Readdressing Poverty Measurement Practice in Pakistan

Fowad Murtaza[1]

Abstract

A clear and systematic methodology for poverty measurement is lacking for Pakistan which results in differing poverty estimates with divergent patterns and trends. This paper measures poverty in Pakistan by establishing a clear and systematic methodology and demonstrates poverty comparisons. Using the data from Household Integrated Economic Survey 2011-12, over 41.18% population in Pakistan is estimated to be below the poverty line. Poverty is found significantly higher in the rural areas as compared with the urban areas at the national level as well as in all the provinces. Though incidence of poverty appears to be highest in Balochistan, majority of poor are found in Punjab.

1.   Introduction

The existence of pervasive poverty is one of the defining characteristics of low-income countries (Nasir et al 2015). There have been numerous debates on poverty measurement methodology but consensus on a single poverty measurement technique and methodology has yet to be reached. Practically, all developed approaches for measuring poverty make compromises on different issues, therefore poverty measurement is based on approximations (Murtaza 2010). The concern that remains is how to make the best approximations as different methodologies can bring substantial differences in findings.

Naseem (1973) pioneered poverty measurement in Pakistan. Since then though much work on poverty estimation in Pakistan has been done, a clear and systematic methodology for poverty measurement is lacking for Pakistan. This results in differing poverty estimates with divergent patterns and trends, making the findings of the existing work in Pakistan unclear and less credible. Moreover, the focus of existing work on poverty in Pakistan has been on estimating the incidence

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[1] Essex Pathways, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, UK. Corresponding author's Email: fmurta@essex.ac.uk. The author is grateful to Mr Iftikhar Cheema of Oxform Policy Management, Islamabad and Ms Rabia Awan of Federal Bureau of Statistics Pakistan for their help in data management and poverty line measurement.

of poverty and widely ignores the importance of poverty comparisons which could be useful for poverty alleviation policy formulation (Murtaza 2010). Therefore, the objectives of this paper are to estimate poverty in Pakistan by adopting a clear and systematic approach and to make comparisons across regions and provinces.

The rest of the paper is organized as follows. A review of literature on poverty measurement in Pakistan is presented in Section 2. Methodology for the poverty estimation is established in Section 3. The results of poverty estimates are discussed in Section 4, and finally Section 5 concludes the paper.

2.   Review of Previous Studies

Most of the poverty measurement work in Pakistan uses consumption expenditure as an indicator of well-being, while few have used income (or both). Not many of these studies provide a clear justification or reasoning for their preferred methodologies or their components such as unit of analysis, type of poverty line etc. A summary review of selected work on Pakistan addressing the key methodological issues is presented in Table 1.

3.   Methodology for Poverty Measurement

Though measurement of poverty seems straight forward, practically it is a complex and challenging task. There are (at least) six important issues which need to be addressed while measuring poverty: (1) use of appropriate data source (2) selection of an indicator of well-being for evaluating the welfare (3) decision about the unit of analysis (4) selection and calculation of poverty line i.e. to differentiate poor from non-poor (5) selection of poverty measure i.e. to aggregate individually identified poor into a poverty measure (6) checking the robustness of the poverty measure (Ravallion 1992). These issues are addressed below for establishing a systematic approach for calculating poverty while examining the prevailing poverty measurement practices in Pakistan.

3.1.   Source of Data

Representative household surveys on income and consumption are the only data sources that can give direct information about the distribution of living standards and poverty in a country. Poverty measurement is more meaningful if done using micro household survey data instead of grouped data. Earlier studies such as Naseem (1973), Aladdin (1975), Mujahid (1978), Kruijk and Myrna (1985), Ahmad et al. (1989), Zaidi and Vos (1993, 1994) used the published grouped household survey data.

Table 1: Previous Work on Poverty Measurement in Pakistan

Study	Data type†	Indicator of well-being	Unit of analysis	Treatment of prices	Treatment of household composition	Absolute or relative poverty line	Single or multiple poverty lines	Poverty line‡	Poverty measure	Comments
Naseem (1973)	Household grouped♦	Consumption	Household / Individual	Used some price index to adjust prices	considered all members same	Absolute	Multiple	Arbitrary	Head count ratio	Pioneering work on measuring poverty using HH survey data
Alauddin (1975)	Household grouped	Income / Consumption	Household / Individual	Used some price index to adjust prices	considered all members same	Absolute	Multiple	Arbitrary	Head count ratio	Measured poverty using six HIES rounds for the country and regions. Also measured poverty for some minimum calorie requirement.
Mujahid (1978)	Household grouped	Income	Household / Individual	Used some price index to adjust prices	considered all members same	Absolute	Multiple	Arbitrary	Head count ratio	Emphasizes that only household income and household size can give meaningful poverty estimates (as opposed to Naseem, 1973).
Kruijk and Myrna (1985)	Household grouped	Income	Household	No price adjustment was made	considered all members same	Absolute	Single	Arbitrary	Head count ratio	Using HIES data, estimated different poverty measures for two periods at the national and urban-rural levels, and did the comparisons.
Ahmad et al. (1989)	Household grouped	Income / Consumption	Household	Used some price index to adjust prices	considered all members same	Absolute	Multiple	Arbitrary	Head count ratio, Sen index	Using HIES data, estimated poverty measure for two periods at the urban and rural levels, and did the comparisons.

