Using the DHS wealth index and World Bank poverty thresholds to examine socio-economic position in the Family Planning Market Analyzer

Background

The Family Planning (FP) Market Analyzer (fpmarketanalyzer.org) combines data from Demographic and Health Surveys (DHS) and FP2020's projections of modern contraceptive prevalence (mCPR) to allow users to explore potential scenarios as part of a total market approach (TMA), including shifts in market share between the public and private health sector. An important consideration when thinking about the potential roles of the public and private sectors in a family planning market is a women's ability to pay for products and services from private providers. The FP Market Analyzer allows further exploration of changes by income level using a methodology that combines analyses of absolute wealth with DHS data.

Traditionally, DHS analysis speaks to socio-economic differences via wealth quintiles. These quintiles are derived from a series of questions about household construction materials, water and sanitation access, and ownership of various items (e.g. television, refrigerator), which form a wealth index score. This score is used to rank households by wealth, and the population is then subdivided into five quintiles to produce a relative indicator of socio-economic status within a given country at the time of the survey. While the wealth quintiles are useful to understand relative wealth and equity within a country, they do not give one a sense of *absolute* wealth; someone deemed "rich" according to the wealth quintiles might still have few resources for out-of-pocket expenditures.

> *Wealth Quintiles* are a **relative** measure while *poverty lines* are an **absolute** measure.
>
> Both can be helpful for different types of decision making.

In addition to the relative versus absolute conception of wealth, there is also the distinction between asset-based measures and income-based measures based on the flow of resources via income and expenditures. A key source for income level data comes from the World Bank (WB), which generates poverty headcounts for most countries based on a complex methodology utilizing multiple sources, including country-specific survey data on income and consumption and information on prices and purchasing power parity (PPP).[1] The WB estimates the proportion of a country's population living under the International Poverty Line (IPL), as defined as $1.90 per person per day. Additional measures of poverty at higher thresholds, $3.20 (Lower-Middle Income poverty line) and $5.50 (Upper-Middle Income poverty line), are also calculated. These measures are estimated based on 2011 PPP exchange rates, meaning they take into account variations in price level across countries. Therefore, these absolute measures of poverty are directly comparable across countries.

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[1] See http://iresearch.worldbank.org/PovcalNet/home.aspx for more details on the WB methodology.

Because the DHS surveys measure assets and not income, a hybrid approach was developed for the FP Market Analyzer to combine the DHS wealth index and WB poverty headcount thresholds to allow segmentation of users into four "income levels". This brief describes the hybrid approach and compares it to wealth quintiles in three sub-Saharan African countries.

Methods

The approach to examining wealth and income in the FP Market Analyzer is to use the DHS wealth index score and apply the WB poverty headcount thresholds to divide the population into four levels:

1. Those living under the IPL (less than $1.90 a day)
2. Those living on income between $1.90 and $3.20 a day
3. Those living on income between $3.20 and $5.50 a day
4. Those living on income greater than $5.50 a day

Assuming that the ordering of households based on wealth will be similar to the ordering of households based on income, DHS data is weighted by household size and all household members, including women of reproductive age (WRA), are allocated to one of the four income levels based on share of the country's population living at each level. Further details on the data sources and methodology for creating the income level variable can be found in the technical notes below.

Results

Comparing income levels versus wealth quintiles

Results for three countries designated as Low-Income by the World Bank (The Democratic Republic of the Congo (DRC), Cote d'Ivoire, and Zimbabwe) are presented below to demonstrate how an examination of the FP market will differ when using income levels instead of wealth quintiles. Figures 1-3 illustrate how socio-economic status can vary among low-income countries. The pie charts on the left represent the hybrid approach for distribution of WRA according to the income categories generated from the WB poverty thresholds used in FP Market Analyzer. In the bar charts on the right, the distribution of WRA by DHS wealth quintile is represented, with an overlay of the income categories. Because the quintiles are developed at the household level (including children), not the individual level, when looking at only the WRA they do not fall into five equal groups.

