1. Introduction

The Palestinian Expenditure and Consumption Survey (PECS) is a multi-purpose survey on household budgets and living standards, based on which official poverty estimates are calculated for the Palestinian territories. It collects information on a range of topics that include food and non-food expenditures, core data on socio-economic and health characteristics, dwelling conditions, and labor activities and incomes.

The first PECS survey was implemented by the Palestinian Central Bureau of Statistics (PCBS) in 1995. The PECS survey was designed to be implemented on an annual basis, and poverty estimates were first produced in 1998. In 2009, PCBS requested technical assistance from the World Bank to validate its poverty measurement methodology, and to improve it in line with international best practices. This programmatic technical assistance over the period 2008-2010, which initiated a long-standing technical partnership between PCBS and the World Bank, successfully implemented critical improvements to the measurement methodology. It also suggested improvements in survey design that would be particularly relevant for middle income countries with largely urban populations like the Palestinian territories.

Despite a protracted and continued situation of volatility and conflict, PCBS successfully implemented the PECS survey annually until 2011. After 2011, there was a gap in data collection, which, in large part, followed a financing gap. In 2014, the World Bank's Poverty and Equity team secured financing to fill the gap through the Trust Fund for Statistical Capacity Building, and supported a program of technical assistance centered on the PECS. The 2016 PECS was implemented for a 12-month period, starting in October 2016. For this survey, PCBS adopted some key improvements recommended by the technical assistance program. In particular, the 2016 PECS collected for the first time detailed information on the key durable assets including purchase and current values. Additional questions were also added to better measure the quality of access to improved water and sanitation.

The PECS was intended to be implemented every 3 to 5 years starting with the 2016 round, but COVID-19 delayed the next round to 2023. The technical assistance program for the 2023 PECS had two main goals: (i) improving survey design and reducing the time-gap from survey completion to the availability of data for analysis; and (ii) to inform internal discussions and debate on improving the poverty measurement methodology, by taking advantage of newly available data and improved measurement methods.

The 2023 PECS was implemented from January to December 2023, with three quarters of data collection completed in Gaza and four quarters completed in the West Bank and East Jerusalem. The final sample included 4,373 households with 21,797 individuals.

This note provides background on poverty measurement using the 2023 PECS. Section 2 outlines the 2023 PECS sample design and weighting strategy. Section 3 briefly discusses the main methodological issues in poverty measurement. Section 4 explains the construction of the welfare aggregate, and Section 5 describes the official poverty lines in the Palestinian territories. Section 6 concludes.

2. 2023 PECS sample design and weighting strategy

The 2023 PECS is based on a two-stage stratified cluster sample design. The sample comprises 586 enumeration areas in the first stage and 12 households per enumeration area in the second stage for a total of 7032 planned households. It is stratified by governorate and location type (urban/rural/camp). With the goal of managing the variability of accuracy across governorates, the design allocates more

sampling units to strata characterized by higher levels of uncertainty in estimates of target variables from the PECS 2017 (food, non-food, and total consumption). This is done using the Bethel algorithm, and implemented in R using the package R2BEAT.[1] Enumeration areas within each governorate were randomly assigned across quarters to enable the production of representative quarterly estimates.

The outbreak of war in October 2023 made it impossible to collect Q4 data in Gaza, although data collection continued in the West Bank and East Jerusalem. Table 1 summarizes the planned and realized samples for the year by area, removing Q4 households from the planned sample for Gaza.

Table 1: Planned and realized samples of households for the 2023 PECS

	Planned	Realized	Response rate (Realized/Planned)
West Bank	4656	2980	64%
East Jerusalem	336	240	71%
Gaza	1536	1153	75%
Overall	***6528***	***4373***	***67%***

Notes: Q4 households removed from planned sample for Gaza. Response rates varied minimally across quarters except in East Jerusalem, where 86-96 percent of households responded in Q1-2 and 50-61 percent responded in Q3-4.