Malik (1992)	Household micro[♦♦]	Consumption	Household	No price adjustment was made	used some equivalence scale	Absolute	Multiple	FEI	FGT[‡‡]	Measured rural poverty at the national and provincial levels by using the data from two rounds of HIES. Also estimated rural poverty by classifying agro-climate zones.
Zaidi (1992)	Household micro	Consumption	Household	No price adjustment was made	used some equivalence scale	Relative	Single	Arbitrary	Head count ratio	Used the relative poverty line to measure poverty in Pakistan by using HIES data.
Zaidi and Vos (1993)	Household grouped	Income / Consumption	Household	No price adjustment was made	used some equivalence scale	Relative	Single	Arbitrary	Head count ratio	Used the relative poverty line to measure poverty in Pakistan by using HIES data. Also computed calculated poverty for population subgroups.
Zaidi and Vos (1994)	Household grouped	Income / Consumption	Household	No price adjustment was made	used some equivalence scale	Relative	Single	Arbitrary	Head count ratio	Used the relative poverty line to examine the difference in poverty over time by using two rounds of HIES data. Also calculated and compared poverty for population subgroups.
IFPRI (1995)[♯]	Household micro	Income	Individual	Used some price index to adjust prices	considered all members same	Relative	Single	Arbitrary	Head count ratio	Gathered data by surveying four rural districts and measured poverty and estimated its determinants.

Bhatti et al. (1999)	Household micro	Consumption	Individual	--	--	Absolute	Single	--	FGT	Estimated sectoral poverty in Pakistan using the poverty line of Ali (1995).
Arif et al. (2000)	Household micro	Consumption	Household	No price adjustment was made	considered all members same	Relative	Multiple	CBN	FGT	Used HIES data and measured relative poverty at the national and urban-rural levels. Also measured poverty for farm and non-farm workers in rural areas.
McCulloch et al. (2000)	Household micro	Income	Household	No price adjustment was made	used some equivalence scale	Relative	Single	Arbitrary	FGT	Used a five years panel survey data of 686 households in rural Pakistan to measure chronic and transitional poverty in rural Pakistan.
Haq et al. (2001)	Household micro	Consumption	Household	No price adjustment was made	considered all members same	Relative	Single	Arbitrary	Head count ratio	Estimated poverty in Pakistan considering only non-food consumption for the poverty line using two rounds of HIES.
Qureshi et al. (2001)	Household micro	Consumption	Household	No price adjustment was made	used some equivalence scale	Absolute	Multiple	DCI, CBN	Head count ratio	Estimated food poverty and cost of basic need poverty using one round of HIES.
FBS (2002)	Household micro	Consumption	Individual	Used some price index to adjust prices	used some equivalence scale	Absolute	Single	FEI	FGT	Used five rounds of HIES during 1990s and measured poverty for the whole country and did comparisons at the urban-rural and province levels.

Jamal (2002)	Household micro	Consumption	Individual	No price adjustment was made	considered all members same	Absolute	Multiple	FEI	FGT	Using three HIES data sets, suggests a route to measure absolute poverty line and then poverty measure.
Anwar et al. (2004)	Household micro	Consumption	Individual	--	--	Absolute	Single	FEI	FGT	Estimated poverty and poverty profile for national, urban-rural areas, and the province level, using the poverty line of CRPRID (2003).
Anwar (2005)	Household micro	Income/ Consumption	Individual	No price adjustment was made	used some equivalence scale	Relative	Multiple	Arbitrary	FGT	Used HIES data and measured relative poverty for national, urban-rural areas, and the province level.

♯ The study was based on a survey of 727 households in three rural and one urban district (in three different provinces); therefore, it was not a representative survey.

† The source of data was HIES.

♦ Published summary of household characteristics drawn from HIES.

♦♦ Individual household data from HIES.

‡ Direct Calorie Intake (DCI), Food Energy Intake (FEI), Cost of Basic Need (CBN)

‡‡ FGT: Foster, Greere, Thorebeck measures of poverty

The present study uses micro household data from the Household Integrated Economic Survey (HIES) 2011-12 conducted by the Federal Bureau of Statistics (FBS), Government of Pakistan. The universe of HIES consists of all urban and rural areas of the four provinces of the country. The survey adopts two-stage stratified sampling design which draws a sample size of 15,807 households. The entire sample is drawn from 1158 primary sampling units (PSUs); 585 urban and 573 rural PSUs.

