Ethiopia Poverty Measurement Training

Day 1: Welfare aggregate construction recap

Theory of Welfare Measurement

- There are many ways to think about welfare or well-being, we will use a definition based exclusively on material well-being
- Whether or not a household has enough financial resources to meet their basic needs and participate in society

Welfare and Consumption

- We will build a measure of welfare based on the level of real (adjusted for price levels) value (at market prices) of per capita consumption.
- What in economic theory justifies this as a meaningful measure of well-being that can be compared over time or across households?
- How can welfare theory inform how we value things like own production and how we adjust for price differences?

Monetary Poverty

- Only looking at goods/services you need money to buy.
- If the state provides free basic health care or education for everyone, you don’t need money to access it, and it doesn’t need to be included in our analysis of monetary poverty.
- In some rural contexts, you might not need money to have access to land and construct decent basic housing.

Nominal Consumption

- In general, include all goods and services consumed by the household
- Exclude things that aren't consumed by members of the household in the reference period
- Use consumption instead of expenditure if you can, or make sure expenditure is a reasonable proxy
- Use market value or as close as you can get
- Exclude atypical (lumpy) consumption/expenditure
  - What the household spent over the recall period is very different from what they usually spend

Exclusions: not consumption for this household this year

Transfers to other households

- These funds will be included when the household receiving them uses them to consume

Donations to religious or charitable organizations

- Although part of religious donations may be considered as payment for services, they are better considered as transfers or contributions to public goods

Taxes and levies

Investments, savings, loan repayments (reflect past or future consumption)

Consumption vs Expenditure

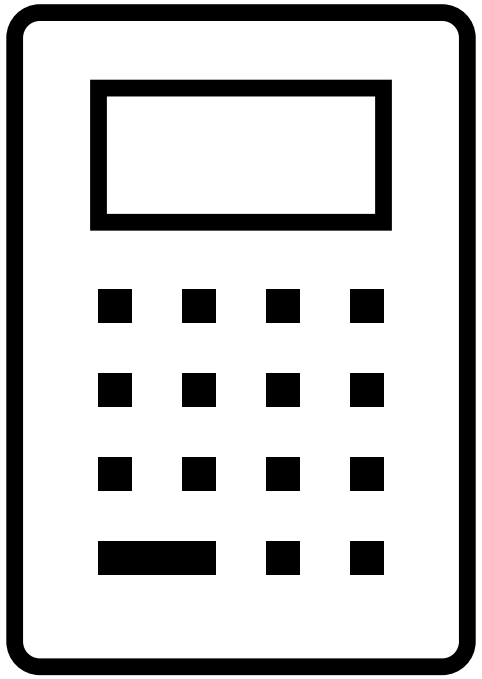
- Some surveys have both quantity of food consumed, and quantity of food purchased
  - would use quantity of food consumed
- What we want to measure is consumption (how much rice is eaten), what we usually mostly have is expenditure (how much rice is purchased).
  - data on consumption of food from own production or gifts is the only thing usually captured on the questionnaire as consumption
- Is it reasonable to assume that, over the given recall period, expenditure ≈ consumption?
  - depends on type of item (perishable, consumable or not) and recall period
  - if recall period is much too short, may be better not to include item at all

Valuation

- Based on the consumer theory model, goods and services should be valued at market prices if possible: the prices the household actually faces when acquiring them
- Easy when the actual purchase cost is given
- More difficult when goods and services are provided to the household and there is no resale market / opportunity cost of consuming
  - hard to know how to value and quantify consumed does not reflect the household's optimizing behavior
  - examples: free school lunches, public services of varying quality, food rations, food or housing provided to refugees/IDPs
  - exclude altogether or use best estimate: average value of similar things similar households choose to purchase

Atypical/Lumpy Expenditures

- Expenditure during the recall period (even if 1 year) is NOT what a household usually spends
  - Purchases of durable goods, house (we explicitly include this via annual use value instead)
  - Life event expenses (weddings, funerals, baby naming)
  - Large medical expenses
- Why not include?
  - Often represents deliberate unsmoothing of consumption by households (theoretically, this consumption maybe should be allocated over entire lifetime of household)
  - This deliberate unsmoothing loses the link to household's expectation of permanent income
- Why might you want to include?
  - Household that have the money to pay for these things are better off than those who don't
  - There is some displacement: households probably spend less on other things in years where they make these big purchases
  - The more unexpected, the more displacement (funerals, medical expenses)



Avoid Double Counting

- Some items may be included twice on the questionnaire in different ways / with different recall period
  - transport for school and health care in those sections, all transport in nonfood expenditures
  - mobile phone credit in individual ITC section, also nonfood expenditures
  - small durable goods in durable goods section and also nonfood expenditures
- Make sure to avoid double counting, pick only one source
  - probably the more detailed source / the one with the longer recall period is better

The Nominal Consumption Aggregate

- Food consumption
  - Regular food consumption
  - Food away from home
- Nonfood consumption
  - Durable goods
  - Housing
  - Nonfood nondurable goods
  - Education and health expenditure
  - Alcohol, narcotics and tobacco

Food Consumption

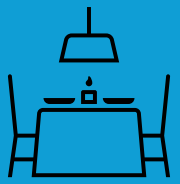
- All food consumed during the reference period should be included:
  - Food purchased in the marketplace, including meals purchased away from home for consumption at home or away from home.
  - Food produced by the household.
  - Food received in-kind, both supplies and prepared meals, as transfer from other households, charities or the government, or received as payment or benefit.

Classification / Grouping

Ingredients (rice, oil, salt) or prepared meals / snacks (a plate of rice and sauce)?

