commodities over time. Finally, estimating a single national poverty line fails to account for the possibility of regional differences in prices and consumption patterns.

Recently, the government of Pakistan, in recognition of the shortcomings in its poverty estimates, made plans to revise them. The revised estimates address regional, especially

---

<sup>1</sup> Poverty is defined with reference to the recommended calorie intake of a person. To adjust for the size and age composition of a household, an adult equivalent scale is used. Calorie requirements are then converted into minimum food expenditure, in accordance with the expenditure pattern of the poor.

rural/urban, price gaps and also allow the consumption basket to evolve through time so that substitution effects are incorporated. In this study, we re-estimate poverty in Pakistan using the official methodology and a modified version of the Poverty Line Estimation Analytical Software (PLEASE). Across the alternatives employed, poverty trends differ drastically from the current official figures. The alternative methods employed are variants of the FEI and cost of basic needs (CBN) approaches to poverty measures. For the main alternatives, flexible bundles are developed that account for variations in consumption patterns and prices across space and through time. The CBN approach, as implemented using PLEASE, is an attractive option as it allows for utility-consistent estimates of consumption poverty rates.

The remainder of this paper is structured as follows. Section 2 discusses the methodologies employed. Section 3 presents the data employed. Section 4 presents results. A final section concludes and looks ahead to future trends.

## 2 Methods

At the time of writing, the official methodology for estimating consumption poverty rates is based on an application of the FEI method to the HIES data for 1998–99. Adult equivalent consumption aggregates (see Section 3) are used as the welfare indicator in the estimation of an official poverty line. A single goods basket is assumed in all the provinces. However, in view of different prices across provinces and rural/urban areas, the poverty line is adjusted with Paasche price indices calculated at the primary sampling unit level by using the median prices and average budget shares in each unit. The first three per-adult equivalent consumption expenditure quintiles are used so that the consumption patterns of the relatively well-off do not affect the determination of the FEI poverty line. Details can be found in GoP (2003) and Cheema (2005).

Poverty lines are then adjusted in subsequent years by the CPI-based inflation rate between the household survey years. This means that poverty lines in each year are based on the same fixed consumption bundle. The Foster–Greer–Thorbecke class of poverty measures is used to measure poverty headcount, poverty gap, and the severity of poverty (Foster et al. 1984).

In response to the concerns about the use of CPI raised in Malik et al. (2014a) and elsewhere, we apply the FEI approach, first nationally and then regionally, to all surveys since 2000. In other words, rather than update the 1998–99 consumption bundle based on CPI, new bundles are calculated for each additional survey. This is done using the same approach as applied in 1998–99 and by calculating separate FEI lines by spatial domain.

There are also general concerns about the FEI approach. Ravallion and Bidani (1994) point out that because of higher relative prices for food and systematic differences in consumption patterns and activity levels across regions and survey years, the FEI method may be biased towards relatively rich regions (e.g. towards urban areas relative to rural areas). In addition, this method does not capture the true effect of price increases. Ravallion (1998) argues that an increase in prices may increase or decrease the poverty line depending on how the consumption patterns change (normal versus inferior goods).

The CBN approach provides an alternative to FEI (Ravallion 1994, 1998; Ravallion and Bidani 1994; Ravallion and Sen 1996; Wodon 1997). In common practice, the CBN approach identifies a single national consumption bundle satisfying minimum calorie requirements and evaluates this bundle at region-specific prices. However, if the consumption patterns of the poor vary by region and preferences permit substitution, the use of a single national consumption bundle may yield inconsistent poverty measures (Tarp et al. 2002). To address this issue, recent studies

suggest the use of region-specific consumption bundles and region-specific prices to estimate poverty lines (Arndt and Simler, 2010; Datt and Jolliffe 2005; Gibson and Rozelle 2003; Mukherjee and Benson 2003; Ravallion and Lokshin 2006; Tarp et al. 2002).

A difficulty found in both the FEI and the CBN approaches with using different bundles for each region is that the bundles may violate utility consistency of poverty lines, with some bundles being preferred to others (Ravallion and Lokshin 2006), thus rendering the associated poverty measures incomparable. In other words, an estimated increase in poverty may occur purely because the quality of the bundles underlying the poverty line improves over time, driving up the real value of the poverty line and hence the poverty rate. In order to allow comparability over time and space, Ravallion and Lokshin (2006) suggested applying the revealed preference criteria to assess the utility consistency of poverty lines. Subsequently, Arndt and Simler (2010) proposed a maximum entropy approach to impose revealed preference conditions across consumption bundles, thus ensuring the existence of utility-consistent preference sets associated with the estimated consumption bundles. Here, we employ the basic approach suggested by Arndt and Simler (2010) via implementation of the PLEASE methodology with a series of modifications appropriate to the case of Pakistan.

### **3 Data**

The official estimates, revised FEI estimates, and PLEASE estimates are generated using nationally representative household survey data collected between 2001 and 2011 by the government of Pakistan. The relevant survey modules and steps taken in preparing the data are described below. Additionally, we discuss issues related to the representativeness and quality of the data.

The Pakistan Bureau of Statistics (PBS) conducted the first Household Income and Expenditure Survey in 1963; it has been repeated periodically since then. To address the requirements of a new system of national accounts, the questionnaire was revised in 1990. The surveys conducted in 1990, 1992–93, 1993–94, and 1996–97 used the revised questionnaire. The scope of the survey was expanded in 1998 when it was merged with the Pakistan Integrated Household Survey (PIHS) that collects information on social indicators. This combined survey retained the acronym HIES, with ‘Household Integrated Economic Survey’ as the updated name. (The HIES acronym used herein refers to this updated name.) Also at that time, the questionnaire was further improved and was split into male and female sub-questionnaires.

This analysis employs data from five HIES conducted in 2001–02, 2004–05, 2005–06, 2007–08, and 2010–11 (see GoP 2001b, 2005, 2006, 2008b, 2011). These five surveys collected data on household characteristics, consumption patterns, household income by source, and social indicators. Data from these surveys enable researchers to estimate poverty at the national and sub-national (urban–rural and provincial) levels. The population sample for the HIES consists of all urban and rural areas of the four provinces (Punjab, Sindh, Khyber Pakhtunkhwa (KPK), and Balochistan) and the capital territory (Islamabad) of Pakistan. It excludes the protected areas of KPK and military restricted areas.