3.2.   Indicator of Well-being

Indeed, standard of living cannot be observed exactly, and one may only identify some indicator(s) of standard of living which can capture only some of its dimensions. There is not a single universally accepted measure of standard of living (Murtaza 2010). Usually, monetary and non-monetary categories are used as indicators of well-being. Monetary indicators primarily include income or consumption expenditure. Non-monetary indicators, on the other hand, employ nutrition intake, health, educational attainment, energy use, life satisfaction etc. In practice, monetary indicators of well-being seem more feasible as income or consumption expenditure are generally assumed as a direct measure of welfare. Though using income or consumption as an indicator have their own advantages and disadvantages, they are not easy to compute which can ultimately affect the poverty results. Their selection primarily depends upon the contemporary conditions of the country/region of survey and the data itself. Theoretically speaking, income may be considered as a source of well-being, whereas consumption expenditure may refer to achieved well-being. Since not all consumption is supported by income and not all income is spent, the two indicators differ from each other. Consumption is a function of permanent income, not current income. Moreover, consumption is less variable over time compared to income. If there are temporary fluctuations in income, the income indicator of well-being will consider those households/individuals poor who are experiencing that temporary shock. However, their short run consumption may not change because of the temporary shock if they engage in consumption smoothing through dis-saving and/or borrowing etc. Therefore, if the consideration is achieved well-being rather than potential well-being, consumption expenditure appears to be an appropriate indicator of well-being (Atkinson 1989, Andersson et al. 2006). Because of its significance and practicability (availability of data), this study uses consumption expenditure as an indicator for welfare ranking in Pakistan (Murtaza 2010). Though majority of studies in Pakistan use consumption expenditure as a measure of well-being, most of them do not explain the reason for their selection.

Computation of the consumption aggregate is not trivial. In computing consumption expenditure for Pakistan, researchers include or exclude different items from the consumption bundle without giving any details about their choice. This makes the poverty line ambiguous and the poverty measure vague. Importantly, to assure the comparability of results between different years, the consumption aggregate needs to be constructed by including the same set of items for all data sets. In present study, the components of consumption expenditure are grouped into following five sub-aggregates (Murtaza 2010):

i) food items

ii) fuel and utilities (kerosene, gas, electricity, firewood, etc.)

iii) housing (rent or imputed rent, and minor repairs)

iv) frequent non-food expenses (household laundry and cleaning, personal care products and services etc.)

v) other non-food expenses (clothes, footwear, education, health related expenses etc.)

Some expenses which are unrelated to living standards (for instance taxes, fines, expenditure on religious functions such as marriages and funerals etc.) are purposely not included in the consumption aggregate. Expenditure on durable goods such as furniture, car, television, phone etc. are also not included in the consumption aggregate.

3.3.   Unit of Analysis

Although in the household surveys consumption expenditure is available at the household level, analysis would be more meaningful if poverty is measured in terms of individuals, not households. In poverty measurement literature on Pakistan, many authors use household as a unit of analysis or if some of them speak about individuals, they miss the distinctions of the two in their discussion of results.[2] For instance, Zaidi (1992) and Qureshi et al. (2001) conclude that in Pakistan 39% and 35% households are poor respectively. These are misleading findings since a proportion of households do not reflect the actual population. The information provided in the HIES data is the weight of household in total population, not total households. An example serves to elaborate this issue. Who would be considered poor, a household with consumption expenditure of Rs.

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[2] See, for instance, Naseem (1973), Aladdin (1975), Kruijk and Myrna (1985), Ahmad et al. (1989), Malik (1992), Zaidi (1992), Zaidi and Vos (1993, 1994), Aric et al. (2000), McCulloch and Baulch (2000), Haq et al. (2001), Qureshi et al. (2001).

5,000.00 or a household with consumption expenditure of Rs. 1,000.00?[3] A distinction based solely on household consumption would have judged the later household poorer than the former. However, on per capita basis both households would be indifferent if the former has five individuals and the later has only one. Therefore, for a clear understanding and meaningful interpretation of poverty estimates, unit of analysis in this study is individuals, not households (Murtaza 2010).

However, converting the household consumption expenditure into per capita consumption expenditure needs delicate adjustments. Since households have different composition of gender and age representing different requirements, household consumption should be corrected for household size and composition by using equivalence and economies of scales.

3.3.1. Equivalence Scales

In food consumption, individuals in different age and gender groups have different nutritional requirements. Therefore, specific equivalence scales are used to address this issue. Calculating poverty measure with different alternative scales can allow testing the degree to which they affect the results.