Figure 1. Distribution of WRA by income levels and wealth quintiles: DRC

■ < $1.90   ■ $1.90-$3.20   ■ $3.20-$5.50   ■ > $5.50
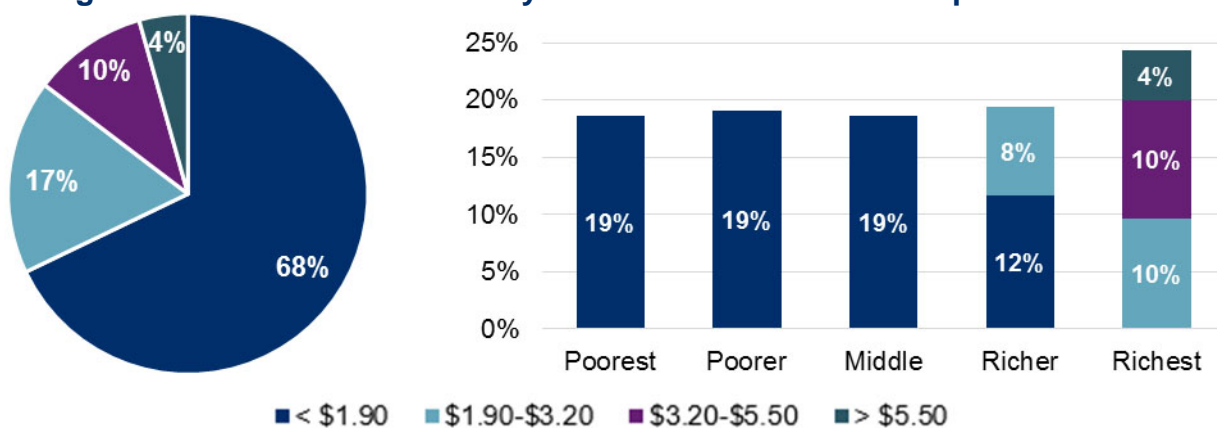
In the DRC, the World Bank estimates that 68% of WRA live on less than $1.90 a day. When this data is overlaid on the bar chart showing the wealth quintiles, it highlights the differences between the two methodologies. One can see that the first three quintiles and even most of the fourth (Richer) quintile are living below the IPL. It shows that women whom the wealth quintiles designate as "Richer" are still living in extreme poverty, even though *relatively* they are wealthier than three-fifths of the population. So, the two methodologies provide very different interpretations of who would be considered "rich" and potentially able to pay for commodities and services in the private sector. Below we contrast this to the patterns in the other countries.

The Côte d'Ivoire population is more evenly distributed with regards to the four income levels, and the corresponding quintile graph similarly reflects an even income distribution among the quintiles.

Figure 2. Distribution of WRA by income levels and wealth quintiles: Côte d'Ivoire
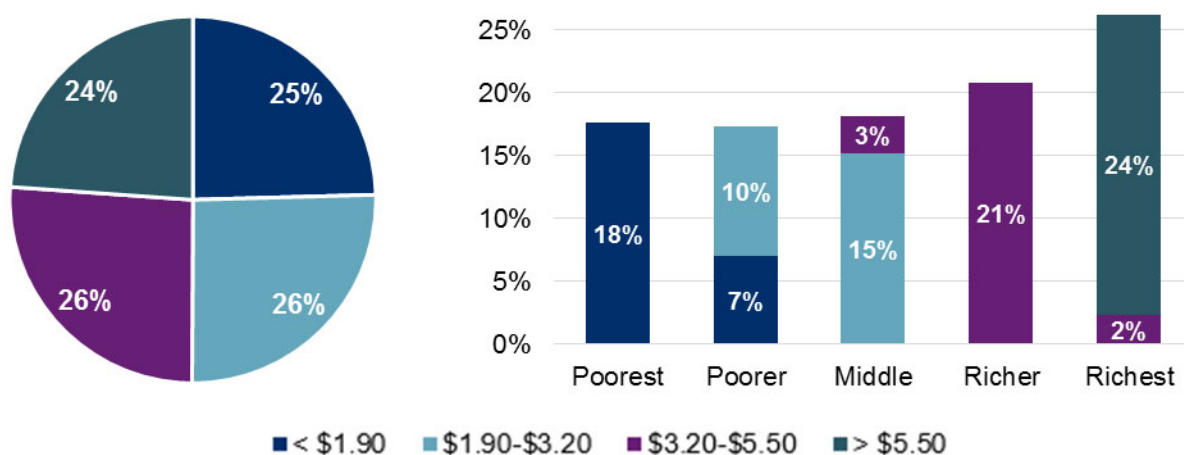
Finally, the Zimbabwe data show a greater proportion of the population in the higher income levels, with 39% living on more than $5.50 per day. Consequently, the quintile distribution shows that even some of the poorest quintile are living above the IPL.[2]