In all surveys, a two-stage stratified random sample design is adopted to select the households. In the first stage, primary sampling units (enumeration blocks) are selected in the urban and rural areas of all four provinces. In the second stage, the sample of households is randomly selected from these primary sampling units. In this study, using a random systematic sampling scheme

with a random start, either 16 or 12 households were selected from each primary sampling unit.<sup>2</sup> The sample sizes for the five surveys were 16,182 (2001–02), 14,708 (2004–05), 15,543 (2005–06), 15,512 (2007–08), and 16,341 (2010–11) households.<sup>3</sup>

Data on household expenditures are critical sources of information for consumption-based poverty estimation as real consumption expenditure is the welfare indicator for measurement of the poverty status of a household. For Pakistan, the consumption aggregate includes not only actual purchases but also self-produced and consumed items, consumption of items received as gifts, plus items provided in place of monetary compensation. The HIES provides detailed information on the consumption of food and non-food items. Consumption data consists of food items, fuel and utilities, housing (rent, imputed rent, and minor repair), frequent non-food expenses (household laundry and cleaning, personal care products and services) and other non-food expenses (clothes, footwear, education, and health-related expenses). Expenses such as taxes, fines, and expenses on marriages and funerals are not included in the consumption aggregate as they are judged to be insufficiently related to current living standards. The official methodology also excludes estimated use-values for durable goods. For purposes of consistency in this study, the same exclusion was maintained for all the methods employed.

Survey data on some of the food items (quantities and expenditures) are collected on a recall period of 14 days and others on a recall period of one month. Non-food expenditures are collected in either monthly or annual recall. Care was taken in data preparation in this study to ensure data across all items were calibrated to daily values. For food items, most of the quantities have been reported in kilograms or grams or as number of items. To make food consumption consistent, the consumed quantities are converted into grams and all quantities and expenditures are converted to daily values. Using the food composition tables for Pakistan (GoP 2001a), these quantities are then converted into calories.

Following GoP (2003), we assigned an adult equivalence factor to each individual in the household on the basis of a 2,350-calorie threshold and the individual's gender and age. Exclusion of durable goods and use of an adult equivalence factor are departures from the default PLEASE methodology to maintain consistency with the official methodology.

As noted in Section 2, the revised FEI and PLEASE methodologies allow for the estimation of distinct poverty lines by spatial domain. In all cases where separate poverty lines are calculated across space, eight spatial domains are employed. These spatial domains correspond to the rural and urban zones of the four provinces. Even though the sample frame represents Islamabad, it is incorporated into the urban zone of the province of Punjab.

In this study, data preparation involved an extensive cleaning process for each dataset. For each year of data, outliers for food items were replaced as follows: for each item, a median and standard deviation was calculated separately for each spatial domain for both total value and total quantity. Values greater than the sum of the median and three times the standard deviation were

---

<sup>2</sup> According to the summary reports for each of the five survey years, the sampling design is based on the most recent population census from 1998–99. The number of villages (also referred to as *mouzas* or *dehs*), which informs the sampling frame for the rural areas, remains constant at 50,588 for all five years. As Malik et al. (2014b) explain, there are several problems associated with the fact that the sampling frame has not been updated since the most recent census, leading to questionable representativeness of the data for each of the years.

<sup>3</sup> Although designed to be nationally representative, military restricted areas were excluded from the sampling universe for each of the five surveys. For all years except 2001–02, Azad Jammu and Kashmir, Federally Administered Tribal Area, and Northern Areas were excluded from the scope of the survey. For 2001–02, removal of observations from these areas (1,351 households) results in an adjusted sample size of 14,697.

replaced with the median value for that item in that spatial domain. For 2001–02, we dropped observations for 182 households, or 1.2 per cent of the total sample, from the analysis as a result of missing (121 households) or incomplete (63 households) consumption data. For subsequent years, we dropped 1.4 (2004–05), 0.51 (2005–06), 0.46 (2007–08), and 0.28 (2010–11) per cent of households as a result of missing or incomplete consumption data.

To address the issue of seasonality, HIES collects data over a period of one year. The survey years 2005–06, 2007–08, and 2010–11 identify the quarter in which data were collected. This enables us to identify the seasonal differences during the survey year. Unfortunately, the same is not true for 2001–02 and 2004–05. For these years, we assume no seasonal differences.

## **4 Analytical steps and results**

### **4.1 Official methodology: a fixed FEI bundle across space and time**

The official measures of poverty show a considerable decline in the poverty headcount during the past decade. The incidence of poverty, according to official estimates, declined from 34.5 per cent in 2001–02 to 12.4 per cent in 2010–11. A 24-percentage point decline is observed in rural poverty headcount during the same period—a decline much greater than the corresponding decline in urban poverty headcount (GoP 2013, 2014). Official poverty rates are shown in Table 1.

As mentioned, the decline in official poverty estimates from 1998–99 does not correspond well with other welfare measures. For example, average real household consumption expenditure has remained more or less stagnant since 2001, whereas the average share of food expenditure in total household consumption has increased sharply since 2005–06.<sup>4</sup>

This contrasting situation has raised concerns about Pakistan’s poverty figures and trends (Jamal 2012; Malik et al. 2014b). Using the 2010–11 HIES data and applying the official methodology, Malik et al. (2014b) re-estimated the poverty line by incorporating provincial and urban–rural price variations, finding a poverty headcount for 2010–11 of 45.6 per cent, much higher than the official estimate of 12.4 per cent.<sup>5</sup>

As discussed earlier, the official poverty line was originally estimated using the 1998–99 HIES data and extrapolated for subsequent years by adjusting for inflation using CPI. Malik et al. (2014a) highlighted two major inadequacies in the measurement of CPI: (i) under-coverage of the data on prices, and (ii) underestimation of food shares in total household budget. The PBS, which is responsible for computing and disseminating CPI and inflation rate in the country, collects data on prices only from urban areas. The food share is estimated through the Family Budget Survey, which is also conducted in urban areas. Therefore, CPI has an inherent urban bias that may not reflect the changes in the consumption basket of rural households.

Using HIES data, Malik et al. (2014a) demonstrate significant differences in the prices of different food and non-food items not only across provinces but also across urban and rural

---

<sup>4</sup> For details, see the official survey reports on the HIES between years 2004 and 2012 (GoP 2015).