3.3.2. Economies of Scale

Larger households generally have an advantage over smaller households by virtue of their ability to purchase produce in bulk which might be more economical (Ravallion 1992). Also, the households consume goods which are used/shared by all/many household members giving the same welfare to everybody (e.g. housing, infrastructure, lighting etc.) which means that larger households have a lower per capita cost of achieving a certain welfare than smaller households. Household size is thus needed to correct for economies of scale which then will be used to calculate per capita consumption expenditure. However, there is no single agreed upon method to estimate economies of scale in consumption expenditure, though simple tests can be done to determine the degree of sensitivity of a poverty profile to the assumption about economies of scale (Lanjouw and Ravallion 1995, Deaton 1997, Murtaza 2010). Most of the existing studies in Pakistan did not consider correcting the consumption (or income) for household size and composition.[4] The present

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[3] Rs. is the symbol for Pakistani currency; Rupee.
[4] Such as Naseem (1973), Aladdin (1975), Mujahid (1978), Kruijk and Myrna (1985), Ahmad et al. (1989), IFPRI (1995), Arif et al. (2000), Jamal (2003), Haq et al. (2001).

study uses the equivalence scale presented in table 2 to normalize the food consumption into an adult equivalent.

Table 2: Equivalence Scale for Adjusting Food Expenditure

Age groups	Male	Female
Age < 1	0.4297	0.4297
1 <= age < 4	0.5548	0.5548
5 <= age < 9	0.75234	0.75234
10 <= age < 14	1.19829	1.0485
15 <= age < 19	1.3136	0.98808
20 <= age < 39	1.17446	0.885106
40 <= age < 49	1.1234	0.84085
50 <= age < 59	1.0468	0.79659
60 <= age < 99	0.91319	0.694468

Source: Planning Commission, Government of Pakistan

For correcting the household size and converting total consumption aggregate into per capita adult equivalent, a relatively simple scale is used as following (Ahmed 1993, WB 1995, 2001):

Child (<18 years) = 0.8

Adult (>=18 years) = 1

Nevertheless, one needs to acknowledge that this type of correction involves some degree of arbitrariness but what matters is to use the same criteria for comparing different years, regions or groups.

3.4. Selection and Calculation of Poverty Line

3.4.1. Selection of Poverty Line

Poverty line is a threshold level differentiating poor from non-poor. However, the decision of calculating poverty line can easily be criticised because ultimately the way in which the poverty line is calculated is often sensible, but open to objections. The fundamental question in setting the poverty line is whether poverty should be analysed in absolute or relative terms. The literature on poverty measurement in Pakistan markedly differs on selection of poverty line (table 1). Indeed, poverty line can also be subjective, introduced by Goedhart et al. (1977), based upon people's views about the minimum amount necessary for living. However, this type of poverty line is not frequently used for poverty measurement (Murtaza 2010).

Due to its very nature, relative poverty line is not constant in real terms and always changes due to fluctuations in the average consumption (or income) in the society, and therefore affects the poverty estimates over time, across regions and population subgroups. Moreover, there are different opinions about what fraction of the indicator of well-being should be set as a (relative) poverty line (i.e. one half, two-thirds, or three-fourths of the average per capita consumption/income etc). Relative poverty line measure is more popular in high-income countries (Townsend 1979, Vos and Garner 1991). In Pakistan, relative poverty line has been used in few studies but almost all used different cut off points for poverty line without justifying their rationale.[5]

On the other hand, absolute poverty line is defined as some certain standard of what individuals should be able to count on to meet their basic needs. In low-income countries where there are vast income inequalities and people are primarily concerned with their livelihood, use of absolute poverty line is recommended (Sen 1981, WB 1995, UN 2005). The objective of drawing a poverty line in this study is not only to count the poor but also to make comparisons across regions and provinces (which can further be extended to population subgroups)–an objective often missing in studies in Pakistan (Murtaza 2010). Poverty comparisons can better inform policy makers for policy design, monitoring, and evaluation of poverty alleviation programs. Thus, for comparison purpose the estimated consumption value should assure the same purchasing power for all. Therefore, this study estimates an absolute poverty line for Pakistan.

3.4.2. Calculation of Poverty Line

Usually three different methodologies are used to calculate the poverty line: direct calorie intake method; cost of basic needs approach; and food energy intake approach (Ravallion 1992). Direct calorie intake (DCI) or food poverty line method defines the poor as those with per capita calorie intake less than the standard calorie requirement (it is not based on income or consumption expenditure). Using DCI, poverty line is calculated by converting quantities of food items consumed into calories (by using some calorie content table which is usually developed by nutrition agencies of each country) and then converting total calories consumed into per capita adult equivalent calories consumed. In Pakistan, DCI approach is used in few studies (Qureshi et al. 2001, Ahmed 2004). However conceptually, poverty

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[5] For instance, Zaidi (1992), Zaidi and Vos (1993, 1994), IFPRI (1995), Arif et al. (2000), McCulloch et al. (2000), Haq et al. (2001), Anwar (2005).

is deprivation in all dimensions of welfare, not just taking fewer calories. Typically, what food poverty line measures is under nourishment, not poverty.