**Figure 3. Distribution of WRA by income levels and wealth quintiles: Zimbabwe**

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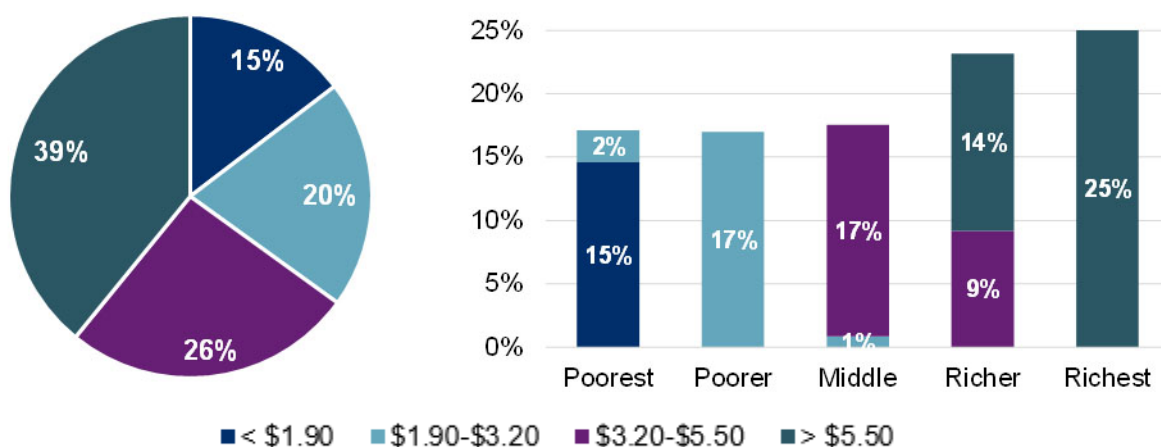
[2] Income classification represents distribution of poverty thresholds as of 2015 and may not reflect the current situation.

Understanding this relationship between the income categories and wealth quintiles can help program planners better characterize population segments by socio-economic position and think through questions about ability to pay for FP. As such, using income categories instead of wealth quintiles can lead one to very different conclusions about market size when considering TMA scenarios.

Utilizing results to inform FP TMA programs

Consider a situation where a program is interested in assessing the size of the market for women who could potentially purchase FP in the private sector, priced for women of a higher socio-economic position. Figure 4 shows how the estimates of the size of the potential market able to pay for FP differs when one uses the top two income categories (over $3.20) vs. the top two wealth quintiles (richer/richest). In the DRC, the income category variable yields a much lower potential market size estimate compared to the quintile approach (92,000 vs. 353,000 WRA) because many WRA in the richer/richest quintiles are living below $3.20 a day. For Côte d'Ivoire, where income is more evenly distributed, one can see that the market size estimates are similar based on either approach. In contrast, for Zimbabwe, the potential market size estimate is higher using the income categories compared to the quintile estimate (869,000 vs. 567,000).