<sup>5</sup> Jamal (2012) also re-estimated poverty rates using the 2010–11 HIES and arrived at an estimate of 36.6 per cent. The approach employed used different calorie thresholds for urban (2,230) and rural (2,550) areas and estimated different calorie-expenditure functions for rural and urban areas by incorporating provincial dummies. Jamal (2012) also estimated the consumption basket using households in the bottom quartile of per capita consumption expenditure.



areas of provinces. As one might expect, items that are produced in rural areas, such as cereals, pulses, meat, and milk, are more expensive in urban areas. Processed items, such as edible oil/ghee and sugar, are more expensive in rural areas. In addition, Malik et al. (2014a) highlight differences in the food budget shares across urban and rural areas and point out that the current CPI only reflects the consumption patterns of the urban population.

## **4.2 Revised FEI results**

To overcome the issue of urban bias in CPI and to allow poverty lines to vary over time and space, we estimated regional poverty lines for five rounds of the HIES: 2001–02, 2004–05, 2005–06, 2007–08, and 2010–11. In an attempt to isolate the impact of methodological changes, the poverty numbers were estimated with three different methods. First, we estimated a national poverty line in 2001–02 using the official FEI methodology and obtained poverty lines for subsequent years via CPI adjustments. Second, we estimated a single national poverty line for each year using the official FEI methodology. Third, we followed the official FEI methodology; however, we estimated different poverty lines in each year and for urban and rural areas of each province. In total, eight poverty lines were estimated in each year. The national and provincial poverty lines were calculated as the weighted average of these spatial lines, where spatial population was used as weights.

Results are presented in Figure 1. The figure illustrates declining poverty rates of the CPI-adjusted poverty lines, as per official reports and as estimated in the present study. In contrast with the official trend of decreasing poverty incidence, using a national and a regional and time-specific form of the official methodology, this study demonstrates that poverty incidence rises steadily between 2001–02 and 2010–11. Poverty incidence is found to be higher in rural areas than in urban areas in all the estimates. The CPI-adjusted poverty lines show that the gap between rural and urban poverty incidence has reduced over time. However, the opposite is true when poverty lines are estimated for each year.

It is interesting to note that the gap between urban and rural areas is larger when one poverty line, instead of spatial poverty lines, is used to draw poverty estimates. This may be because cost of living varies across areas. Therefore, using one poverty line may overestimate or underestimate poverty across spatial domains. This is confirmed by looking at the provincial estimates of poverty. Poverty incidence is observed to be highest in the province of Punjab when one poverty line is used. However, Sindh and KPK appear the poorest when spatial poverty lines are used. Similar differences can be observed across the rural and urban areas of each province. Although rural poverty incidence is higher than urban poverty incidence, the gap between these two is greater when one poverty line is used (Table 2; Appendix Table A1).

## **4.3 PLEASE approach and results**

As discussed, the FEI approach may not be utility-consistent. This is particularly true when multiple FEI bundles are estimated across space and time. While we do not attempt to address these concerns in the context of the FEI approach, we do address these concerns by following a CBN approach that ensures utility consistency using a modified version of PLEASE.

We have already mentioned exclusion of asset-use values and calculation of household consumption per adult equivalent as opposed to per capita as modifications imposed to ensure maximum possible consistency with the official methodology in terms of data treatment. We also applied two additional modifications to the default PLEASE code in terms of data processing/analysis: the first relates to the calorie requirement calculation, and the second to the sample population used to calculate the poverty line.

In the default PLEASE code, a method to calculate the calorie requirement for each spatial domain based on household demographics is applied. In place of this approach, we applied the method for calculating adult equivalence described in GoP (2003). Following this official methodology, we assigned an adult equivalence factor to each individual in the household and multiplied this factor by the calorie threshold of 2350 daily adult equivalent calories (GoP 2003). The weighted average of this value gave the calorie requirement for each spatial domain. Food baskets in each domain were then scaled to attain this calorie requirement.

The second modification relates to the sample population used to construct the food baskets and poverty lines. In the default code, an iterative process is employed in order to arrive at poverty lines based on the consumption patterns of those households living at or below the poverty line. For Pakistan, we simply used the consumption patterns of the bottom 60 per cent of households, ranked by nominal per capita expenditures in each spatial domain. This modification was undertaken to retain greater comparability with the official methodology.

This approach, deriving bundles based on the consumption patterns of bottom 60 per cent of households in each domain and then scaling those bundles to strike calorie targets, yields a first set of poverty lines. National poverty rates from this simple approach, prior to any corrections for utility consistency, are shown in Figure 2. The figure also illustrates the rates obtained from the FEI approach as applied by spatial domain. Both approaches yield qualitatively similar results in terms of trends. In both cases, poverty rates are observed to increase over the period of study. The FEI approach results in a higher poverty line corresponding to a higher level of welfare that marks the (arbitrary) cut-off between poor and non-poor households. In addition, the FEI approach results in a slightly larger increase in the poverty rate.

Examining rural–urban differences, rural poverty incidence is observed to be consistently higher than urban poverty incidence in the FEI approach (Table 3). However, poverty estimates using the PLEASE code indicate that poverty incidence in urban areas is not much different from that in rural areas. Urban poverty incidence is observed to be higher than rural poverty incidence for 2001–02 and 2007–08, and a rise in poverty overall is noted in 2010–11. However, looking across provinces, this trend holds only for Punjab (see Appendix Table A2). This indicates that the overall trends are mainly driven by the largest province.

In Figure 3, utility consistency is ensured via entropy adjustments imposing revealed preference conditions across space for each survey year. This is shown alongside poverty rates derived from the unadjusted poverty lines (pre-entropy) shown in Figure 2. With the spatial adjustment imposed (post-entropy without intertemporal adjustment), poverty rates are observed to still increase over the period of study, although the magnitude of the increase is somewhat reduced. Figure 3 reveals that poverty incidence increased at a higher rate during 2007–08 compared to 2010–11 when revealed preference conditions were imposed. Most of this increase occurred in the rural areas of Punjab and KPK (Appendix Table A3). This result is consistent with the economic situation within the country after the food price hike. For example, the price of wheat, the major staple of the country, rose by more than 200 per cent. The real wages of agricultural and non-agricultural workers declined. This resulted in worsening the situation for net buyers of food and net sellers of labour, especially in rural areas. We re-estimated poverty lines to now impose spatial and temporal revealed preference constraints in entropy adjustments (post-entropy with intertemporal adjustment). In these estimates the magnitude of poverty declined but did not change the trend (Figure 3). A comparison of the FEI spatial domain method and the CBN method with and without spatial and temporal adjustments indicates that poverty estimates differ in magnitude, but they move in the same direction over time. However, the official estimates show contrasting results.