Given the unusual structure of the realized sample, three sets of weights were constructed for the 2023 PECS. In the first set, quarterly weights were constructed, and these weights allow for the calculation of quarterly estimates and are available for the West Bank (including East Jerusalem) for all four quarters and for the three quarter the data was collected in Gaza, before the interruption in October 2023. Naturally, these quarter weights allow the computation of quarter estimates for whole Palestine. The second set consist in three-quarters weights, which refer to the average Palestinian population during from January to September (Q1, Q2 and Q3) 2023. These weights enable the computation of estimates for the whole of the Palestinian territories, and for West Bank and Gaza. . Finally, annual weights were constructed for the West Bank to use the full four quarters of data available for this region.

Weights were constructed in four steps:

Step 1. Design weights were calculated as the reciprocal of household inclusion probabilities, taking into account inclusion probabilities of planned PSUs and household conditional inclusion probabilities.

Step 2. Quarterly and three-quarters weights were adjusted based on the planned share of sampled enumeration areas covered.

Step 3. All weights sets were adjusted for non-response and calibrated to known population totals. Three-quarters weights and annual weights for the West Bank were calibrated to counts of households and individuals by sampling strata (governorate crossed with locality type). Since not all sampling strata were covered in every quarter, quarterly weights were calibrated to counts of households and individuals by governorate and (region/locality type) cell.

[1] An example of this implementation can be found here.

Step 4. The calibrated weights were minimally trimmed to reduce the impact of excessively large weights.

3. Methodological issues in poverty measurement[2]

This section outlines some of the key methodological issues in measuring monetary poverty. In general, poverty measurement includes two key choices: (i) the choice and construction of a welfare aggregate, which allows the analyst to rank the population based on this measure of welfare; and (ii) setting the poverty line, or defining the minimum welfare level below which individuals or households are considered poor.

The first step in the process of defining a welfare aggregate is choosing whether to use income or expenditures to measure monetary welfare. The appropriateness of the measure typically depends on country context. Having detailed and quality information based on a well-designed questionnaire, whether on income or consumption, is the critical element in welfare measurement. In rich, developed countries, incomes are typically the basis for measuring welfare, as a high degree of formalization in the economy allows for accurate reporting on all sources of income. For example, poverty in most of the European Union countries is measured by income.[3] In non-developed countries on the other hand, consumption or expenditure is arguably more closely related to well-being than income, because (i) may be better measured in countries with large agrarian (and self-production) and informal sectors, while incomes tend to be under-reported (Azzarri et al. 2010) and (ii) because it reflects not only the goods and services a household can afford based on their current income but also whether the household can access credit markets especially during times of income volatility. Thus, consumption is less subject to seasonal volatility in rural areas compared to income and is more likely to be representative of general welfare (Coudouel, Hentschel and Wodon 2012; Haughton and Khandker 2014).

Once the choice between income and expenditures has been determined, the components of the welfare aggregate need to be defined. On the one hand, the welfare aggregate should be comprehensive enough to capture important dimensions of wellbeing, while on the other, being attentive to concerns about measurement error. The key criterion to guide the selection of components is whether the inclusion of the component improves the ability to correctly rank individuals in terms of their wellbeing, or if the additional information (or the way the information is collected) simply adds noise to the measure. Food consumption, for example, includes expenditures or consumption from own production, transfers and food outside home. Nonfood consumption usually excludes lumpy infrequent expenditures (e.g. funerals, weddings, Hajj), investment and items that are hard to estimate accurately. In contrast, durables require a particular treatment because they are bought at a particular point in time but consumed during a period of several years. Consumption should ideally include only the annual consumption of a durable rather than purchase value (Amendola and Vecchi 2014). The same principle should apply in measuring the value of housing services (Deaton and Zaidi 2002, Haughton and Khandker 2014).

There is no consensus in literature on whether health expenditures should be included in the welfare aggregate. One argument to exclude health expenditure is because they often imply a regrettable necessity and do not contribute to welfare. Another fundamental issue is the inability to distinguish

[2] This section draws heavily from Atamanov et al (2016).

