

A Note on Discrepancies in Consumption Measured from Household Surveys vs. National Accounts*

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Summary

This note briefly summarizes information on the consistency, or lack thereof, in estimates of household consumption as calculated from household income and expenditure surveys and those reported in national accounts statistics (NAS). It is by no means an exhaustive review, and instead focuses on reviewing key recent literature on the topic, complemented by an examination of recent data. It also briefly discusses the specific case of Tanzania, which prompted the request for this note. The main points are:

- Neither national accounts nor household surveys (HHS) are inherently more accurate measures of household consumption. Differences in methodology, coverage, and measurement error imply that discrepancies in NAS and HHS should be expected.
- Cross-country evidence shows that on average HHS and NAS provide similar estimates of consumption levels and growth. There is an enormous dispersion underlying this average, and in any given country the NAS and HHS estimates of consumption levels or growth may diverge by a wide margin.

Methodological Differences

There is no basis for arguing a priori that consumption estimates from NAS are more accurate than those from household surveys, or vice versa. Both suffer from measurement error, and the methodologies are sufficiently different that it is debatable whether they are even attempting to measure the same thing. Ravallion (2003) notes three reasons in particular why NAS and HHS estimates may differ:

1. **HHS are likely to underestimate income and expenditure** because of lower compliance by richer households, respondents forgetting or concealing income or expenditure, or insufficiently detailed survey instruments.
2. **NAS tend to capture illegal, informal, household-based, and subsistence elements of consumption imperfectly at best.** As economies develop and become more formalized, NAS consumption growth rates will tend to be biased upward. Similarly, the formulas for netting out of intermediate products from value added often don't keep pace with a growing economy's increased intermediation, which will bias NAS consumption estimates upward.
3. **Coverage and accounting practices differ, with NAS having broader coverage.** One potentially large component of consumption included in NAS but not HHS is spending on goods and services by unincorporated businesses and non-profit organizations (charities, religious organizations, clubs, trade unions, political parties, etc.). Deaton and Kozel (2005) give the example of financial intermediation in India, which grew from zero to 2.5% of NAS consumption between 1983/84 and 1993/94, but would not have changed in HHS estimates. Finally, household consumption in NAS is rarely calculated directly, but rather as a residual after calculating the other components of GDP.

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Empirical Evidence: Consumption levels

Cross-country analysis finds no significant difference between NAS consumption levels and HHS levels from expenditure surveys. Using data from 88 low- and middle-income countries, Ravallion (2003) finds that on average HHS estimates are only 93% of NAS estimates, and notes that the remaining 7% is a plausible estimate for the size of consumption by nonprofit organizations. When income surveys are included as well that figure drops to a statistically significant 83%, confirming that income is underreported more than expenditure. Comparing discrepancies in levels by region, the differences in ECA and South Asia are statistically significant, but not those in LAC (after controlling for income vs. expenditure surveys) or SSA.

The dispersion of HHS/NAS ratios is enormous, with HHS accounting for anywhere from 21% to 225% of the consumption reported in NAS. Ravallion (2003) finds a particularly large HHS/NAS discrepancy in India, with HHS accounting for only 55% of the NAS consumption level. Deaton and Kozel (2005) discuss the India case in considerable detail, attributing the different estimates to the different methodological and coverage practices mentioned earlier. In particular they report that much of the difference is due to the use of outdated “rates and ratios” for capturing unobservable but important quantities such as intermediate outputs.

The discrepancies in HHS and NAS are particularly prominent in sub-Saharan Africa. Table 1 presents estimates of the HHS/NAS ratio for two survey years for each of 24 countries in SSA.¹ Most noticeable are the extreme outliers of Swaziland and Madagascar, but more generally it can be noted that HHS and NAS consumption estimates differ by more than 30% in almost half of the observations. The large discrepancies occur in both directions, as shown in Figure 1, which displays the HHS/NAS ratio data from Table 1. In fact, the direction of the discrepancies almost balances out, so that the average HHS/NAS ratio is 1.03.