Figure 4. Number of higher income/wealth quintile FP users by sector
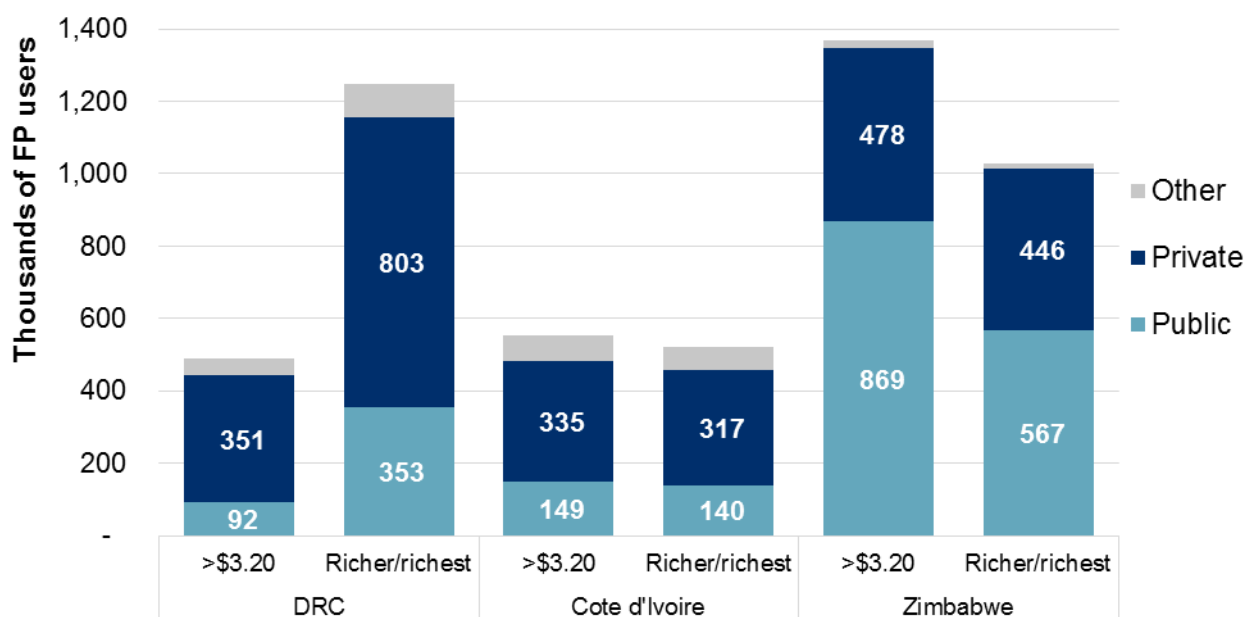
Another example could be a social marketing organization interested in understanding the potential market size for a new oral contraceptive pill aimed at women of a higher socio-economic position. Figure 5 shows the market size estimation for pill users in the highest income categories versus wealth quintiles. As with the prior example, the estimates of those who might be able to afford this product based on the highest income categories is much lower than those based on the highest wealth quintiles in the DRC, equivalent in Côte d'Ivoire, and higher in Zimbabwe.

Figure 5. Number of higher income/wealth quintile pill users

Advantages and Limitations

A total market approach to family planning involves consideration of many aspects of the FP market. Beyond income level, one must also consider method mix and availability, consumer preferences, service quality, and affordability, even among those who might be classified into "higher" income levels. The socio-economic position of FP clients is relevant in appropriately segmenting the market by ability to pay for FP or identifying the need for subsidy to facilitate private sector access. While the typical approach of using wealth quintiles can be useful in examining issues of equity within a population, it has limits when applying TMA principles to understand reasonable expectations on individual's ability to pay for FP. Whereas the wealthiest 40% in one country may have enough resources to afford out-of-pocket costs for FP in the private sector, that may not necessarily be true in another country. This was clearly demonstrated comparing the three country examples highlighted above. As such, conceptually, absolute measures of income and consumption are a better fit for determining ability to pay for FP than a relative measure of assets. However, due to the difficulties in obtaining reliable income/consumption data in low- and middle-income countries, the DHS wealth index is the best available approximation of relative socio-economic status, and variables that already exist in DHS surveys are needed in order to link income analysis with FP method use. This limitation necessitated the hybrid approach used in the FP Market Analyzer.