[3] Nevertheless, Meyers and Sullivan (2009) argue that even for a developed country like the United States, consumption is a better measure especially for those at the lower end of the distribution.

between health expenditures aimed at improving welfare and health expenditure as a regrettable necessity. The decision on the inclusion is sometimes made based on elasticity of health expenditure with respect to total expenditure. Essentially if one observes individuals with high values of consumption (not including health expenditures) having high expenditures on health, then it is assumed that on average health expenditures are reflecting preventative health expenditures and will help to better sort the population in terms of well-being. So, a higher elasticity implies a stronger case for inclusion. Even though education expenditures can be seen as investment rather than current consumption, this component is often included in welfare aggregates, as recommended by Deaton and Zaidi (2002).

After the welfare aggregate is constructed, this aggregate needs to be adjusted to allow for valid interpersonal comparisons of welfare. In particular, spatial and inter-temporal deflations account for temporal and spatial differences in prices faced by households. This process makes, for instance, the expenditures incurred by households interviewed in January comparable with those incurred by households interviewed in August; or similarly, across those living in small villages in a desert area to those living in big cities by the sea. Inter-temporal adjustments within the survey period are usually done by using official consumer price index, while spatial adjustments can be done either by using prices from CPI in different locations (if the CPI has an inbuilt spatial deflator[4]) or by calculating unit values from the survey. The advantage of using prices from CPI is that prices on non-food items can be taken into account, as these are generally not collected in household surveys. However, it is important to check the coverage because very often these prices are collected in urban areas only. Sometimes, CPIs do not have any spatial deflators built in and in these cases, they cannot be used for spatial adjustment of the welfare aggregate.

The second important adjustment is related to the adjustment of welfare aggregate for household composition. This is usually done by simply dividing household consumption by total household size, or by taking into account household economies of scale and adult-equivalence scale adjustments. Using household size is appealing for its simplicity and transparency, and it is very often used to measure poverty at the individual level. Welfare aggregates per adult equivalent are also frequently used to capture differences in consumption requirements by age. For example, young children may have lower food requirements compared to adults. Economy of scale can be introduced as well by adding elasticity ranging from zero to one (Haughton and Khandker 2014). The key challenge in using an adult equivalent is picking an appropriate scale, as there are very few satisfactory ways to estimate economies of scale (Deaton and Zaidi 1998).

Once the welfare aggregate is finalized, the next step is to construct the poverty line, which determines cutoff points to define who is considered poor in a geographic area at a given time. The choice of a poverty line depends on the local context, and it typically varies with across high and low-income countries. In developing countries, where a significant proportion of the population cannot meet its basic needs, an absolute standard is often used to set the poverty line. Wealthier countries, where absolute deprivation is not as significant often use relative poverty lines, where the line is defined in relation to the overall distribution of income (World Bank 2015).

[4] This is only true if the CPI is explicitly set up as a spatial deflator i.e If all regional CPIs are not set to equal 100 in the base year.

4. Welfare aggregate and its components[5]

Palestinian households spend close to one-third of their budgets on food items (35 percent including food away from home), and about two-thirds (65 percent) on non-food items. This expenditure pattern reflects that of a standard middle-income country, where households spend a large share of their budgets on more expensive calories within food, and on non-food items relative to food.

4.1 Food items

The 2023 PECS collects information on food purchases over four weeks through a month-long diary.[6] In addition, respondents are asked about their expenditure on food away from home (take away food and food in restaurants) and own production. Both expenditures and quantities purchased are recorded.[7]

On average, expenditures on food comprise 35 percent of total consumption expenditure; and households across the expenditure distribution consume high-calorie cost items. The top three food groups consumed in the Palestinian territories are meat and poultry, bread and cereals, and vegetables, legumes, and tubers. Fish and seafood as well as alcohol account for negligible shares of food consumption, as would be expected.