In Table 4, official estimates of national level urban and rural poverty incidence for 2010–11 are compared alongside utility-consistent estimates for both national level and province level urban and rural poverty incidence (official estimates within provinces are not reported). These estimates indicate that poverty estimates with spatial and intertemporal adjustments are nearly two times higher than the official estimates. Poverty is higher in rural areas than in urban areas according to both the official and the PLEASE code estimates. Within the provinces, estimates using the PLEASE code show poverty to be consistently worse in rural areas than in urban areas. The gap between urban and rural poverty incidence is largest in Sindh.

## 5 Conclusions

In this study, we explored trends in poverty between 2001 and 2011 in Pakistan using two distinct methods of estimating poverty incidence. Working with nationally representative household data, we estimated poverty lines using both the official methodology and a modified version of the PLEASE code, the latter providing utility-consistent poverty lines. Evidence from both methods suggests that trends in poverty incidence in Pakistan between 2001 and 2010–11 did not follow the path indicated in the official estimates provided by the government of Pakistan.

Official estimates of poverty incidence suggest a downward trend from 2001–02 at an annual rate of approximately 2.2 percentage points per year countrywide, with substantial reductions in both rural and urban areas. In contrast with this trend, estimates obtained by applying the government's official methodology to estimate regional poverty lines suggest a steady increase. Further, utility-consistent estimates obtained using the PLEASE code suggest that poverty levels have remained steady over the period of study. Poverty incidence is higher in rural areas than in urban areas according to results of all methods described here. Data from the most recent year of study, 2010–11, show the divide between rural and urban poverty incidence is most pronounced in the Sindh province.

## References

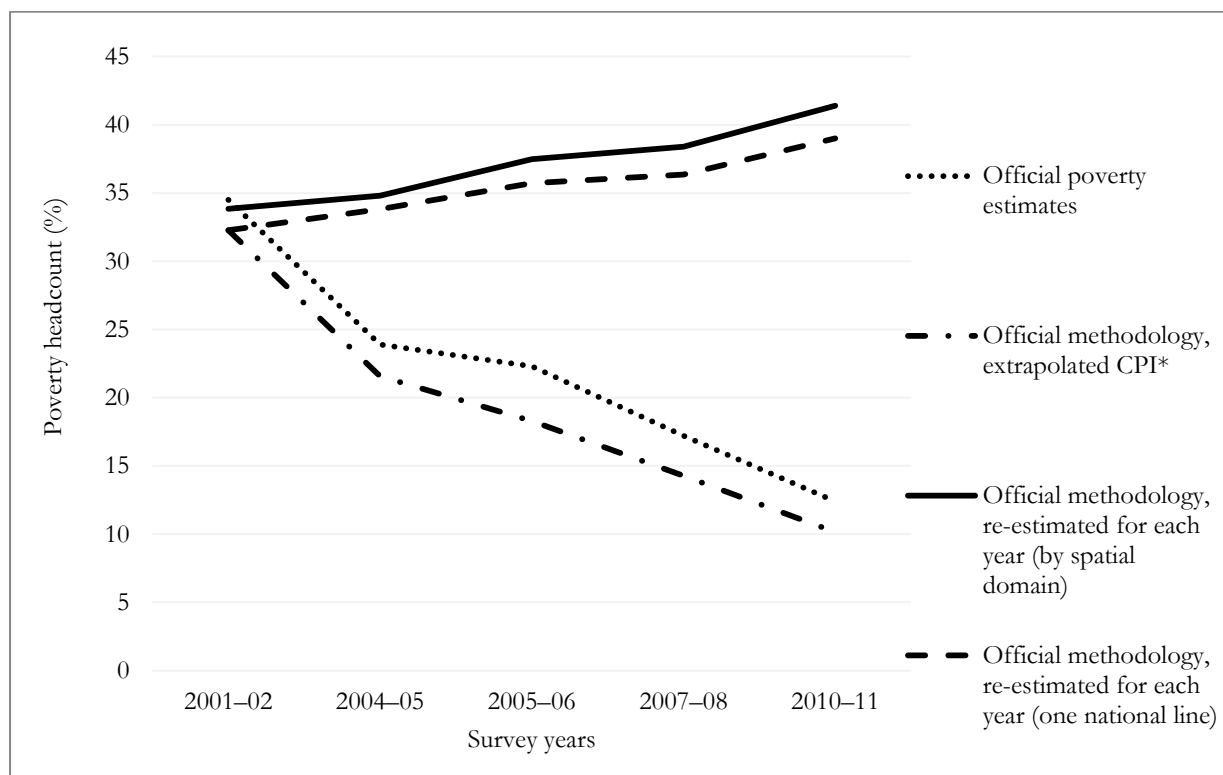
- Ahmad, E., and C. Allison (1990). 'Poverty, Growth and Public Policy in Pakistan'. Draft paper. Islamabad: Pakistan Institute of Development Economics.
- Ahmad, E., and S. Ludlow (1989). 'Poverty, Inequality and Growth in Pakistan'. Background paper for the 1990 World Development Report. Washington, DC: World Bank. Available at: <http://www.pide.org.pk/pdf/PDR/1989/Volume4/831-850.pdf> (accessed 22 December 2015).
- Akhtar, S. (1988). 'Poverty in Pakistan'. Draft mimeo. Islamabad: World Bank.
- Allaudin, T. (1975). 'Mass Poverty in Pakistan: A Further Study'. *Pakistan Development Review*, 14(4): 431–50.
- Anwar, T., and S.K. Qureshi (2002). 'Trends in Absolute Poverty in Pakistan: 1990–91 and 2001'. *Pakistan Development Review*, 41(4, Part II): 859–78.
- Anwar, T., S.K. Qureshi, and H. Ali (2005). 'Landlessness and Rural Poverty in Pakistan'. Paper presented at the 20th Annual General Meeting and Conference of Pakistan Society of Development Economists (PIDE), Islamabad, 10–12 January. Available at: <http://www.pide.org.pk/pdf/psde20AGM/Landlessness%20and%20Rural%20Poverty%20in%20Pakistan.pdf> (accessed 22 December 2015).