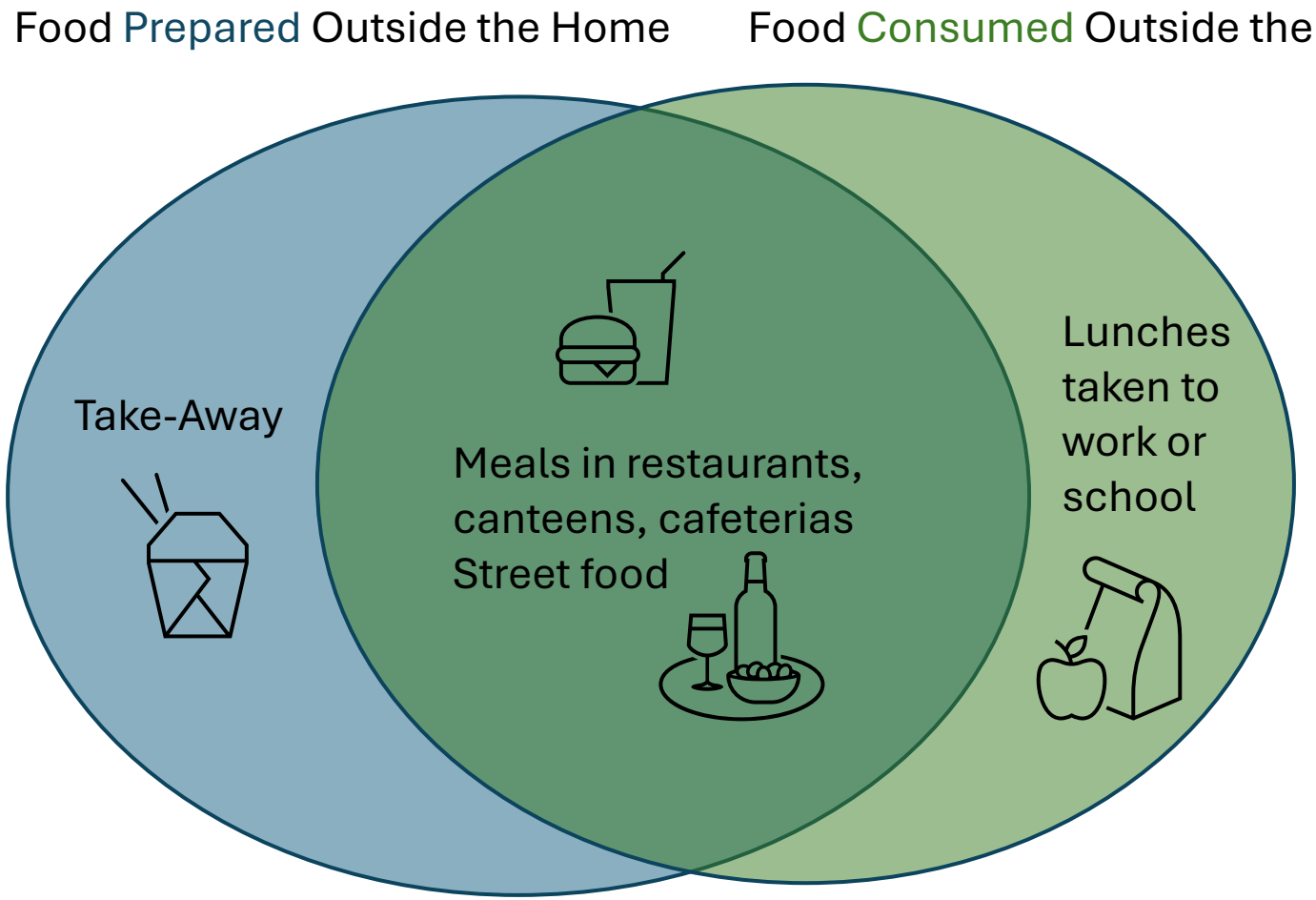
How obtained? Purchased, own production, received for free [bought at subsidized prices]

Consumed at home or away from home?



Food Away from Home

- Lots of recent work on how important this is
- Term “FAFH” can be used somewhat ambiguously to mean food prepared outside of the home, or food consumed outside of the home, or both or either.
- All of these should be included in the aggregate.



Non-food Consumption

Exclude

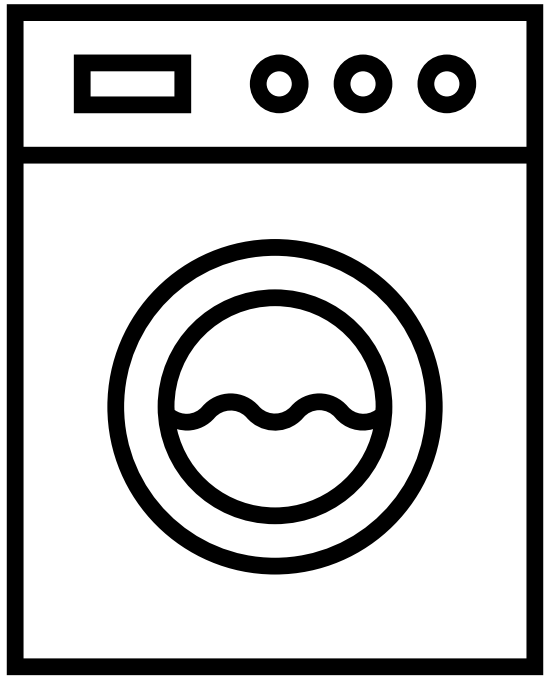
- Transfers to other households
- Donations to religious or charitable organizations
- Investments, savings, loan repayments
- Taxes and levies (income tax)
- Life event expenses (marriage, funeral etc)
- Value of public services
- Inputs for household businesses
- Purchases of durable goods
- Major household repairs or upgrades to dwelling

Include

- Most nonfood, nondurable goods and services
- Insurance
- Leisure expenditures / holidays
- Salaries of household staff
- Minor repairs and maintenance of dwelling

Considerations

- Include expenses scattered throughout the questionnaire:
  - Alcohol, tobacco, narcotics are often collected in the food section
    - generally processed with food
  - Water, electricity, gas, other fuels, home maintenance/repairs. These are sometimes included here, sometimes with housing, make sure to include once and only once
  - Some semi-durable goods may be included in non-food expenditure. If they are in the durable good section, include use value from there only. If they are not, make judgement call based on how lumpy the item is
- Avoid double counting
  - Pay attention to health and education expenses (particularly transport), ITC expenses
- Annualize
  - Recall periods may vary



Durable goods

- Durable goods “deliver useful services to a consumer through repeated use over an extended period of time.”
- Lumpy/valuable enough to make practical to ask respondent about current stock and value
  - In a way that it wouldn’t be to ask about pairs of shoes or cooking pots.
- Physical goods for which the use year after year can be realistically modeled using depreciation

Items to Exclude

- Make sure to only include consumer durable goods, not farm implements or productive assets for a household business
  - Sewing machines are often in included in this list, in many context they are productive assets for a business, not a consumer good for a hobby
- Goods that are used as a store of wealth (silver and gold) rather than for use should also be excluded
- Some durable goods maybe also be included in the non-food expenditure section, make sure not to double count
  - For most things, it's better to take use value than expenditure if you have both
- Some questionnaires include houses and land in this list
  - Value of housing actually used is included elsewhere
  - Farmland is productive asset
  - Other dwellings / land might be a source of savings or income but are not consumption

Consumption Flow

- How much of the value / purchase price of the durable good is “used up” for the year that is the reference period for the survey?
- Three methods:
  1. Acquisition approach (wrong)
  2. Rental equivalence approach (practically impossible)
  3. User cost approach (recommended)
- If you are interested, see M&V 4.4 for discussion of 1 & 2. M&V and most practitioners agree that 3 is to be used.