Within countries, the direction of the bias tends to be consistent over time. In 18 of the 24 countries the HHS/NAS ratio is persistently above or below 1.

Empirical Evidence: Consumption growth rates

Ravallion (2003) reports significant differences in NAS and HHS consumption growth rates, but finds that the result is driven entirely by contracting ECA economies. When ECA is removed from the sample, the NAS consumption growth rate is an unbiased predictor of the HHS consumption growth rate. Differences in coverage predict that NAS consumption growth estimates are likely to be larger than HHS estimates, with growth rates that are biased upward as economies grow. However, there is so much dispersion from country to country (including HHS estimates exceeding NAS estimates in 23% of the 88 countries studied) that the average difference is small and not statistically significant. The relationship between NAS and HHS estimates is especially weak in SSA and South Asia.²

¹ These data are from DECRG and reflect updates of the data used in Ravallion (2003).

² Ravallion (2003) reports a slope coefficient for SSA of 0.645 (se=0.357), whereas a perfect predictor would have $\beta=1$. The intercept is -2.679 (se=1.258), versus an intercept of 0 for a perfect predictor.

Table 1: Levels and growth rates in private consumption from household surveys (HHS) and national accounts statistics (NAS) for 24 selected African countries

Country	Survey years	Mean HHS / NAS (year 1)	Mean HHS / NAS (year 2)	HHS annual growth rate	NAS annual growth rate
Botswana	1985.5-1993.9	0.80	0.67	3.6%	6.0%
Burkina Faso	1994-2003	0.98	0.77	1.6%	4.4%
Burundi	1992-1998	0.72	1.29	-1.4%	-11.7%
Cameroon	1996-2001	0.66	0.85	5.8%	0.3%
Côte d'Ivoire	1985-2002	1.11	1.18	-2.0%	-2.4%
Ethiopia	1981.5-2000	1.59	1.75	0.5%	0.0%
The Gambia	1992-1998	0.53	1.14	12.6%	-0.8%
Ghana	1987.5-1998.3	0.97	1.43	2.8%	-0.9%
Kenya	1992.4-1997	1.40	1.33	2.3%	3.3%
Lesotho	1986.5-1995	0.65	0.78	1.9%	-0.2%
Madagascar	1980-2001	3.48	3.25	-1.0%	-0.7%
Mali	1989-2001	1.91	1.02	-2.6%	2.8%
Mauritania	1987-2000	0.54	0.68	2.9%	1.0%
Mozambique	1996.5-2002.5	1.07	0.97	3.7%	5.5%
Niger	1992-1994.4	0.98	0.80	-6.5%	4.3%
Nigeria	1985.5-2003	0.94	1.22	-0.3%	-1.8%
Rwanda	1984.5-2000	0.85	0.89	-0.9%	-1.2%
Senegal	1991-2001	0.62	0.83	2.7%	-0.2%
South Africa	1993-2000	0.65	0.50	-1.7%	2.2%
Swaziland	1994.5-2000.5	0.21	0.23	5.4%	3.3%
Tanzania	1991-2000.4	1.16	0.92	0.8%	3.5%
Uganda	1989-2002	1.36	1.18	2.4%	3.5%
Zambia	1991-2004.3	0.83	0.78	0.6%	1.1%
Zimbabwe	1990.5-1995	0.60	0.56	-4.2%	-2.6%

In sub-Saharan Africa NAS consumption growth estimates are larger than HHS estimates only about half the time. The last two columns of Table 1 show the implied annual growth rates in consumption estimated from NAS and HHS. In 13 of 24 cases the NAS estimate is higher, but again the dispersion is large. Note that when the HHS/NAS ratio decreases over time—which is consistent with an economy that is developing and becoming more formal—the NAS growth rate typically exceeds the HHS growth rate. This is expected on for reasons of methodology and coverage. The converse also holds, with increasing HHS/NAS ratios associated with higher growth estimates in HHS than NAS. The large discrepancies in the NAS and HHS growth rates are highlighted in Figure 2, which plots the growth rates.