Cost of basic need (CBN) method sets the poverty line by computing the cost of a predefined food basket that enables a household to meet predetermined nutritional requirements, and also adds to this an allowance for basic non-food consumption. In Pakistan, few studies have used the cost of basic needs approach, however except Ahmad (1993) and WB (1995, 2001) none defines how the basic needs basket was constructed and the cost of the basket was measured. In practice, CBN is applicable when the data are collected on a predefined basic needs basket. In Pakistan, however HIES data are not collected on a predefined basket of goods which are deemed to provide the minimum level of living. Due to the data limitation, calculating poverty in Pakistan based on CBN approach would give misleading results.

Food energy intake (FEI), often called as calorie-based method, sets the poverty line as the consumption expenditure (or income) at which basic needs (food and non-food) are met. It specifies food needs as a predefined calorie intake. The poverty line is estimated based on empirical relationship between food energy intake and consumption expenditure i.e. calorie–consumption function. However, at least three issues need to be addressed while adopting the calorie approach: (i) decision about the minimum calorie intake per day (ii) transformation of calorie intake into a monetary value (iii) inclusion of other non-food minimum expenditure in relation to the minimum food expenditure (Ravallion 1992). In Pakistan few studies have used FEI but except FBS (2002) no one addressed the underlying issues in using this approach. Given the data and their limitations, this study adopts calorie-based poverty line that calculates consumption expenditure required to reach the minimum calorie intake which also includes a minimum expenditure on non-food items.

In Pakistan, the decision about the minimum calorie intake varies a lot with the range of choices from 2,100 calories per adult per day to 2,550 calories per adult per day.[6] The present study uses 2,350 calories per adult per day at the national level for urban and rural areas, adjusted for caloric requirement for male and female as set by the Government of Pakistan (Planning Commission 2003).

Conversion of calories into a monetary value is a delicate matter as prices differ across regions and areas. For example, it is possible that prices are higher in

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[6] See Naseem (1973), Irfan and Amjad (1984), Ercelawn (1988), Amjad and Kemal (1997), Jafri (1999), Qureshi and Arif (2001), and FBS (2002).

urban areas than in rural areas, if so then the poverty line even using the same calorie benchmark would be higher in urban areas. Due to high prices, preferences for high quality or expensive sources of calories and other goods also increase the poverty line in urban areas (Ravallion and Sen 1994).

In Pakistan, poverty line is often set separately for each region and province, but not all studies give precise reasons for their decision. Some argue that by doing so the difference in prices, tastes, and consumption patterns are corrected.[7] Their reason is based on the daily required calories so that poverty line would reflect the necessary expenditure required to achieve the calorie target. However, the question arises as to whether the daily required calories a realistic target that everybody must reach? The calorie requirement depends on age, level of activity, and specific physiological need of an individual (a pregnant woman may need different amounts than a non-pregnant woman of the same age). Another problem is that while transforming quantities into calories we cannot take into account the quality of food. Moreover, individuals can consume the required calories by spending different amounts, which reflects not only the cultural differences but also their habits due to their socio-economic status. It is possible for one to consume fewer calories but consume higher quality and expensive food and live in a healthier way. Thus, the question is should different poverty lines be set for different regions? By having 2350 official daily per adult calorie requirement in Pakistan, setting separate poverty lines for urban and rural areas will quite likely give contradictory results that poverty line and poverty is higher in urban areas than in rural areas (due to higher prices in urban areas). Also, separate poverty lines will be relative not absolute, thus making the comparisons across regions, groups, and time difficult. To address this issue, sometimes a lower calorie requirement is set for urban areas. This is often justified by different level of activities and specific needs of people living in these regions. This practice is found in Jafri (1999), SPDC (2000), Arif (2002), Amjad and Kemal (1997), and Malik (1988). However, it is difficult to argue that what should be the exact calorie difference between urban and rural areas. The decision is likely to be arbitrary. Correction of urban and rural calories requirement even does not address another question; what if urban areas in Punjab are better off than urban areas in Balochistan? The cost of achieving a certain number of calories in urban Punjab may be higher, not because of price difference or consumption patterns but because wealthier households in urban Punjab spend

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[7] See, for instance, Naseem (1973), Alauddin (1975), Mujahid (1978), Malik (1988), Ahmad et al. (1989), Ercelawn (1990), Malik J (1992), Jafri (1999), SPDC (2000), Arif et al. (2000), Qureshi et al. (2001), Jamal (2002), Anwar (2005).

more to achieve the same number of calories. Moreover, in the total expenditure, urban Punjab's non-food share will also be higher because of the Engel's law. Therefore, poverty line for urban Punjab will be higher than urban Balochistan due to higher welfare in urban Punjab.

Furthermore, transformation of the calorie intake in monetary terms is usually done in two ways; either by taking the average food expenditure of those households/individuals who consume the right amount of required calories, or by using the calorie function (regressing calories consumed on food consumption expenditure). Average food expenditure approach is most commonly used in Pakistan (Murtaza 2010). Though average food expenditure of those who consume required calories gives some indicative value of the poverty line, however if the calorie intake is really a concern then all individuals who do not consume the minimum required calories should be considered poor, not those who do not spend a certain amount of money. It must be appreciated that the transformation from food quantities consumed into calories can never be a precise transformation. The limitation is that household surveys (like HIES) do not give information on food quality, actual absorption of calories by everyone, and calorie requirements for individuals' activities.