- Arif, G.M. (2006). 'Poverty, Economic Growth, and Inequality: A Review of Pakistan's Poverty Literature'. Background Paper 1. Islamabad: Asian Development Bank.
- Arif, G.M., H. Nazli, and R. Haq (2000). 'Rural Non-Agriculture Employment and Poverty in Pakistan'. *Pakistan Development Review*, 39(4, Part II): 1089–110.
- Arndt, C., and K.R. Simler (2010). 'Estimating Utility-Consistent Poverty Lines with Applications to Egypt and Mozambique'. *Economic Development and Cultural Change*, 58(3): 449–74.
- Beck, U., K. Pauw, and R. Mussa (2015). 'Methods matter: The sensitivity of Malawian poverty estimates to definitions, data, and assumptions'. WIDER Working Paper 2015/126. Helsinki: UNU-WIDER.
- Cheema, I.A. (2005). *A Profile of Poverty in Pakistan*. Islamabad: Centre for Research on Poverty Reduction and Income Distribution Planning Commission.
- Datt, G., and D. Jolliffe (2005). 'Poverty in Egypt: Modeling and Policy Simulations'. *Economic Development and Cultural Change*, 53(2): 327–46.
- de Kruijk, H., and M. van Leeuwen (1985). 'Changes in Poverty and Income Inequality in Pakistan During the 1970s'. *Pakistan Development Review*, 24(3–4): 407–22.
- Ercelawn, A.A. (1989). 'Poverty in Pakistan: Choice of Poverty Criteria'. Draft paper. Islamabad: Federal Bureau of Statistics, Government of Pakistan.
- Ercelawn, A.A. (1990). 'Absolute Poverty in Pakistan: Poverty Lines, Incidence, Intensity'. Draft paper. Karachi: Applied Economics Research Centre, University of Karachi.
- Foster, J., J. Greer, and E. Thorbecke (1984). 'A Class of Decomposable Poverty Measures'. *Econometrica*, 52(3): 761–66.
- Gibson, J., and S. Rozelle (2003). 'Poverty and Access to Roads in Papua New Guinea'. *Economic Development and Cultural Change*, 52(1): 159–86.
- GoP (2001a). *Food Consumption Table for Pakistan (Revised 2001)*. Islamabad/Peshawar: Ministry of Planning and Development, Government of Pakistan (GoP), and UNICEF/ Department of Agricultural Chemistry, NWFP Agriculture University. Available at: [http://www.fao.org/fileadmin/templates/food\\_composition/documents/regional/Book\\_Food\\_Composition\\_Table\\_for\\_Pakistan\\_.pdf](http://www.fao.org/fileadmin/templates/food_composition/documents/regional/Book_Food_Composition_Table_for_Pakistan_.pdf) (accessed 22 December 2015).
- GoP (2001b). *Household Integrated Economic Survey 2001–02*. Islamabad: Federal Bureau of Statistics, Government of Pakistan (GoP).
- GoP (2003). 'Accelerating Economic Growth and Reducing Poverty: The Road Ahead'. Poverty Reduction Strategy Paper. Islamabad: Ministry of Finance, Government of Pakistan (GoP). Available at: <http://www.embassyofpakistanusa.org/forms/Accelerating%20Economic%20Growth%20and%20Reducing%20Poverty--The%20Road%20Ahead%20%5BPRSP-2003%5D.pdf> (accessed 22 December 2015).
- GoP (2005). *Household Integrated Economic Survey 2004–05*. Islamabad: Federal Bureau of Statistics, Government of Pakistan (GoP).
- GoP (2006). *Household Integrated Economic Survey 2005–06*. Islamabad: Federal Bureau of Statistics, Government of Pakistan (GoP).
- GoP (2008a). *Economic Survey 2007–08*. Islamabad: Ministry of Finance, Government of Pakistan (GoP).

- GoP (2008b). *Household Integrated Economic Survey 2007–08*. Islamabad: Federal Bureau of Statistics, Government of Pakistan (GoP).
- GoP (2011). *Household Integrated Economic Survey 2010–11*. Islamabad: Federal Bureau of Statistics, Government of Pakistan (GoP).
- GoP (2013). *Economic Survey 2012–13*. Islamabad: Ministry of Finance, Government of Pakistan (GoP).
- GoP (2014). *Economic Survey 2013–14*. Islamabad: Ministry of Finance, Government of Pakistan (GoP).
- GoP (2015). ‘Household Integrated Economic Survey Report 2004–05, 2005–06, 2007–08, 2010–11, 2011–12’. In *Pakistan Social and Living Standards Measurement*. Islamabad: Ministry of Finance, Government of Pakistan (GoP). Available at: <http://www.pbs.gov.pk/content/pakistan-social-and-living-standards-measurement> (accessed 22 December 2015).
- Irfan, M., and R. Amjad (1984). ‘Poverty in Rural Pakistan’. In A.R. Khan and E. Lee (eds), *Poverty in Rural Asia*. Geneva: International Labour Office (ILO)/ARTEP.
- Jafri, S.M.Y. (1999). ‘Assessing Poverty in Pakistan’. In *A Profile of Poverty in Pakistan*. HDC Report. Islamabad: Mahbub ul Haq Human Development Centre (HDC). Available at: <http://mhhd.org/?p=54> (accessed 22 December 2014).
- Jamal, H. (2012). ‘Pakistan Poverty Statistics: Estimates for 2011’. Research Report 84. Karachi: Social Policy Development Centre (SPDC). Available at: <http://www.spdc.org.pk/Data/Publication/PDF/RR84.pdf> (accessed 22 December 2015).
- Malik, M.H. (1988). ‘Some New Evidence on the Incidence of Poverty in Pakistan’. *Pakistan Development Review*, 27(4): 509–15.
- Malik, S.J. (1993). ‘Poverty in Pakistan, 1984–85 to 1987–88’. M. Lipton and J. van der Gaag (eds), *Including the Poor: Proceedings of a Symposium Organized by the World Bank and the International Food Policy Research Institute*. Washington, DC: World Bank Regional and Sectoral Studies.
- Malik, S.J. (1994). ‘Poverty in Pakistan: 1984–85, 1987–88 and 1990–91’. Mimeo. Washington, DC: International Food Policy Research Institute.
- Malik, S.J. (2005). ‘Agricultural Growth and Rural Poverty in Pakistan: A Review of the Evidence’. Pakistan Resident Mission Working Paper 2. Islamabad: Asian Development Bank/Pakistan Resident Mission.
- Malik, S.J., H. Nazli, A. Mehmood, and A. Shahzad (2014a). ‘Issues in the Measurement and Construction of the Consumer Price Index in Pakistan’. PSSP Working Paper 020. Islamabad: Pakistan Strategy Support Program, International Food Policy Research Institute.
- Malik, S.J., H. Nazli, and E. Whitney (2014b). ‘The Official Estimates of Poverty in Pakistan: What Is Wrong and Why? Illustrations using the Government of Pakistan’s Household Integrated Economic Survey 2010–11’. PSSP Working Paper 26. Islamabad: Pakistan Strategy Support Program (PSSP), International Food Policy Research Institute.
- Mukherjee, S., and T. Benson (2003). ‘The Determinants of Poverty in Malawi, 1998’. *World Development*, 31(2): 339–58.
- Naseem, S.M. (1973). ‘Mass Poverty in Pakistan: Some Preliminary Findings’. *Pakistan Development Review*, 12(4): 317–60.