Validity of Assumptions

- Poor households in low-income countries may sell assets to raise cash, but in many contexts, it is not a very common practice (pawning of assets may be common in some contexts)
  - But: a rich market for second-hand consumer durables does exist which would help households be able to estimate the value of their goods
- Poor households in many contexts don't actually have the opportunity to save their money at the official interest rate
  - But: there is still a benefit of having money now as opposed to later
- Bottom line:
  - we taking use value as a fraction of the current value of the item, usually between 10 and 40%
  - the utility/value a household gets from the durable good declines over time as the good ages / wears out

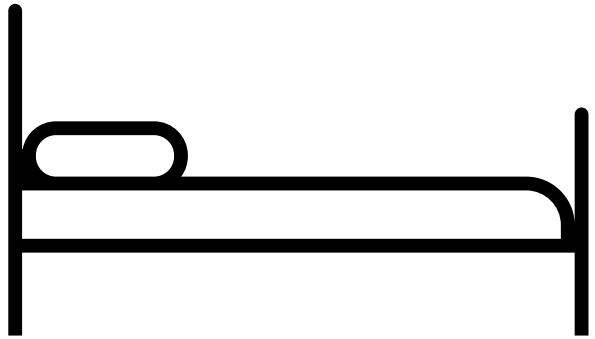
Reporting Depreciation Rates

Appendix B: Durable Goods and Depreciation Rates

Code	Items	Median Depreciation Rate
2	Antenne parabolique/numerique	15.66
3	Armoires et autres meubles	6.70
4	Aspirateur	15.48
5	Bouteille de gaz	4.96
6	Chaine musicale	10.49
9	Climatiseur	8.18
10	Congelateur	6.82
11	Cuisiniire	8.97
13	Fer a repasser a charbon	9.14
14	Fer a repasser a lectrique	11.21
15	Four a micro-onde ou a lectrique	9.14
16	Frigo	7.79
17	Groupe electrogene	9.22
18	Lave-linge, seche linge	10.58
19	Lecteur DVD/VCD	11.16
20	Lit	7.68
21	Matelas simple	10.56
22	Mixeur/Presse-fruits non electrique	10.61
23	Ordinateur fixe	9.09
24	Piano et appareil de musique	10.30
25	Poste radio	16.91
26	Rechaud a gaz	11.09
27	Rechaud a petrole	16.74
28	Refrigerateur	7.17
29	Robot de cuisine electrique (Moulinex)	10.56
30	Salon (Fauteuils et table basse)	7.53

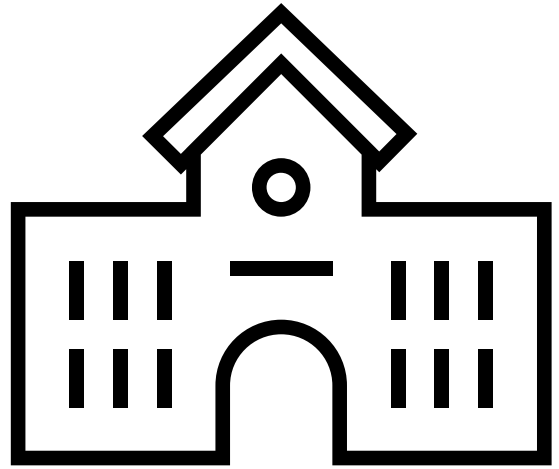
Multiple Items

- Households can own multiple items of the same kind
- Questionnaires often only collect information on one, sometimes the newest
- Some questionnaires collect information on 2 or 3
- If households own more items than we have information on, usually just assume all of them have the same value
- If newest is specifically asked about, could assume others have only a fraction of the value



Education Expenditures

- There are theoretical reasons not to include:
  - Specific to a particular point in the household's life cycle, theoretically should be smoothed across life cycle of household members – impossible in practice
  - Could be considered investment / savings rather than consumption
- In practice, education is always included

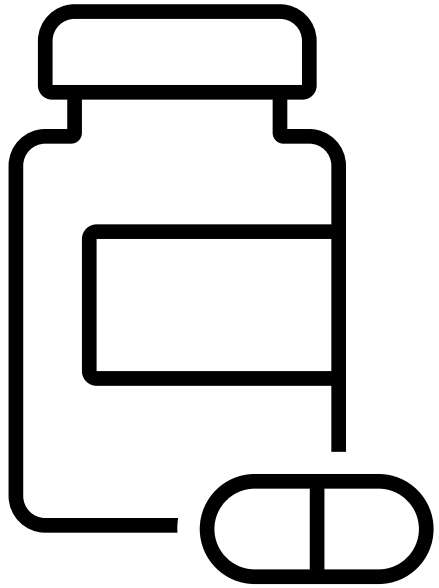


Education Expenditures (cont.)

- Expenditure on education is usually collected at individual level
- Check logic of questionnaire and skip patterns to make sure a value is included for all children [likely] attending school
- Include all components if recorded: tuition / fees, payments for uniforms, schoolbooks, school lunches, mandatory contributions, informal fees etc
  - Context dependent which of these can realistically be zero
- Take note of recall period, annualize if needed
  - Definition of recall period is one of the hardest parts of education questionnaire design
  - Different annualizations may be needed if recall period is “current school year to date”
- Identification of outliers may need to take into account level (primary vs. secondary) and type of school (private vs. public)

Health Expenditures

- Deaton and Zaidi recommended against the inclusion of most health expenditures
- Most practitioners have included at least some health expenditures
- Sound theoretical arguments have been made as to why they should be included
- Recommendation has changed: (most) health expenditures should be included
- If possible, include informal payments to health care providers
- For countries with insurance
  - include insurance premiums
  - include out-of-pocket expenditures for health care