On the other hand, for calculating poverty line in Pakistan, sometimes average amount spent on non-food items by those households/individuals who consume required calories is added to their average food expenditure (Murtaza 2010). This is done with the assumption that if the households just satisfy the minimum food requirement, what else they spend on non-food must be necessary. This is also not appealing since it calculates poverty line considering only those households which consume required calories. Unfortunately, calculating poverty line this way does not tell how much one has to spend in order to get a certain number of calories. On the contrary, it tells what on average people spend to get a specified number of calories.

3.4.3. Calculating Poverty Line for Pakistan

Since one of the objectives of this paper is to make poverty comparisons, recognising the limitations of the data, a single poverty line for the whole country is calculated. The consumption expenditure aggregate is normalised for the regional price differences by using the prices faced by the households located in the respective primary sampling unit.[8] This allows for regional differences and adjusts

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[8] Construction of the prices index used for normalising the consumption expenditures is outlined in Murtaza 2010.

the poverty line by the price differences–something not common in literature in Pakistan.[9] Per capita adult equivalent consumption expenditure is then calculated by using the equivalence and economies of scales (mentioned earlier). In order to calculate the poverty line, per adult equivalent consumption expenditure is regressed on per adult equivalent calorie intake (of the first three quintiles of consumption aggregate to avoid the influence of the consumption patterns of rich on poverty line). This assumes that individuals who attain the minimum required calories also consume non-food items, if not they would have increased their calorie consumption. In other words, the poverty line will reflect how much households spend to reach a certain calorie intake, indirectly depending on the level of activities of individuals, living standards, consumption patterns, and the price structure. Using the benchmark of 2,350 per adult equivalent calorie requirement, for 2011-12 the poverty line for Pakistan is estimated as Rs 2,735.38 per adult equivalent per month. However, due to above mentioned issues and limitations, it must be acknowledged that poverty line is only an approximate value; it cannot be perfect in separating poor from non-poor.

3.5. Selection of Poverty Measure

The poverty measure translates the comparison of an indicator of well-being and the poverty line into an aggregate number for the population as a whole (or a subgroup). There are numerous poverties measures available. In Pakistan, head count ratio or FGT measures are the common choice for poverty calculation. Due to their appealing properties and decomposability feature, this study uses FGT measures for calculating the incidence of poverty in Pakistan (UN 2005).

4. Incidence of Poverty in Pakistan

The poverty estimates for Pakistan in 2011-12 are presented in table 3. For comparison purpose, confidence intervals for respective poverty estimates are also shown in table 3. Except FBS (2002), none of the literature in Pakistan reports poverty estimates through their confidence intervals (or standard errors), however everyone seems comparing poverty estimates across regions or over time without considering their statistical significance.

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[9] See Kruijk and Myrna (1985), Malik (1992), Zaidi (1992), Zaidi and Vos (1993), Zaidi and Vos (1994), Bhatti et al. (1999), Arif et al. (2000), McCulloch et al. (2000), Haq et al. (2001), Qureshi et al. (2001), Jamal (2002), Anwar et al. (2004), Anwar (2005).

Table 3: Incidence of Poverty in Pakistan (2011-12)*

Region	Headcount Index (%)
Pakistan	41.18 (40.15, 42.21)
Urban	26.78 (25.24, 28.31)
Rural	48.44 (47.15, 49.73)
Punjab	37.88 (36.41, 39.36)
Urban	25.91 (23.72, 28.10)
Rural	43.48 (41.62, 45.34)
Sindh	42.91 (41.04, 44.77)
Urban	25.72 (23.13, 28.31)
Rural	59.20 (56.83, 61.56)
Khyber Pakhtunkhwa (KPK)	45.40 (43.16, 47.65)
Urban	31.84 (28.34, 35.34)
Rural	48.20 (45.61, 50.79)
Balochistan	62.60 (59.56, 65.64)
Urban	42.21 (37.47, 46.95)
Rural	69.30 (65.75, 72.86)

Source: Author's calculations using HIES 2011-12. * Figures in parenthesis are 95% confidence intervals for the corresponding estimate of poverty.

Approximately 41.18% of the population in Pakistan is estimated to be poor. Poverty in rural areas (48.44%) is significantly higher than poverty in urban areas (26.78%). Provincial comparison shows that the highest poverty is found in Balochistan (62.60%) while Punjab depicts the lowest incidence of poverty (37.88%). Prevalence of poverty in Sindh (42.91%) and Balochistan (45.40%) is not statistically different from each other. The results indicate that rural areas in all provinces are more deprived than urban areas. The biggest gap in urban-rural poverty appears in Sindh, whereas the gap is smallest in KP. The reason for the huge difference between urban-rural poverty in Sindh could be due to Karachi which is country's economic hub, contributing around 35% to the national economy. Comparing poverty in urban areas across provinces indicates that poverty is highest in balochistan (42.21%) followed by KP (31.84%). However urban poverty does not seem statistically different in Punjab and Sindh. On the other hand, rural poverty is higher in Sindh, KP and Balochistan than Punjab. This could be because Punjab has stronger agriculture base and better infrastructure than other provinces.