- Naseem, S.M. (1977). 'Rural Poverty and Landlessness in Pakistan'. ILO Report on Poverty and Landlessness in Asia. Geneva: International Labour Office (ILO).
- Ravallion, M. (1994). *Poverty Comparisons*. Chur: Harwood Academic Publishers.
- Ravallion, M. (1998). 'Poverty Lines in Theory and Practice'. LSMS Living Standards Measurement Study Working Paper 133. Washington, DC: World Bank. Available at: <http://documents.worldbank.org/curated/en/1998/07/438657/poverty-lines-theory-practice> (accessed 22 December 2015).
- Ravallion, M., and B. Bidani (1994). 'How Robust Is a Poverty Profile?'. *World Bank Economic Review*, 8(1): 75–102.
- Ravallion, M., and M. Lokshin (2006). 'Testing Poverty Lines'. *Review of Income and Wealth*, 52(3): 399–421.
- Ravallion, M., and B. Sen (1996). 'When Method Matters: Monitoring Poverty in Bangladesh'. *Economic Development and Cultural Change*, 44(4): 761–92.
- SPDC (2005). *Combating Poverty: Is Growth Sufficient? Social Development in Pakistan, Annual Review 2004*. Karachi: Social Policy and Development Centre (SPDC). Available at: <http://www.spdc.org.pk/Data/Publication/PDF/AR-6.pdf> (accessed 22 December 2015).
- Tarp, F., K.R. Simler, C. Matusse, R. Heltberg, and G. Dava (2002). 'The robustness of poverty profiles reconsidered', *Economic Development and Cultural Change*, 51(1): 77–108.
- Wodon, Q. (1997). 'Food Energy Intake and Cost of Basic Needs: Measuring Poverty in Bangladesh'. *Journal of Development Studies*, 34(2): 66–101.
- World Bank (2002). 'Poverty in Pakistan: Vulnerabilities, Social Gaps, and Rural Dynamics'. Report 24296-PAK. Washington, DC: Poverty Reduction and Economic Management Sector Unit, South Asia Region, World Bank.

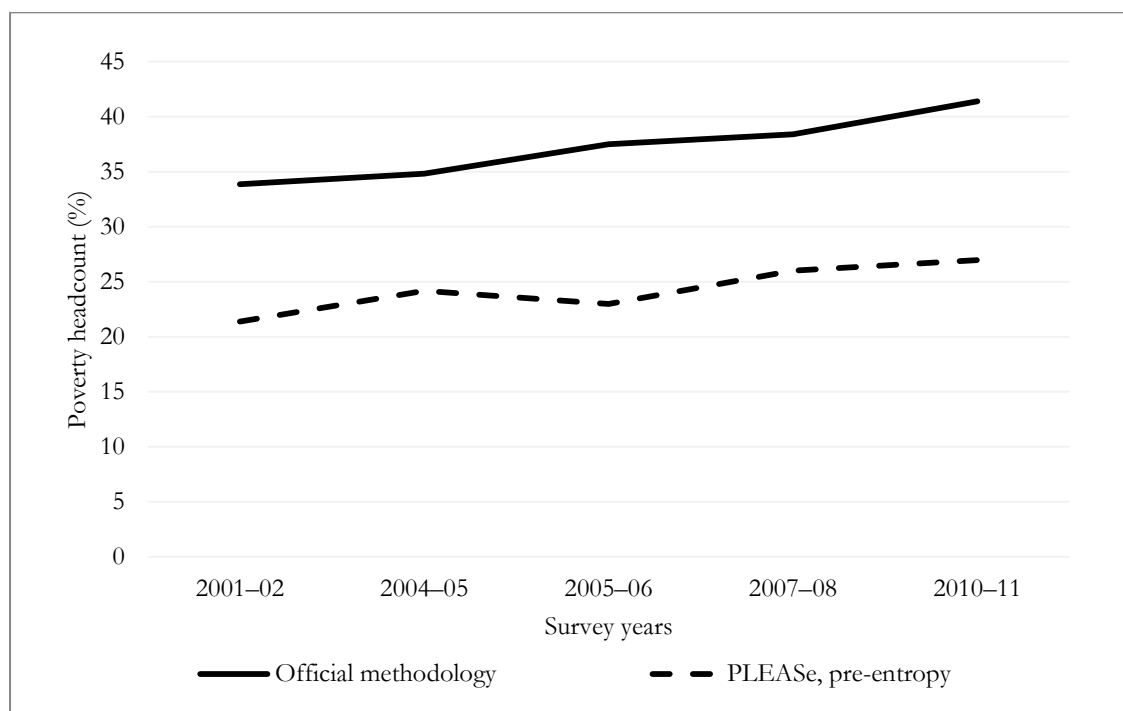
Figure 1: Poverty estimates using food energy intake (FEI) methodologies



Note: \*Official methodology applied to 2001-02 survey data and updated for subsequent years using official consumer price index (CPI) data published in various economic surveys.