Discrepancies on consumption growth in Tanzania (2001–07)

There are many potential explanations for the discrepancy in HHS and NAS consumption estimates for Tanzania for the period 2001–07, as well as the period 1991–2001. It is likely to be the sum of several distinct factors, probably including some of the common reasons enumerated above. Some other potential avenues of exploration include:

- The 2007 survey reports substantial urbanization, with the urban share of the population increasing from 20 to 26 percent, and substantially higher mean real

consumption in urban areas. As the latest census was 5 years old when the survey was conducted, this must have required some projections of urbanization when determining sample weights. If urbanization is occurring even faster than projected then there may be consumption growth in urban areas that isn't reflected in household surveys because the sample weights do not fully capture urbanization.

- Have the relative prices of basic needs have changed substantially since 2001, and if so, does the Fisher index pick this up? That is, do 2007 consumption weights enter the calculation of the Fisher index? These questions are prompted in part by the OPM powerpoint indicating that the same poverty reference basket from 2001 was used.
- It would be useful to know the NAS rate of consumption growth in nominal terms. The 2007 survey data indicate that HHS nominal consumption roughly doubled from 2001 to 2007.

References

- Deaton, A. and V. Kozel. 2005. "Data and Dogma: The Great Indian Poverty Debate." *World Bank Research Observer* 20(2): 177–199.
- Ravallion, M. 2003. "Measuring Aggregate Welfare in Developing Countries: How Well do National Accounts and Surveys Agree?" *Review of Economics and Statistics* 85(3): 645–652.

Figure 1: Histogram of HHS/NAS consumption ratios (24 selected African countries x 2 observations on each)

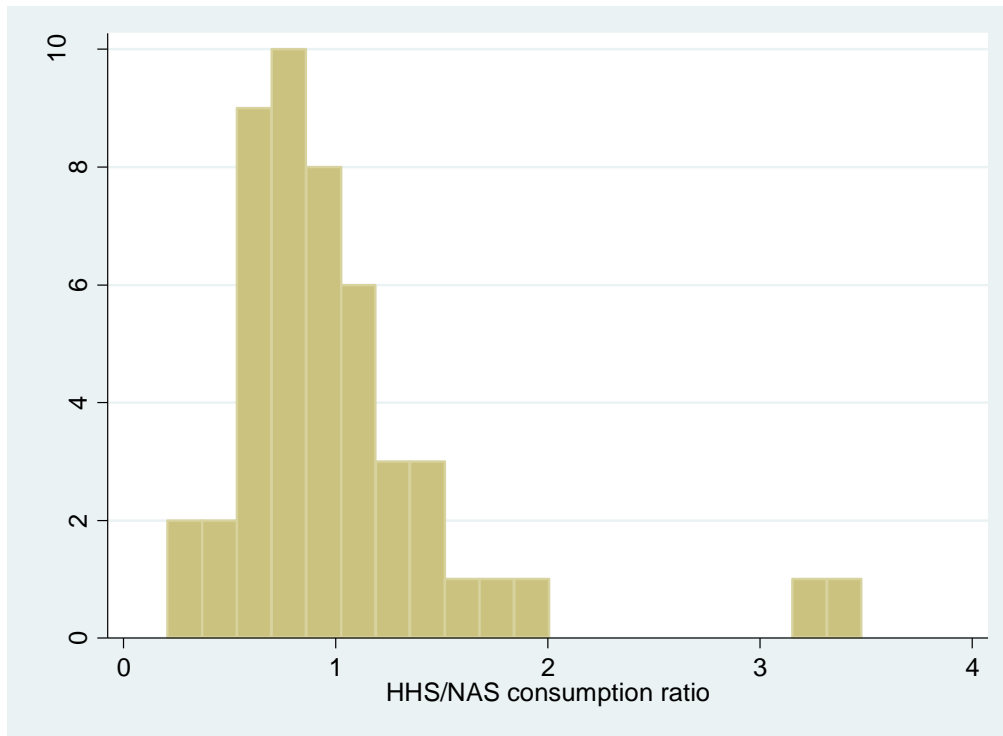


Figure 2: Growth rates in HHS vs. NAS consumption per capita (24 selected African countries)