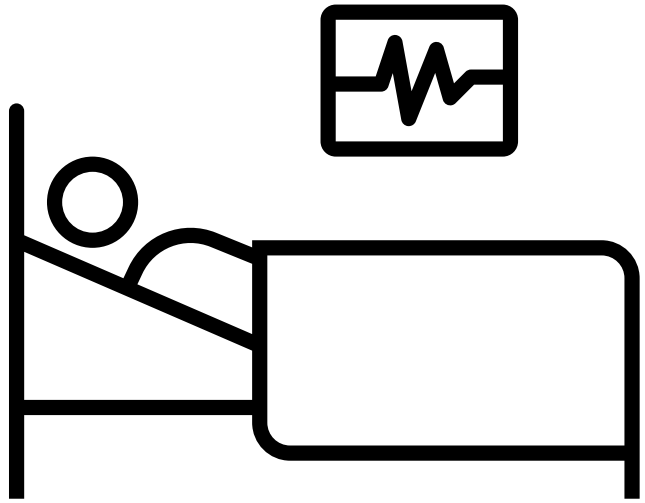


Link to Welfare Theory

- Trade off between including health expenditures for comprehensiveness and excluding health expenditures because they are linked to a loss of welfare
- Including them is consistent with welfare theory as outlined in topic 0
- “A monetary measure of wellbeing is inevitably unable to account for some aspects of welfare, such as the state of one’s health.”
- Best to accept that the NCA never reflects health status
- Not measuring how many problems you have, just the financial resources available to solve them

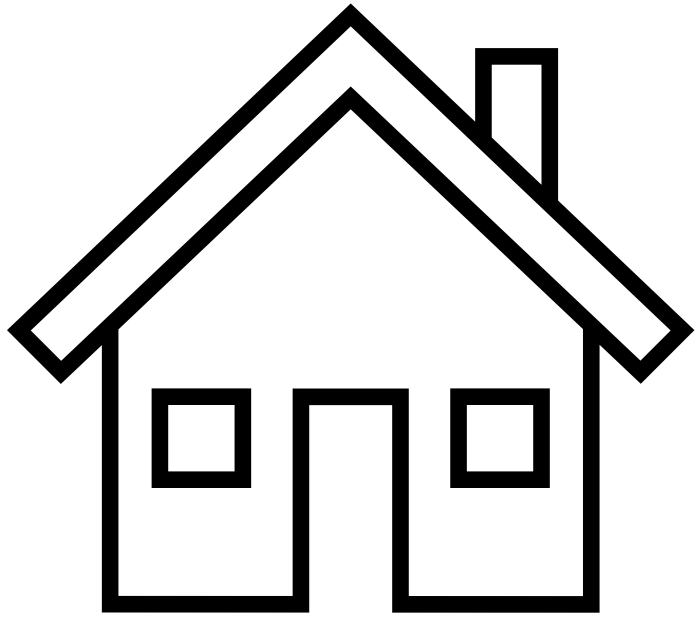
Atypical Expenditures

- Health care expenditures do tend to be lumpy: large and infrequent
- Recall period for even minor illnesses can be too short: often one month
  - With too short a recall period, you don't even have a reasonable estimate of what the household spent for that year
  - Some countries cheat and annualize by a lower factor
- For hospitalization, even the maximum recall period may not be enough to reflect "typical" consumption
- This is one compelling reason to exclude spending on major health problems (proxied by hospitalization)



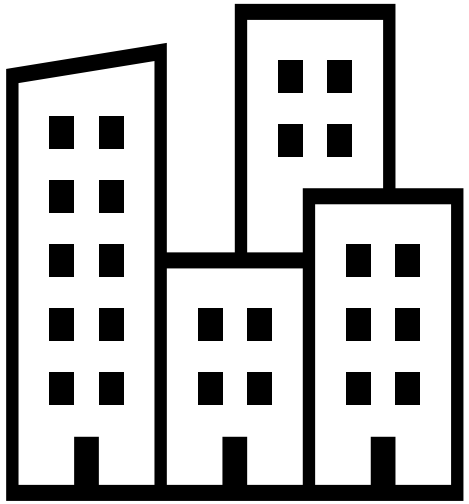
Valuing Housing

- Housing is a major component of household's wellbeing
- Market tenants:
  - rent dwelling at market rates
  - those who purchased a dwelling in an area with deep market for buying/selling dwellings
- Non-market tenants:
  - those who live in a dwelling they constructed / inherited or bought in a shallow market
  - those whose dwelling is provided for free/at a subsidized rate by the state / their employer / friends or family.



Market Tenants

- For renters, use actual rent paid in almost all cases
- For those who purchased their dwelling, and a strong market exists
  - could consider as a durable good
  - could use mortgage payment
  - however, housing tends to appreciate so dwelling functions both as consumer durable good and as investment



Non-Market Tenants

- For owner-occupiers: if a rental market exists, the opportunity cost of living in a dwelling you own is the forgone income from not renting it out. Can either:
  - ask respondent to estimate this directly, or
  - use a regression to estimate based on characteristics and actual rent for other dwellings in the area
- In rural areas of many low-income countries:
  - no rental market exists
  - still need to account for the time and materials households spent to construct and maintain their dwelling
- Dwellings provided by the state / employer / friends or family
  - may be considered as income/transfer
  - actual utility they provide to the household is hard to quantify

Respondent-Estimated Rental Value

- Ask the respondent “**How much would you have to pay to rent a house / apartment like yours**?”
- Rental markets may not be present in all areas, particularly in rural areas, making this question very difficult to answer meaningfully
- Even if there is a rental market, studies show that owners tend to over-estimate the rental value of their properties

Hedonic Regression

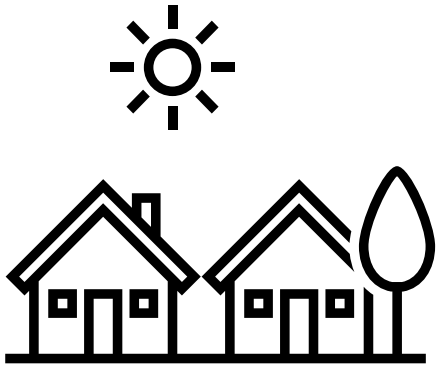
- Use actual observed rents (from renters) to construct a model of rent based on various characteristics of the dwelling (size, location, construction materials, amenities)
- Using the population of renters, regress the logarithm of the actual rent paid on various characteristics of the dwelling:

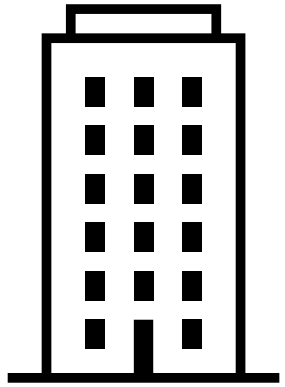
$$\ln rent_h = \beta x_h + \varepsilon_h = \beta_0 + \beta_1 x_{1h} + \cdots + \beta_k x_{kh} + \varepsilon_h$$