Though comparing the incidence of poverty in regions and provinces is useful, analysing their relative contribution to national poverty would be more

illuminating as the distribution of populations varies significantly across regions and provinces−an aspect widely missing from the literature in Pakistan. Decomposition of poverty is presented in Table 4. The results show that though highest poverty is present in Balochistan, it contributes only 6.38% to the national poverty as Balochistan's share in the total population is mere 4.2%. On the other hand, although poverty appeared to be lowest in Punjab, majority of the poor (53.17%) live in Punjab. Interestingly, poverty appears to be a rural phenomenon in Pakistan as rural areas contribute 78.22% to the national poverty. This is consistent with Ravallion et al. (2007) which suggest that majority (75%) of the poor in low-income countries live in the rural areas.

Table 4: Decomposition of Poverty Across Regions and Provinces (2011-12)

Region/Province	Incidence of Poverty (%)	Population Share (%)	Relative Contribution to National Poverty (%)
Urban (national)	26.78	33.50	21.78
Rural (national)	48.44	66.50	78.22
Punjab	37.88	57.80	53.17
Sindh	42.91	23.93	24.93
KP	45.40	14.07	15.52
Balochistan	62.60	4.20	6.38

Source: Author's calculations using HIES 2011-12.

Though poverty estimates of this study are not directly comparable with the estimates of other studies (Table 5) due to different methodologies used, the estimates indicate that recently poverty in Pakistan appears to be a rural phenomenon. One of the factors responsible for ruralisation of poverty in Pakistan could be the rural-urban migration.

Besides the poverty measures above, it would be interesting to note that 75.26% of the population is undernourished (consuming less than 2,350 calories per day). However, this cannot be called 'food poverty' because consuming less calories do not mean that individuals cannot consume required calories−perhaps they are consuming a variety of expensive food of a high quality.

4.1. Testing the Robustness of Poverty Measure

Since the main objective of poverty analysis is to make comparisons and to design poverty reduction strategies, it is desirable to determine the robustness of the poverty estimates. This would require checking the sensitivity of the poverty estimates to the assumptions adopted for the poverty measurement i.e. equivalence scale, economies of scale, calculation of poverty line, selection of poverty measure, measurement errors etc. No study in Pakistan has mentioned the robustness of their poverty line and poverty estimates except Zaidi and Vos (1994) and FBS (2002).

Stochastic dominance test is one of the various techniques for checking the robustness of poverty line and poverty estimates by comparing the ranking of cumulative distribution function of the indicator of well-being across region/groups or over time. In this study, sensitivity of the poverty estimates, and patterns is checked through stochastic dominance i.e. how would the poverty estimates and patterns differ if the poverty line changes. Figure 1 shows the cumulative distribution of population for different levels of per capita adult equivalent consumption expenditure in rural and urban areas. The cumulative distribution curve (incidence of poverty curve) for rural areas is throughout laying above the corresponding urban curve, indicating that poverty in rural areas is greater than in urban areas irrespective of the poverty line i.e. the poverty pattern is insensitive to the poverty line.

Table 5: Summary of Previous Poverty Estimates in Pakistan

Study	Poverty Estimate	
Naseem (1973)	Rural: 60.5%, Urban: 70%	(1963-64)
	Rural: 59.7%, Urban: 59.3%	(1966-67)
	Rural: 61.5%, Urban: 57.9%	(1968-69)
	Rural: 59.7%, Urban: 58.7%	(1969-70)
Allaudin (1975)	Rural: 83.01%, Urban: 70.95%	(1963-64)
	Rural: 80.1%, Urban: 61.69%	(1966-67)
	Rural: 75.49%, Urban: 60.48%	(1968-69)
	Rural: 73.27%, Urban: 60.17%	(1969-70)
	Rural: 81.75%, Urban: 59.56%	(1970-71)
	Rural: 87.42%, Urban: 62.41%	(1971-72)
Mujahid (1978)	Rural: 41.6%, Urban: 55%	(1963-64)
	Rural: 55.8%, Urban: 54%	(1966-67)
	Rural: 52.6%, Urban: 51.9%	(1969-70)
Kruijk and Myrna (1985)	National: 65%, Rural: 73%, Urban: 50% (1969-70)	
	National: 43%, Rural: 51%, Urban: 30% (1979)	
	Rural: 33%, Urban: 32%	(1976-77)