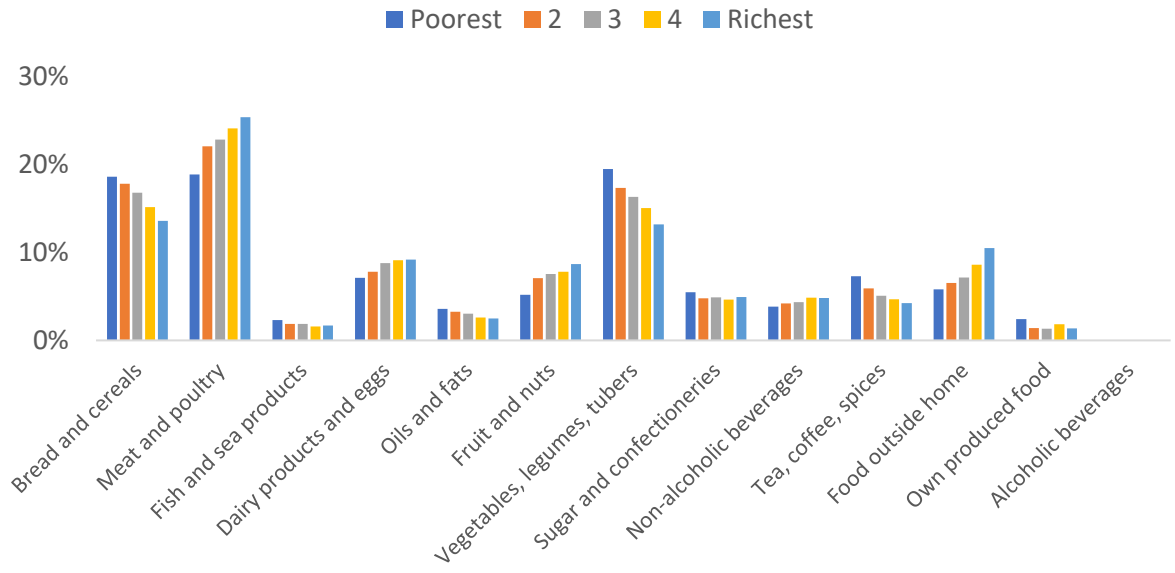
Figure 1 below shows the shares of different food groups in total food consumption across consumption (per adult equivalent) quintiles. In general, the poorer quintiles rely more on cheaper calories from cereals and vegetables, while the richer quintiles have higher shares of total food consumption coming from more expensive sources of calories – meat, fruits and food away from home. In absolute terms, the richest spend about eight times more on food away from home than the poorest per adult equivalent.

[5] A welfare aggregate is usually a mixture of expenditure and consumption, and both terms are used interchangeably while talking about the welfare aggregate.

[6] A four-week diary recording period is generally longer than the 2-week diaries that are used in other countries in the region. Some countries are switching from diaries altogether to using recall modes to collect information on food consumption.

[7] Two households recorded zero food purchases (not dropped). In many countries, consumption is recorded in addition to expenditures.

Figure 1: Shares of food products in total food consumption by quintiles



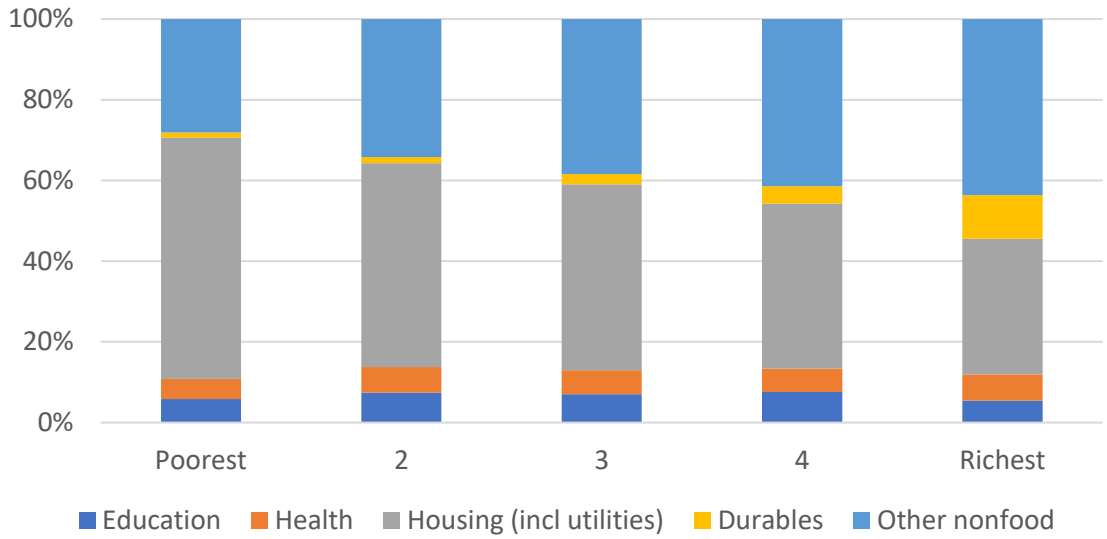
Source: PECS 2023
Note: Quintiles are based on consumption per adult equivalent.