- Then use this model to predict rental values out of sample for homeowners and non-market tenants
- Might have separate regressions for different strata (capital city, other urban areas, rural areas)
- Can use method such as stepwise or lasso to select independent variables for regression
- Need all independent variables to be nonmissing in order to predict
  - Any missing values will have to be imputed using median for similar households

Hedonic Regression – modification

- In many countries, renters are highly concentrated in urban markets and a model developed based mainly on modern apartments in urban areas may do very poorly predicting the value of traditional houses in rural areas
- Can incorporate respondent-estimated rental values into the regression and then used the predicted value from this regression as the rental-equivalent
    - Assumes respondent-estimated rental values have some information to contribute but provides more consistent relationship between characteristics and value
    - Should include a binary variable for whether the observation is actual rent or respondent-estimate. If this variable is significant, consider using predictions for all households (including market tenants) for consistency

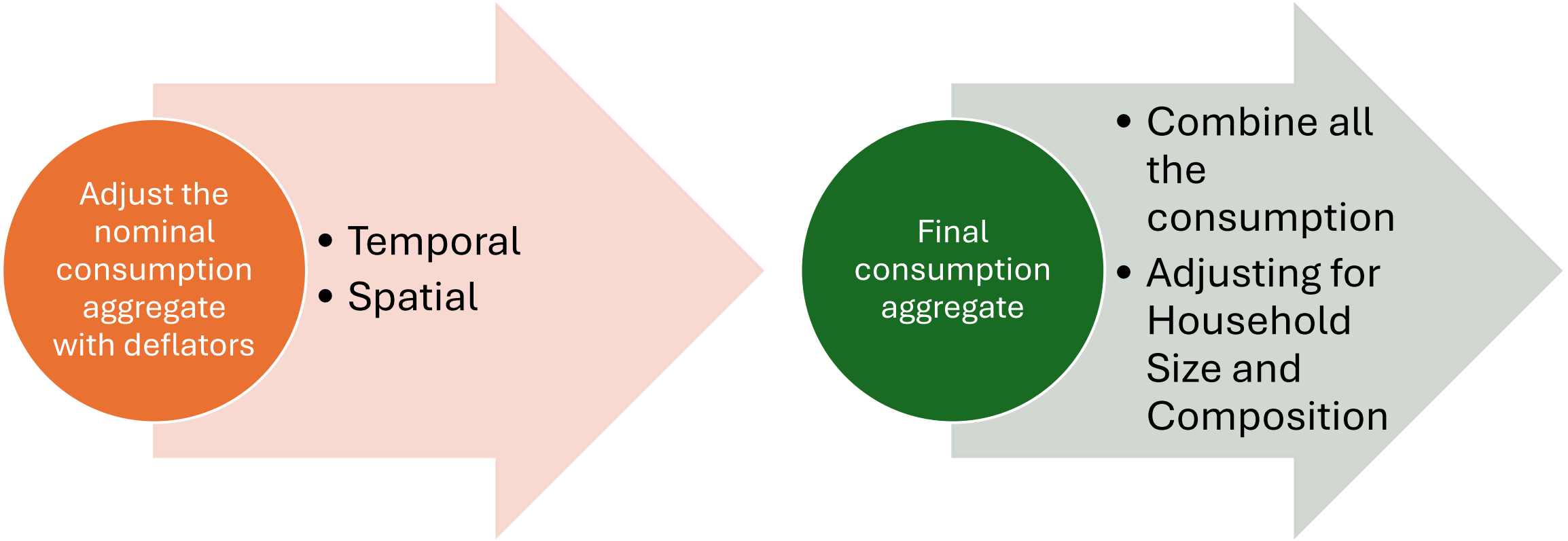




Exclude Housing Altogether?

- Some east African countries have excluded housing altogether in rural areas due to difficulty in constructing a reasonable use value
  - Very thin to non-existent rental markets in rural areas
  - Too hard to quantify cost / opportunity cost of living in your own home
  - Housing may not be something you need money for in rural parts of these countries
- Requires separate poverty lines for urban and rural areas
- Timor Leste considering excluding housing altogether due to very thin rental markets even in urban areas
- Tajikistan excluded housing altogether due to low rates of renting (most households still live in dwellings allocated by the communist state)

Next step


Adjust the nominal consumption aggregate with deflators
• Temporal
• Spatial
Final consumption aggregate
• Combine all the consumption
• Adjusting for Household Size and Composition

Deflators

- Need to adjust nominal consumption to reflect the actual prices paid by households
- Prices can vary over time due to
  - general inflation
  - seasonal variation
  - only a concern when data collection takes place over a longer period (>2 months?)
- Prices can across space
  - often higher in urban areas

Various Price Indices

	Paasche	Laspeyres	Fisher
Textbook Formula	$P^h = \frac{p^h \cdot q^h}{p^0 \cdot q^h}$	$L^h = \frac{p^h \cdot q^0}{p^0 \cdot q^0}$	$F^h = \sqrt{P^h L^h}$
D&Z Formula	$P^h = \left(\sum w_k^h \frac{p_k^0}{p_k^h} \right)^{-1}$	$L^h = \sum \left(w_k^0 \frac{p_k^h}{p_k^0} \right)$	

- w_k^h is the share of good k in the household's total consumption; w_k^0 is the share in total national consumption
- Note: CPI is usually (always?) a Laspeyres price index, using fixed weights.

Price Sources

Source	Pros	Cons
Unit values (from observed hh purchases)	• Collected in exactly the areas as the households in the survey • Classification of foods aligns perfectly	• Better-off households may consume higher quality versions of items • Within each classification, households will tend to consume more of what is locally relatively cheaper • Usually only available for food
Price survey	• Collected in exactly the areas of the households in the survey • Classification of items can align perfectly • Precise quality definitions can be applied • Covers food and nonfood	• Rarely implemented, additional cost • Needs to be done carefully, otherwise will just introduce noise
Raw CPI data	• Data on large number of items • Should have consistent quality definitions • Available at no extra cost • Covers food and nonfood	• Often only collected in urban areas • May not have access to raw data • Coding of items may be different from survey

Other Decisions

- Use separate temporal and spatial price deflators, or create one joint price index?
  - I recommend using a joint one UNLESS you want to use the CPI for temporal deflation
- If using separate ones, which one to apply first?
  - M&V recommend applying temporal first
- Use separate deflators for separate components of the consumption aggregate (food vs. non-food, by top-level COICOP)?
  - M&V recommend against this: can distort share of food in total consumption
- Use lower level of aggregation for budget shares than for prices?
  - Budget shares can be down to household level. Prices can be down to cluster-level.