Ahmad et al. (1989)	Rural: 30%, Urban: 23%	(1979)
	Rural: 24%, Urban: 20%	(1984-85)
Malik J Sohail (1992)	National: 18.3%, Rural: 21.1%	(1984-85)
	National: 13.1%, Rural: 15.5%	(1987-88)
Zaidi (1992)	National: 38.7% (1984-85)	
Zaidi and Vos (1993)	National: 35.1%, Rural: 36.1%, Urban:18.1% (1987-88)	
Zaidi and Vos (1994)	National: 31.9%, Rural: 36.4%, Urban: 20.2% (1984-85)	
	National: 31.2%, Rural: 36.1%, Urban: 18.1% (1987-88)	
IFPRI (1995)[*]	Rural: 20%	(1986/87 – 1988/89)
Bhatti et al. (1999)	National: 46.02%	(1987-88)
	National: 48.03%	(1990-91)
Arif et al. (2000)	National: 27.4%, Rural: 29.9%, Urban: 23.1% (1993-94)	
	National: 29.6%, Rural: 31.6%, Urban: 27.4% (1996-97)	
McCulloch et al. (2000)	Rural: 24.9%	(1986-91)
Haq et al. (2001)	National: 34.5%, Rural: 40.65%, Urban: 18.75 (1987-88)	
	National: 38.7%, Rural: 52.8%, Urban: 21.9% (1993-94)	
Qureshi et al. (2001)	National: 35.2%, Rural: 39.8%, Urban: 31.7% (1998-99)	
FBS (2002)	National: 26.57%, Rural: 28.89%, Urban: 20.72%(1992-93)	
	National: 29.27%, Rural: 34.7%, Urban: 16.32% (1993-94)	
	National: 26.25%, Rural: 30.73%, Urban: 16.12% (1996-97)	
	National: 32.24%, Rural: 36.33%, Urban: 22.42% (1998-99)	
Jamal (2002)	National: 23.58 %	(1988)
	National: 29.97%	(1999)
Anwar et al. (2004)	National: 38.07%, Rural: 42.97%, Urban: 26.04% (2001-02)	
Anwar (2005)	National: 40.7%, Rural: 46.7%, Urban: 31.1% (2001-02)	

Figure 1: Robustness of Poverty Measure
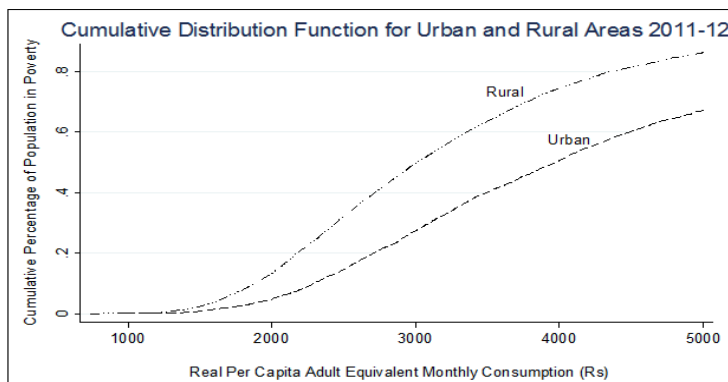
Source: Author's estimations using HIES 2011-12.

5.   Conclusion

Poverty measurement practice in Pakistan seems unclear and inappropriately explained. The main purpose of this study is to outline a systematic poverty measurement technique which will enable poverty comparisons across regions, provinces, population subgroups and over time. In this study, poverty is measured using calorie-based approach by constructing an absolute poverty line. Instead of using multiple poverty lines for different regions and provinces, a single poverty line is constructed for the whole country. Identifying poor areas and groups on the basis of a unified process will help designing focused poverty alleviation policies and directing resources to those areas and communities.

In 2011-12, around 41.18% population of Pakistan is estimated to be poor with poverty significantly high in rural areas than in urban areas. At the provincial level, Balochistan is found to be the poorest province with 62.60% of its population living below the poverty line, whereas Punjab appeared to be the least poor province with 37.88% poor population. However, Punjab contributes most (53.17%) to the national poverty while the share of Balochistan is the least (6.38%). Within the provinces, poverty is significantly higher in rural areas compared to urban areas. In Balochistan, the rural poverty is 164% more than the urban poverty– the biggest urban-rural disparity among all provinces. On the other hand, the least difference in urban-rural poverty is found in KP–rural poverty is 51% higher than urban poverty. Compared to other provinces, urban areas in Punjab and Sindh showed the least poverty, whereas rural poverty in Punjab was the lowest. The rural-urban poverty comparison indicates that more resources may be directed to rural areas for alleviating poverty particularly in rural Punjab. The pro-poor policies in rural areas should not only focus on the uplifting the poor but also on redistribution of economic benefits among poor to reduce the inequality within the poor. This will also reduce the pressure on rural-urban migration thus lowering the urban poverty. Focused rural poverty alleviation policies and allocation of resources would also reduce rural-urban poverty gap.

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