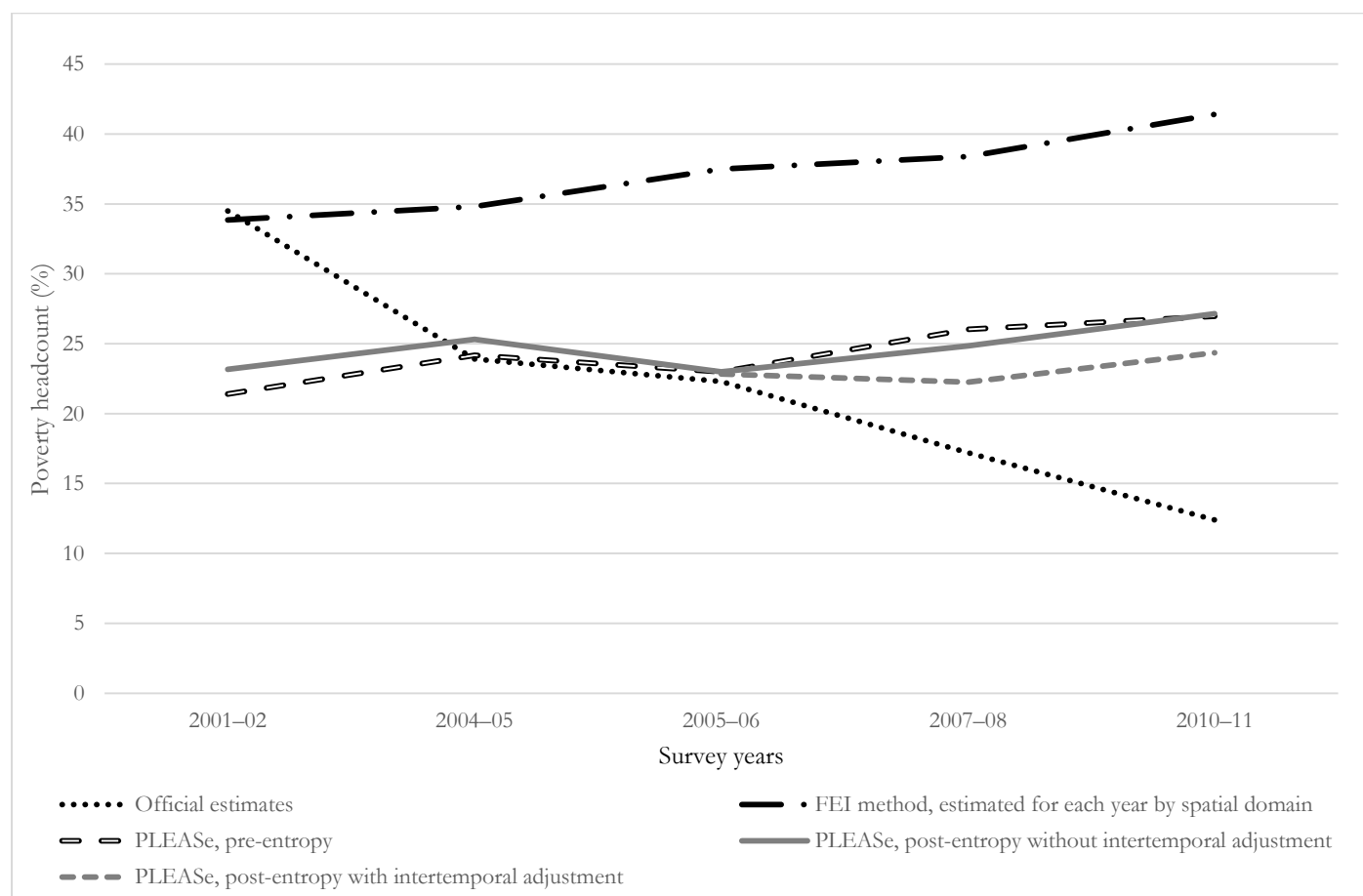
Source: Based on Cheema (2005), GoP (2008a, 2014), and authors' calculations using Household Integrated Economic Survey (HIES) data.

Figure 2: National poverty headcounts for cost of basic needs (CBN) and FEI bundles without controlling for utility consistency



Source: Authors' calculations using HIES data.

Figure 3: Poverty rates from official estimates, official methodology (FEI), and unadjusted and spatially adjusted CBN bundles



Source: Authors' calculations using HIES data.



Table 1: Trends in poverty indicators based on the official poverty line (1992–93 to 2010–11)

Year	Poverty headcount			Poverty gap			Severity of poverty		
	Urban	Rural	National	Urban	Rural	National	Urban	Rural	National
1992–93	20.0	27.6	25.5	3.4	4.6	4.3	0.9	1.2	1.1
1993–94	15.9	33.5	28.2	2.7	6.3	5.2	0.7	1.8	1.4
1996–97	15.8	30.2	25.8	2.4	5.3	4.4	0.6	1.4	1.1
1998–99	20.9	34.7	30.6	4.3	7.6	6.4	1.3	2.4	2.0
2001–02	22.7	39.3	34.5	4.6	8.0	7.0	1.4	2.4	2.1
2004–05	14.9	28.1	23.9	2.9	5.6	4.8	0.8	1.8	1.5
2005–06*	13.1	27.0	22.3	2.1	5.0	4.0	0.5	1.4	1.1
2007–08	10.0	20.6	17.2	—	—	—	—	—	—
2010–11	7.1	15.1	12.4	—	—	—	—	—	—

Note: ‘—’ indicates that these results were not published for that year.

Source: Based on Cheema (2005) and Government of Pakistan (2008a; 2014).

Table 2: Poverty estimates using the food energy intake (FEI) methodology by urban and rural areas

	2001–02	2004–05	2005–06	2007–08	2010–11
Official methodology, extrapolated CPI*					
National	32.3	21.6	18.3	14.3	10.2
Urban	17.6	11.3	8.7	6.2	5.0
Rural	38.2	26.4	23.1	18.2	12.7
Official methodology, re-estimated for each year (by spatial domain)					
National	33.9	34.8	37.5	38.4	41.4
Urban	25.2	24.4	29.2	30.1	33.9
Rural	37.4	39.7	41.7	42.4	45.1
Official methodology, re-estimated for each year (one national line)					
National	32.3	33.8	35.7	36.3	39.0
Urban	17.6	19.1	20.9	22.6	24.1
Rural	38.2	40.7	43.2	43.0	46.4

Source: GoP (2014) and authors’ calculations using HIES data.

Table 3: Poverty estimates using the FEI and PLEASe methodologies without controlling for utility consistency by rural and urban areas

	2001–02	2004–05	2005–06	2007–08	2010–11
Official methodology, re-estimated for each year (by spatial domain)					
National	33.9	34.8	37.5	38.4	41.4
Urban	25.2	24.4	29.2	30.1	33.9
Rural	37.4	39.7	41.7	42.4	45.1
PLEASe, pre-entropy					
National	21.4	24.2	23.0	26.0	27.0
Urban	23.8	23.5	22.8	27.0	26.1
Rural	20.4	24.5	23.1	25.6	27.4

Source: GoP (2014) and authors’ calculations using HIES data.