4.2 Non-food items

The 2023 PECS collects information on non-food expenditure using a month-long diary for regularly purchased items like clothing, household supplies, or medical or transportation services. It collects information using a 12-month recall period for less frequent expenditures like furniture, appliances, or expenses related to education, and it collects information on purchases of personal transportation vehicles using a 3-year recall period. Expenditures on gifts and charitable contributions, fees and taxes, insurance, and wedding and funeral expenses are excluded from the welfare aggregate.

As in other middle-income countries, non-food items account for a large share of expenditures in the Palestinian territories (65 percent). Within non-food, housing, durable assets, and education and health account for a large share of household expenses (these four categories together account for 63 percent on non-food). The composition of non-food expenditures also varies by quintiles, and this is presented in Figure 2.

Figure 2: Nonfood expenditure structure by quintiles



Source: PECS 2023
Note: Quintiles are based on consumption per adult equivalent.

4.2.1 Housing services

Housing services, including the flow of services from dwellings as well as household utilities, accounts for 46 percent of non-food expenditures, or close to 30 percent of total expenditures. It accounts for 60 percent of non-food expenditures for the poorest quintile, and 34 percent for the richest. For the 2023 PECS, the flow of services from dwellings is estimated using rental values; other expenditures on housing services are collected through the month-long diary.

Information on actual and estimated rents is collected in the dwelling section of the survey. The prevalence of a rental market is small and geographically concentrated (the West Bank is largest in terms of numbers, East Jerusalem is the largest in terms of shares). From 4,373 sampled households, 306 households rented their dwellings. Most of the remaining households (n=4,065 households) owned dwellings and reported estimated rents by answering the question “What is the monthly estimated rental value of this dwelling (If you rent such a house at the present time, how much will the estimated current monthly rent be?)”.

Table 2 presents the spatial distribution of dwelling occupancy across the West Bank, East Jerusalem and Gaza. Overall, about 7 percent of households rent their dwellings. This share varies being the highest in East Jerusalem (where around 26 percent of households rent their dwellings).

Table 2: Regional distribution of dwelling occupancy

	West Bank	East Jerusalem	Gaza	Total
		Shares		
Owners	82%	73%	79%	*81%*
Renters	6%	26%	5%	*7%*
Other occupancy	11%	1%	15%	*12%*
		N		
Owners	2444	178	912	*3534*
Renters	185	57	64	*306*
Other occupancy	349	5	177	*531*

Source: PECS 2023
Notes: Shares are calculated using household weights. Excludes two households missing occupancy data.

In the West Bank and East Jerusalem, renters reported on average lower monthly rental values than non renters (see Table 3). In Gaza, the pattern was reversed although the average monthly rental values are close.

Table 3: Monthly rental value, actual or estimated, across regions in New Israeli Shekel (NIS)

	West Bank	East Jerusalem	Gaza
Owners	1097	2742	458
Renters	818	2482	453
Other occupancy	919	2033	411
Overall	*1059*	*2665*	*451*

Source: PECS 2023
Note: Household weights are used. Rent values are nominal.

Self-reported actual or estimated rental values were added directly to the welfare aggregate. Imputing estimated rental values for non renters based on data for renters was deemed undesirable because of the small rental market and concerns over possible rent control.

4.2.2 Durables

The 2023 PECS includes information on purchases of durable assets during the last year and on purchases of assets related to transportation during the last three years. Total expenditures on these recent purchases are converted to monthly equivalent values and added to the welfare aggregate. In the dwelling module of the questionnaire, the 2023 PECS also asks about household stock of 35 durable assets. Recent purchases of these assets account for 4 percent of non-food expenditures on average. In line with greater durable asset ownership (and more frequent purchases of durable assets) among more well-off quintiles, the share of non-food expenditure reflecting recent purchases of core durable assets is ten times higher among the richest quintile relative to the poorest.