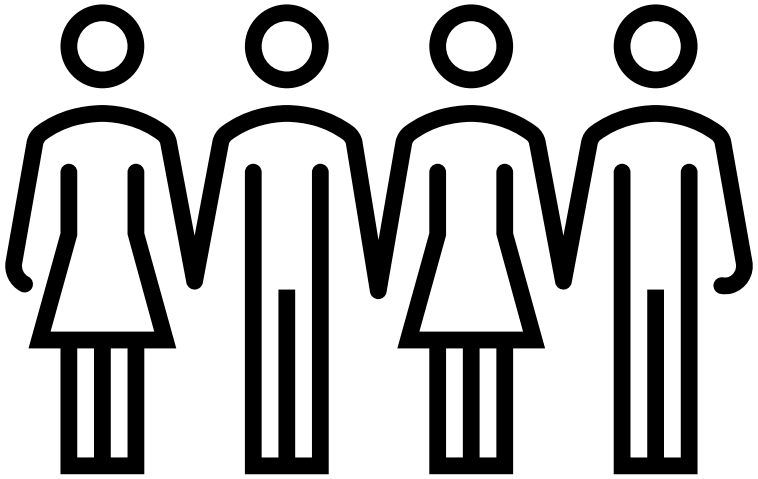
Final consumption aggregate

- We have consumption of each item, food and nonfood, including use value of durable goods and housing rental value
- Very helpful to maintain this as a final dataset that can be used for different types of analysis in the future
- Can add COICOP coding (1 to 3 digits) to this dataset
- Can also include source of consumption: purchase, own production, gift, use value etc.
- In general, these are nominal, annual values

Aggregating and Final Checks

- Sum up consumption of all items over the household
- Drop households for which the NCA cannot be constructed
  - households missing entire sections of the questionnaire
  - households deemed to have too many missing values / imputations otherwise
  - household with extreme share of food in total consumption
- Reweight to adjust for dropped households
  - rescale at PSU level so total weight for PSU remains the same
- Apply spatial and / or temporal deflators
- Adjust for household size and composition
- Look at overall distribution and check outliers

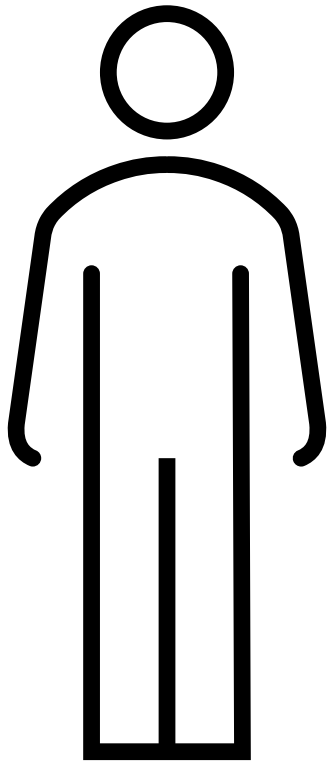
Final touch - Household vs. Individual



- Welfare, living standards, poverty are **individual** level attributes, but data is almost always collected at the **household** level
- There is a lot of interesting research on intrahousehold allocation of resources, but these have not been integrated into routine poverty monitoring
- Household members are just assigned a share of household resources

Adjusting for Household Size and Composition

- How do we compare the welfare status of households with the same NCA, but different household sizes / compositions?
  - Different persons have different needs: the amount of food consumed by a child is generally less than a working age adults
  - There are economies of scale: a household of 4 people generally doesn't need twice as much house as a household of 2 people
- Construct a measure of the needs of the household based on its size and composition, usually measured in number of (male) adult equivalents
  - a household composed of one adult male would be assigned a value of one



Per Capita

- Simply use household size
- Very simple, used for the dollar-a-day international poverty lines
- Assumes no economies of scale, no different needs for different types of people
- Might actually be as good as other measures in some contexts

Calorie-Based Equivalence Scales (2/2)

- The approach most widely used in practice is based on nutritional (calorie) requirements for various categories of individuals by sex and age

$$ES_{FAO} = \sum_i \sum_j N_{ij} \frac{E_{ij}}{E_0}$$

- Where for each age group i and sex j, N_{ij} is the number of individuals in the household and E_{ij} is the energy requirement. E_0 is the energy requirement of an adult male.
- Sometimes know as FAO scale, although the FAO itself does not use this scale to adjust household income/consumption

Calorie-Based Equivalence

TABLE 3-5 Median Heights and Weights and Recommended Energy Intake

Category	Age (years) or Condition	Weight (kg)	Weight (lb)	Height (cm)	Height (in)	REE[a] (kcal/day)	Average Energy Allowance (kcal)[b] Multiples of REE	Per kg	Per day[c]
Infants	0.0–0.5	6	13	60	24	320		108	650
	0.5–1.0	9	20	71	28	500		98	850
Children	1–3	13	29	90	35	740		102	1,300
	4–6	20	44	112	44	950		90	1,800
	7–10	28	62	132	52	1,130		70	2,000
Males	11–14	45	99	157	62	1,440	1.70	55	2,500
	15–18	66	145	176	69	1,760	1.67	45	3,000
	19–24	72	160	177	70	1,780	1.67	40	2,900
	25–50	79	174	176	70	1,800	1.60	37	2,900
	51+	77	170	173	68	1,530	1.50	30	2,300
Females	11–14	46	101	157	62	1,310	1.67	47	2,200
	15–18	55	120	163	64	1,370	1.60	40	2,200
	19–24	58	128	164	65	1,350	1.60	38	2,200
	25–50	63	138	163	64	1,380	1.55	36	2,200
	51+	65	143	160	63	1,280	1.50	30	1,900
Pregnant	1st trimester								+0
	2nd trimester								+300
	3rd trimester								+300
Lactating	1st 6 months								+500
	2nd 6 months								+500

[a] Calculation based on FAO equations (Table 3-1), then rounded.
[b] In the range of light to moderate activity, the coefficient of variation is ±20%.
[c] Figure is rounded.

Table A5.2: Recommended energy intakes

Category	Age (years)	Average energy allowance per day (kcal)	Equivalence scale
Infants	0 - 0.5	650	0.22
	0.5 - 1.0	850	0.29
Children	1 – 3	1300	0.45
	4 – 6	1800	0.62
	7 – 10	2000	0.69
Males	11 – 14	2500	0.86
	15 – 18	3000	1.03
	19 – 25	2900	1.00
	25 - 50	2900	1.00
	51+	2300	0.79
Females	11 - 14	2200	0.76
	15 - 18	2200	0.76
	19 - 25	2200	0.76
	25 - 50	2200	0.76
	51+	1900	0.66

Source: Recommended Dietary Allowances, 10th edition, (Washington D.C.: National Academy Press, 1989).