Table 4: Poverty estimates using the official and spatially/temporally adjusted PLEASe methodologies (2010–11)

	Official methodology	PLEASe methodology				
	National	National	Punjab	Sindh	KPK	Balochistan
Overall	12.4	24.4	23.2	26.0	24.8	28.9
Urban	7.1	17.7	17.2	16.8	21.4	26.1
Rural	15.1	27.7	25.9	34.7	25.5	29.8

Source: GoP (2014) and authors’ calculations using HIES data.

## Appendix

Table A1: Poverty estimates using the food energy intake (FEI) methodology by spatial domain

	2001–02	2004–05	2005–06	2007–08	2010–11
Official methodology, extrapolated CPI*					
Punjab	34.1	23.7	15.8	14.4	11.0
Urban	20.4	13.7	7.4	6.7	5.5
Rural	39.6	28.3	19.7	18.0	13.6
Sindh	32.1	16.2	20.8	14.3	9.7
Urban	12.9	7.0	8.3	4.5	4.1
Rural	44.3	23.0	33.0	22.9	14.9
KPK	28.3	24.1	18.1	9.1	8.6
Urban	19.7	12.7	14.6	3.6	5.7
Rural	29.8	26.3	18.8	10.2	9.2
Balochistan	22.9	18.0	35.1	27.3	7.0
Urban	15.9	11.7	22.1	18.7	4.7
Rural	24.4	19.5	39.2	30.7	7.7
Official methodology, re-estimated for each year (by spatial domain)					
Punjab	33.3	33.7	32.7	33.7	40.3
Urban	28.2	26.2	27.4	27.9	35.0
Rural	35.3	37.3	35.1	36.3	42.8
Sindh	35.0	34.3	43.5	46.9	44.4
Urban	19.5	19.4	28.3	31.4	30.7
Rural	44.9	45.5	58.4	60.3	57.3
KPK	35.0	39.1	39.0	37.5	40.4
Urban	29.9	33.2	37.1	32.1	36.4
Rural	35.8	40.2	39.3	38.6	41.3
Balochistan	31.3	37.5	57.4	55.9	42.2
Urban	24.9	26.7	49.9	46.7	43.5
Rural	32.7	40.3	59.7	59.6	41.8
Official methodology, re-estimated for each year (one national line)					
Punjab	34.1	35.8	32.0	33.5	38.0
Urban	20.4	21.7	19.7	21.5	23.5
Rural	39.6	42.3	37.9	39.0	44.9
Sindh	32.1	27.5	37.5	39.7	39.7
Urban	12.9	13.4	19.0	21.8	23.0
Rural	44.3	37.9	55.6	55.3	55.3
KPK	28.3	39.1	39.7	34.5	41.5
Urban	19.7	25.9	31.9	24.2	31.2
Rural	29.8	41.7	41.1	36.5	43.6
Balochistan	22.9	29.0	56.9	59.4	39.8
Urban	15.9	18.1	40.1	41.9	30.7
Rural	24.4	31.7	62.1	66.3	42.6

Source: GoP (2014) and authors' calculations using HIES data.

Table A2: Poverty estimates using the FEI and PLEASE methodologies without controlling for utility consistency by spatial domain

	2001–02	2004–05	2005–06	2007–08	2010–11
Official methodology, re-estimated for each year (by spatial domain)					
Punjab	33.3	33.7	32.7	33.7	40.3
Urban	28.2	26.2	27.4	27.9	35.0
Rural	35.3	37.3	35.1	36.3	42.8
Sindh	35.0	34.3	43.5	46.9	44.4
Urban	19.5	19.4	28.3	31.4	30.7
Rural	44.9	45.5	58.4	60.3	57.3
KPK	35.0	39.1	39.0	37.5	40.4
Urban	29.9	33.2	37.1	32.1	36.4
Rural	35.8	40.2	39.3	38.6	41.3
Balochistan	31.3	37.5	57.4	55.9	42.2
Urban	24.9	26.7	49.9	46.7	43.5
Rural	32.7	40.3	59.7	59.6	41.8
PLEASE, pre-entropy					
Punjab	19.6	22.2	18.7	22.4	25.5
Urban	22.7	21.5	19.2	23.7	24.6
Rural	18.3	22.6	18.5	21.8	25.9
Sindh	25.8	28.7	32.0	34.8	33.5
Urban	26.0	27.6	26.9	32.9	29.0
Rural	25.6	29.5	37.0	36.4	37.7
KPK	19.3	21.9	17.8	20.4	21.7
Urban	20.8	18.9	21.0	19.9	22.9
Rural	19.1	22.5	17.1	20.5	21.4
Balochistan	25.4	29.8	41.1	42.8	27.5
Urban	25.9	26.8	37.6	35.2	28.7
Rural	25.3	30.5	42.2	45.8	27.2

Source: GoP (2014) and authors' calculations using HIES data.

Table A3: Poverty estimates using the PLEASE methodology with and without spatial and intertemporal adjustment

	2001–02	2004–05	2005–06	2007–08	2010–11
Post-entropy, spatially adjusted but no intertemporal adjustment					
Punjab	22.6	26.3	19.6	21.8	26.2
Urban	22.3	20.6	14.1	17.1	20.1
Rural	22.8	28.9	22.1	23.9	29.1
Sindh	24.6	21.6	26.3	28.3	27.9
Urban	18.2	17.0	15.4	21.3	18.6
Rural	28.7	25.0	37.0	34.5	36.7
KPK	21.8	27.1	22.6	21.8	27.5
Urban	20.2	22.8	21.1	18.5	23.4
Rural	22.1	28.0	22.9	22.5	28.4
Balochistan	25.5	28.5	32.7	53.9	32.7
Urban	21.3	25.9	36.0	42.6	28.9
Rural	26.4	29.1	48.7	58.3	33.8
Pre-entropy, with spatial and intertemporal adjustment					
Punjab	22.6		19.6	19.6	23.2
Urban	22.3		14.1	14.9	17.2
Rural	22.8		22.1	21.8	25.9
Sindh	24.6		26.0	25.2	26.0
Urban	18.2		15.0	18.3	16.8
Rural	28.7		36.7	31.2	34.7
KPK	21.8		22.4	18.8	24.8
Urban	20.2		20.7	15.5	21.4
Rural	22.1		22.7	19.5	25.5
Balochistan	25.5		45.4	49.5	28.9
Urban	21.3		36.0	37.7	26.1
Rural	26.4		48.3	54.1	29.8

Source: GoP (2014) and authors' calculations using HIES data.