The welfare aggregate should ideally include only the use value of a durable for a given reference period, as the simple inclusion of purchases underestimates welfare aggregates, especially for the poorest who

own assets but rarely buy them. However, measuring the flow of services from durables is not trivial as it requires information not just on the stock of durables owned by the household, but also on the year of purchase, purchase price and estimates of current sale value. The PECS 2016/17 piloted an expanded set of questions to collect this information, but the questions proved taxing and difficult for enumerators and respondents to understand. As the resulting data quality was very poor, the expanded questions were dropped from the 2023 PECS and the inclusion of durables in the welfare aggregate remains based on recent purchases.

4.2.3 Education and health

Health and education expenditures together account for 13 percent of average non-food expenditures, and are roughly equally important in their contribution to the welfare aggregate. About 75 percent of households had health expenditure and 85 percent of households with children aged 6-22 spent money on education. Shares of health and education expenditure in total consumption as well as absolute values spent per adult equivalent are shown in Table 4.

Table 4: Monthly expenditure and budget share spent on education and health, by quintile

	Education		**Health**	
	Expenditure per adult equivalent, NIS	*Share of total consumption*	*Expenditure per adult equivalent, NIS*	*Share of total consumption*
Poorest	17	3.2%	18	3.3%
2	36	4.0%	37	4.2%
3	47	3.8%	55	4.5%
4	71	4.2%	78	4.6%
Richest	82	2.9%	244	6.2%
Overall	*54*	*3.6%*	*98*	*4.7%*

Source: PECS 2023

Note: Household weights are used. Expenditure values have been spatially deflated.

4.3 Adjustments to welfare aggregate

Once the welfare aggregate is estimated, it is important to undertake adjustments to make the aggregates comparable for different households.

4.3.1 Adjustment for price variation

Spatial adjustment increases the comparability of expenditure or consumption of households that face different costs of living in different regions. The current methodology constructs a Laspeyres index using prices for 139 food and nonfood products from urban areas. The index is constructed quarterly for three areas: West Bank, East Jerusalem and Gaza (see Table 5). As the survey was interrupted in the last quarter in Gaza, the price index uses the third quarters national prices averages as the base or reference.. A detailed explanation of how the spatial index is constructed can be found in World Bank (2010).

Table 5: Laspeyres spatial deflators by area and quarter

	Q1	**Q2**	**Q3**	**Q4**
West Bank	1.05	1.05	1.06	1.06
East Jerusalem	1.34	1.36	1.32	1.33

Gaza	0.851	0.858	0.851

Within each quarter, no adjustment is made for intertemporal price variation, the impact of which is expected to be limited.

4.3.2 Adjustment for demographic composition

Adjustment for demographic composition is based on an adult equivalence scale, incorporated into the official poverty lines. Children are assumed to consume less than adults and economies of scale in larger households are taken into account. In particular, with these economies of scale, several people may be able to live more cheaply if they live together rather than if they live separately. The assumption of lower needs is more relevant for private non-sharable food consumption (if one individual consumes an item, another individual cannot consume the same item). The economy of scale assumption is more relevant for nonfood items as many of them are akin to public goods that can be consumed by many individuals at once (housing, means of transportation like cars, access to water and so forth).

Specifically, the calculation to adjust the poverty line across different households is

$$\text{Adult equivalence scale} = (A + \alpha K)^{\theta}, \text{ where}$$

A is the number of adults in the household, and K is the number of children. The parameter α is the cost of a child relative to that of an adult, and is equal to 0.46, while the other parameter θ is equal to 0.89. The first equivalence scale assumes that the consumption needs of children (0-18 age) is 0.46 of that of the consumption needs of adults (above 18 age). The second parameter assumes an economy of scale equal to 0.89. The parameters were obtained empirically from PECS-1996 (Khawaja 1998). Given high non-food share in the Palestinian territories and its young population, poverty measurement is likely to be quite sensitive to the choices made for adjustment to household size.