Choice of Equivalence Scale

- Calorie-based equivalence scales
  - this is the probably the best way to adjust food consumption for household size and composition
  - aligns with the method most often used to construct the food poverty line – the amount needed to buy enough calories for one adult male at prevailing local prices and dietary practices
  - gives very concrete measure of extreme poverty: those whose total consumption is not sufficient to purchase enough calories for the household
- Per capita
  - very simple and probably does a reasonable job balancing food and non-food needs in lower-income country contexts
- Equivalence scales with economy of scale
  - more appropriate in middle and high-income contexts in which things like housing with large economies of scale are significant share of household budget

Link to Poverty Line Setting

- The calorie target you use to set your food poverty line depends on the measure of household size / equivalency you are using
- If your welfare measure is per adult male equivalent, you need a calorie target for an adult male
- If your welfare measure is per capita, you need an average calorie value for the population in the country

Final step

Construct Poverty line

Updating the Old Line (1/2)

- If your surveys are highly comparable, in terms of questionnaire design and welfare aggregate construction, the default option is to use the old poverty line and update it for inflation
- Can use official CPI, need to know base of temporal deflation for both surveys, and use inflation between those two base periods
- Use headline CPI to inflate total poverty line (not food and nonfood components separately)

Updating the Old Line (2/2)

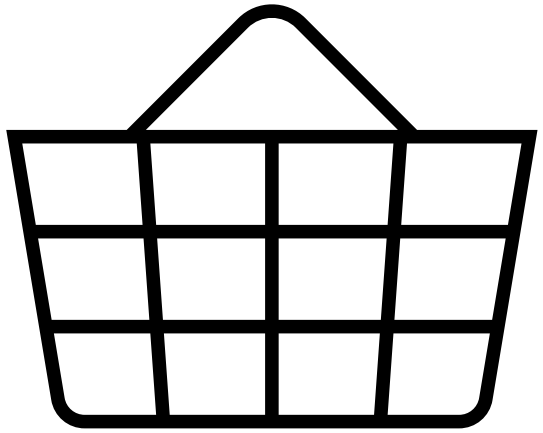
- CPI may
  - overestimate increase in the true-cost-of-living as it is a Laspeyres index
  - reflect consumption patterns of the country as a whole which can be different from that of households close to the poverty line
  - be based on urban prices only, and long term inflation trends in rural areas may be different
  - be politically motivated (artificially low to avoid COLA adjustments for civil servants)
- So can also use alternative indices constructed from the survey data
  - use budget shares from hh survey, or just a reference population close to the poverty line, and apply to price changes from the CPI at say first digit of COICOP level
  - cost food basket from previous survey at new national prices

Constructing a New Line

- If you have implemented major revisions to the questionnaire or the methodology, construct a new line
- If there have been major economic shocks which have dramatically altered the consumption patterns of households, construct a new line

Poverty Line Construction

- The World Bank recommends a Cost-of-Basic-Needs poverty line which is based on
  - cost of a basket of food actually consumed by poor people that provides enough calories
  - plus an allowance for non-food needs (constructed based on actual consumption patterns)



Food Component

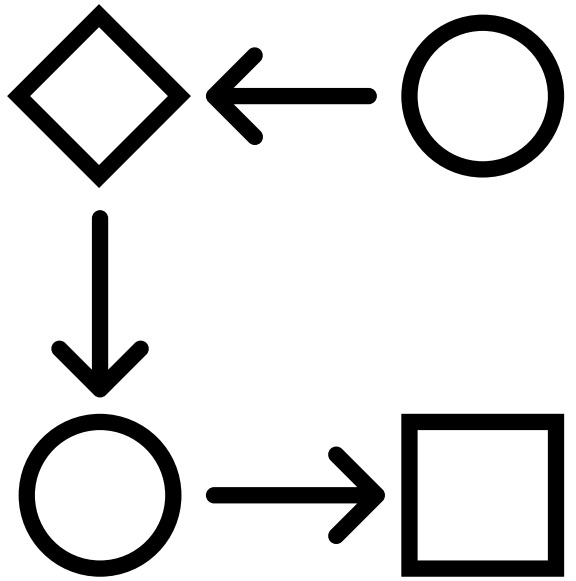
Basket Definition

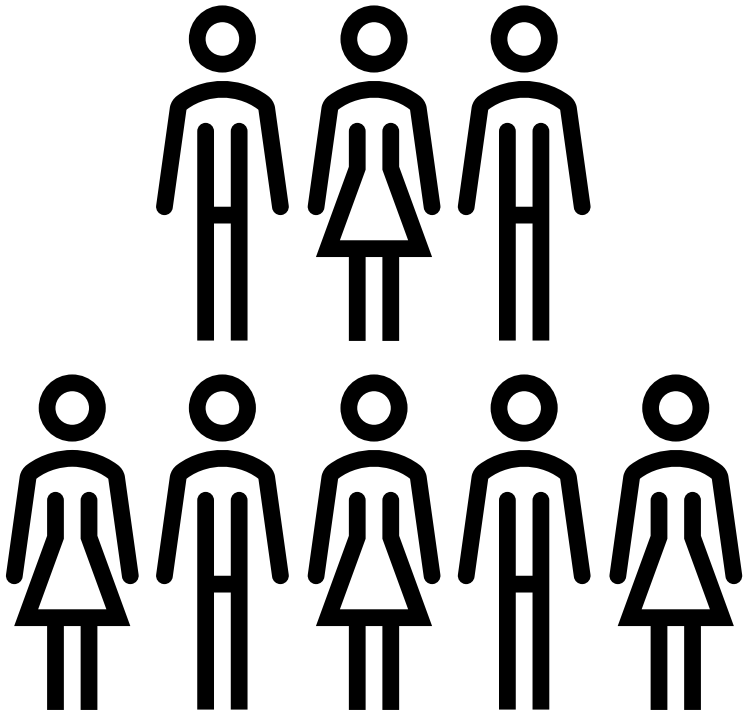
Choice of Calorie needs

Costing

Choices and Steps

- Need to select:
  - Reference population
  - Foods to include in the basket
  - Total number of calories per capita or per AME
- Steps
  - Calculate quantity of each food in the basket
  - Cost each food in the basket using p_0
- OR construct cost-per-calorie and multiply