This approach rests on a key assumption referenced above, that the ordering of households based on wealth will be similar to the ordering of households based on income. This is a significant limitation, because while *wealth*, as measured by a stock of assets, and *income/consumption*, measured by the flow of currencies and prices, both assess the construct of socio-economic position; they are not the same metric. The assumption in the methodology is not that they are the same, but rather that they are correlated to the extent that it is reasonable to rank individuals according to assets as an approximation of income for applying the WB thresholds.

Additionally, it is important to note that both the DHS wealth index and WB poverty thresholds are population-level estimates best suited for policy and programmatic discussions at a macro level, not to describe any specific woman's living standards.

Conclusions

It is important for policymakers and researchers to understand both the relative wealth of individuals within a country and measures of absolute income/consumption, particularly when thinking through questions about ability to pay for FP. Mapping the WB poverty headcount thresholds to DHS data has been previously used in other applications (see technical notes and references), though up until now results have not be readily available. Inclusion of income segmentation within the FP Market Analyzer makes this data easily accessible for nearly 60 countries. Still, there remains a need for further research on the relationships between wealth asset indices, income/consumption, and an individual's willingness and ability to pay for FP.

LEARN MORE   *Go to fpmarketanalyzer.org to see income data for any country with a recent DHS survey*

Technical Notes and References

Population size estimates

- The total number of women of reproductive age (WRA) and total number of modern users in each country draw from Track20/FP2020 estimates (in line with the 2018 FP2020 Progress Report) for each country. The DRC uses their own population estimates, while Côte d'Ivoire and Zimbabwe estimates are from UNPD World Population Prospects 2017.

DHS wealth index and quintiles

- The following DHS surveys were used: DRC 2013/2014, Côte d'Ivoire 2011/2012, Zimbabwe 2015.
- The quintiles are developed at the household level, therefore when looking at only the women, the distribution is not equal quintiles. This is because households in the poorer quintiles tend to have more household members (i.e. children).
- More information on the questions and methods used to generate the DHS wealth index can be found at: https://www.dhsprogram.com/topics/wealth-index/Wealth-Index-Construction.cfm.

World Bank poverty thresholds

- WB poverty thresholds are based on estimates for the year 2015 (the most recent available).
- More information on the methodology for generating the World Bank poverty headcount can be found at http://iresearch.worldbank.org/PovcalNet/data.aspx.

Methodology for generating the income categories

- The household survey sample is weighted to account for sampling weights and the size of the household.
- The household wealth index score (variable hv271) is sorted and ranked from lowest to highest.
- Based on the rank, the sample is divided into 100 groups each representing 1% of the observations, generating a new variable that captures the percentile placement for each observation.
- Using the percentage variable, a new variable is created that classifies each observation into the four income categories based on the WB poverty thresholds.
- The income categories variable is linked to the individual DHS survey observations.

Relevant studies

Harttgen, K., & Vollmer, S. 2011. *Inequality decomposition without income or expenditure data: Using an asset index to simulate household income.* Zurich, Switzerland: United Nations Development Program.

Howe, L., Hargreaves, J., & Huttley, S. 2008. "Issues in the construction of wealth indices for the measurement of socio-economic position in low-income countries." *Emerging Themes in Epidemiology*, 5:3.

Ngo, D., & Christianensen, K. 2018. *The Performance of a Consumption Augmented Asset Index in Ranking Households and Identifying the Poor.* Washington, DC: The World Bank.