5. Poverty line

The National Commission for Poverty Alleviation (1998) established an official definition of poverty in the Palestinian territories. The poverty line is set at the median expenditure level of a specific type of household for certain key items for the poorest 25 to 30 percent of households. More specifically, a deep poverty line is calculated to reflect a budget for food, clothing and housing. A second poverty line, the primary national poverty line, then adds necessities including health care, education, transportation, personal care, and housekeeping supplies. The poverty line used to be calculated every year. PCBS also started a consistent poverty trend, beginning in 2004. The first consistent poverty trend (2004-2009) used the 1998 poverty line. In early 2011, PCBS decided to redefine its poverty line by changing the reference household to two adults and three children, and it started a new consistent poverty series beginning in 2010. The current poverty trend (2011-2023) uses the 2010 poverty line updated for inflation.

Estimates of poverty in 2023 use three-quarters weights for Gaza and annual weights for the West Bank to make full use of available data, noting that the impact of the war in Gaza is not captured.

6. Summary of methodology and concluding remarks

Table 5 summarizes selected points.

Table 5: Summary of methodology	
Housing	Self-reported rental values used for renters and non renters
Durables	Purchases of durable assets within the last 12 months (last three years for vehicles) converted to monthly equivalent value
Education and health	Expenditures in both categories are included
Adjustment for price variation	Adjusted for spatial variation using Laspeyres index, not adjusted for inter-temporal variation
Adjustment for demographic composition	Adjusted using adult equivalence scale (built into poverty line)
Poverty line	Relative poverty line based on median expenditure level of reference household in the poorest 25 to 30 percent of households

References

Amendola, N. & Vecchi, G. 2014. "Durable goods and poverty measurement," Policy Research Working Paper Series 7105, The World Bank.

Atamanov, A., Mostafavi, M., Salehi Isfahani, D. & Vishwanath, T., 2016. Constructing robust poverty trends in the Islamic Republic of Iran. Policy Research Working Paper Series 7836, The World Bank.

Azzarri, C., Carletto, G., Covarrubias, K., A.P., Petracco, de La O. C., Scott, K. and Zezza. A. (2010). "Measure for Measure: Systematic Patterns of Deviation between Measures of Income and Consumption in Developing Countries -Evidence from a New Dataset". Paper presented at the Fifth International Conference on Agricultural Statistics (Icas-V), 13 -15 October 2010, Kampala, Uganda.

Burbidge, John B., Magee, L. and Robb, L. (1988). "Alternative Transformations to Handle Extreme Values of the Dependent Variable." Journal of the American Statistical Association 83 (401): 123–27. doi:10.2307/2288929

Deaton, A. and Zaidi, S. (2002). Guidelines for Constructing Consumption Aggregates for Welfare Analysis. World Bank. Washington, DC.

Duan, N. (1983). Smearing Estimate: A Nonparametric Retransformation Method. Journal of the American Statistical Association, 78(383), 605-610. doi:10.2307/2288126

Coudouel, A., Hentschel, J. and Wodon, Q. (2002). Poverty Measurement and Analysis, in the PRSP Sourcebook, World Bank, Washington D.C.

Haughton, J and Khandker, S. (2009) Handbook on poverty and inequality. World Bank, Washington DC. Meyer, B. D. & James X. S. (2009), "Five Decades of Consumption and Income Poverty," NBER Working Papers 14827.

Mancini, G. & Vecchi, G. (2022), On the Construction of a Consumption Aggregate for Inequality and Poverty Analysis. World Bank, Washington DC.

Meyer, B. D. & James X. S. (2009), "Five Decades of Consumption and Income Poverty," NBER Working Papers 14827.

Ravallion, M. (1998), Poverty Lines in Theory and Practice, Living Standards Measurement Study Working Paper 133, World Bank, Washington DC.

World Bank 2010. Poverty Measurement and Monitoring in the West Bank and Gaza: Methodological Issues, Recommendations and Revised Results. Mimeo.

World Bank. (2015) A Measured Approach to Ending Poverty and Shared Prosperity: Concepts, Data and the Twin Goals. Policy Research Report. Washington DC: World Bank