Reference Population

- Composition of the basket should reflect the actual food consumption patterns of “poor” people
- The reference population defines exactly what we mean by poor
- Usually defined in terms of deciles (either of food consumption or total consumption), should exclude top and bottom deciles

Foods to Include

- Including every single food item from a survey (if there are hundreds) can be more trouble than it is worth.
  - Requires converting non-standard units to grams for every item
  - Requires finding calorie per 100 g values for every food item
  - Composite items (prepared meals) can be very heterogenous and thus difficult to construct meaningful prices / calorie values
  - Results in a huge basket that contains tiny amounts of rarely consumed foods
- Want to include a reasonable number of items that account for most of the food consumption of the poor across the country
- Often use target like foods that account for 80% or 90% of the total value of food consumption

Foods to Include – Prepared/Composite Foods

- Some countries include prepared meals, some do not
- Need to calculate cost per calorie
  - Can assume it is **the same** as the average for other items in the basket. Reasonable in cases where prepared meals are very similar to meals cooked at home and overheads / profit margins are very low
  - Can assume it is **a multiple** of the average of other items in the basket, usually in the range of 1.1 times to 1.5 times. Allows for additional costs of preparing and serving food, profit margins
  - Some countries do studies of restaurants, looking at nutritional content of food and the cost

Calorie Requirement

- Depends on choice of equivalence scale
- If using calorie-based scale, use calories for adult male
- If using per capita, apply population structure to calorie needs
- These are average calorie needs, significantly higher than "minimum" calorie needs FAO uses to get country-level minimum calorie requirements

age	coeff	calories	% of pop	for per cap
0 to 1	0.25	675	2.42	16.335
1 to 3	0.45	1215	8.87	107.771
4 to 6	0.62	1674	9.36	156.686
7 to 10	0.69	1863	12.10	225.423
11 to 14 M	0.86	2322	5.01	116.332
11 to 14 F	0.76	2052	4.49	92.135
15 to 18 M	1.03	2781	4.16	115.690
15 to 18 F	0.76	2052	4.40	90.288
19 to 50 M	1	2700	17.41	470.070
19 to 50 F	0.76	2052	21.11	433.177
51+ M	0.79	2133	5.10	108.783
51+ F	0.66	1782	5.58	99.436
				2032.125

If using calorie-based

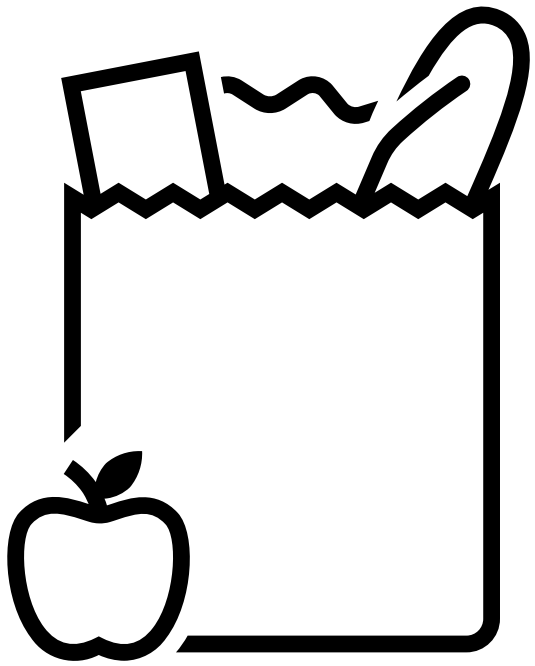
If using per capita

Quantities for Basket - Explicit

1. For the selected foods, compute the total amount in grams consumed by all households in the reference population per day
2. Merge in information on calories to get total calories for each food
3. Divide by the total adult male equivalents to get calories per AME
4. Sum over all food items to get total calories in this basket
5. Scale up quantities so that the basket contains the target number of calories
6. Use the p_0 to compute the cost of the basket

Cost-per-Calorie Approach

- Cost per calorie method – two variations
  - Plutocratic: calculate (weighted) total calories consumed by reference population and total (weighted) value of food consumed (using only selected items to avoid having to calculate calories for hundreds of food items)
  - Democratic: compute cost per calorie (using only selected items) for each household in the reference population, then calculate (weighted) average
- Scale up to cost for target number of calories
- Computationally the easiest
- Plutocratic should be equivalent to explicit basket
- Don’t get actual basket quantities which can be a useful check



Evaluating the Basket

- In every context I know of, the basket is picked just to provide a certain number of calories
- Can easily use food composition tables to see how much protein, vitamin A etc the basket provides, and if this meets nutritional standards
- With slightly more work could construct a basket that meets multiple minimum requirements, in terms of calories, protein etc

Nonfood Component

Ravallion methodology

Ravallion (1998)

- Proposed an upper and lower bound on the nonfood component, based on how households actually balance food and nonfood needs
- Assumes hierarchy of needs:
    1. Survival food needs
    2. Basic non-food needs
    3. Basic food needs

Food Poverty Line is (1) + (3). Want to determine appropriate value for (2)

Upper Bounds vs Lower Bounds

- Consider someone whose food spending equals the food poverty line (1)+(3).
- This person must have already met all their basic nonfood needs, so their nonfood expenditure must be greater than (2).

- Consider someone whose total spending equals the food poverty line (1)+(3).
- This person has sacrificed basic food needs to purchase basic nonfood needs, so their nonfood expenditure must be less than (2).

Estimating

- Ravallion recommends a nonparametric method to estimate.
  - For upper bound: for values of x from 1 to 10
    - Calculate average total nonfood consumption per AME [capita] for households whose food consumption is within x% of the food poverty line
  - Take the average of these 10 averages, this is the nonfood component
- Some countries use a simpler approach and just take the average nonfood expenditure for households whose food consumption is within 10% of the food poverty line.
- For lower bound, replace food consumption with total consumption.

Construction

- Poverty line is cost of basket + nonfood component calculated via Ravallion
- Expressed per capita or AME in overall national prices
  - The welfare aggregate is also in these terms, this is usually how we do the calculations of poverty, equality etc
- For some purposes, it may be helpful to express the poverty line in terms of total needs for a family of 5 (say) in the prices in different parts of the country.

Poverty rate

A poverty rate can be computed by comparing per capita consumption to the poverty line and calculating the percentage of the population living below it.

$$H = \frac{1}{N} \sum_{i=1}^{N} I(y_i < z)$$

Where:

- H: Poverty headcount ratio
- N: Total population
- y_i: Consumption (or income) of individual i
- z: Poverty line
- $I(y_i < z)$: Indicator function equal to 1 if $y_i < z$, and 0 otherwise