

**Exploring differences in national and international poverty estimates:
Is Uganda on track to halve poverty by 2015?**

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ABSTRACT

This paper explores differences in the estimates of incidence of poverty in Uganda since the early 1990s as measured by the national poverty line used by Uganda Bureau of Statistics and the World Bank's "dollar a day" international poverty line. While both measures point to a declining trend in poverty over time there are important differences in the levels of poverty, the speed of the decline and the direction of change in the late 1990s. Proximate causes of this divergence are related to differences in the specification of mean level of welfare and in the distribution of welfare. Proposed underlying causes include differences in: adjustments to account for urban and rural price variation, adjustments to reflect household composition and the application of probability weights associated with the sampling structure.

Keywords: Uganda, sub-Saharan Africa, Poverty line, Purchasing Power Parities, Millennium Development Goals

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1. Introduction

Ten years after the Millennium Development Goals (MDGs) were conceived, and with just five years to their 2015 deadline, there are still important conceptual and methodological challenges outstanding on how to assess progress towards the MDG targets.¹ This is especially true for the first and probably most prominent target: “To reduce by half the proportion of people living on less than a dollar a day.”² In this paper, these challenges are discussed in the context of Uganda; a country often highlighted for being one of a few in sub-Saharan Africa on track to meet the poverty target of the MDGs, and for its effective development planning framework and its strong poverty monitoring system.

When comparing the estimates of poverty incidence from the World Bank’s interactive database PovcalNet with those from the Uganda Bureau of Statistics (UBOS) contained in the most recent official MDG progress report, three distinct discrepancies emerge. Firstly, the estimates generated by the World Bank are much higher than the national estimates. Secondly, while both sets of estimates show a declining trend in poverty levels since the early 1990s, the national poverty estimates point to a rate of poverty reduction that is much faster than when using the international estimates. The implication is that, when looking at national poverty estimates, Uganda appears to be on track to meet MDG1/1 and even the Government’s own more ambitious targets. However, when using international estimates the country is clearly not on track. The third deviation is that according to the national estimates from UBOS there was a significant increase in poverty levels between 1999 and 2002, which is not reflected in the international estimates from the World Bank.

In light of this ambiguous evidence the central question remains: *is Uganda on track to meet the first MDG and halve poverty by 2015?* To seek answers to that question this paper explores methodological and conceptual differences in the way the poverty measures for Uganda are being computed and reported by the national

¹ The first set of Millennium Development Goals, targets and indicators were outlined in United Nations (2001). For an updated list see <http://mdgs.un.org>.

² Since this is the first target of the first Goal below it shall be referred to as “MDG1/1”.

authorities and the World Bank. The analysis should have considerable relevance for how the Government, domestic stakeholders and international development partners assess the success of the Uganda Poverty Eradication Action Plan—especially its promises of “pro-poor growth”—and commence implementation of the new National Development Plan in 2010. Moreover, there are important implications for how national governments and international institutions collaborate around measuring development progress, which are particularly pertinent as the global community looks towards a post-2015 agenda.

The paper is organised as follows. Section 2 discusses poverty trends according to a range of data sources, but the focus is mainly on the estimates presented in the national MDG Report, that represent the official estimates of poverty from the Government of Uganda, and the estimates contained in PovcalNet, which contains the most recent update of the World Bank’s estimates for poverty. Section 3 introduces a simple diagnostic framework for exploring the possible causes of diverging poverty estimates. In Section 4 this framework is used to explore the differences in the estimates of poverty in Uganda from the World Bank and national authorities but it should be general enough to guide a comparison of poverty estimates whether for one country over several time periods or between different countries.

On this basis, it is possible to explain most of the divergence through differences in the way price changes and differences are dealt with, the application of probability weights in the sample survey data and especially how adjustments are made for household composition. However, given limitations in the meta-data for the poverty estimates produced by the World Bank these results are necessarily based on interpretation of—and some degree of speculation on—the incomplete information that is made available, and even then a part of the divergence in the estimates cannot be directly accounted for. Accordingly, Section 5 concludes and offers some recommendations for how to improve the information base for national and international poverty estimates.

2. Progress towards MDG 1/1 in Uganda

Uganda is often regarded as a best-practice or even a “show case” when it comes to reducing poverty, fighting HIV/AIDS and promoting economic and social development (McGee 2004; Dijkstra and van Donge 2001). Per capita GDP has grown 3 percent on average in real terms since the early 1990s outpacing most countries in sub-Saharan Africa. As a result GDP per capita has grown more than 60 percent from USD 175 in 1991 to 282 in 2007. Economic growth was particularly pro-poor in the first part of the period and is thus key to explaining the fast rates of poverty reduction (Kappel *et al.* 2005). Uganda’s strong record in reducing poverty since the early 1990’s also means that its country report on progress towards the MDGs is one of the few in sub-Saharan Africa that rates as “probable” the likelihood of reaching MDG1/1. Indeed according to the UN Economic Commission for Africa, Uganda is among just eight countries out of 44 in sub-Saharan Africa that are likely to reach the MDG poverty target.³

Moreover, the earlier country’s development planning framework, the Uganda Poverty Eradication Action Plan (PEAP), with its emphasis on national ownership and participatory processes, became the model for the Poverty Reduction Strategy Papers introduced by the World Bank and the IMF in 1999 to assist Highly Indebted Poor Countries (HIPC) towards identifying their development challenges and guide them towards debt-relief (Mallaby 2004; Mackinnon and Reinikka 2002). As a consequence, Uganda was also the first country to qualify for debt relief under the HIPC initiative.

2.1 Monitoring at national, regional and global levels

The MDGs constitute the quantitative and time-bound goals that were designed as part of the follow-up to the Millennium Declaration of 2000. On the global level, international organisations track progress according to their thematic mandate, e.g. World Bank on the poverty goals of MDG1, UNESCO on the education goals of MDG2

³ The others are: Botswana, Burkina Faso, Cameroon, Ghana, Lesotho, Mauritius and South Africa (http://www.uneca.org/mdgs/MDGs_page.asp accessed June 2010).

and so on. Cross-sectoral databases administered by the UN Statistics Division and reports such as the “Millennium Development Goals Report” from the UN⁴ and the joint “Global Monitoring Reports” of the World Bank and IMF⁵ provide regular updates of global and regional progress against all the goals and targets. Regional reports are produced by regional development banks, the economic commissions of the UN and other entities. At country-level, national governments and their development partners, including the UN agencies, are expected to prepare national MDG reports. Hundreds of such “MDGRs” have been prepared by both developed and developing countries, with several countries having gone through more than one reporting cycle. In many countries civil-society organisations, with support from the Millennium Campaign, also prepare “shadow reports” that provide an alternative, and sometimes more critical, assessment of country progress.

In Uganda the national authorities and the United Nations Country Team have collaborated on two national reports to assess progress the country’s towards the MDGs in 2005 and 2007 (an updated report is due for release in 2010). These reports follow standard guidelines issued by the United Nations Development Group (2003) and thus using national data sources, the reports go one by one in describing status and trends for each goal and assessing the likelihood of their attainment. However, because of differences in the methodologies used by international agencies for purposes of global reporting on one hand, and by national authorities assessing progress locally on the other hand, it is only natural that discrepancies between the various types of estimates will arise.

Such challenges are particularly pertinent when it comes to target 1a: “Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day.” The main issue here is that “less than one dollar a day” refers directly to the international poverty line used by the World Bank, which is generally considered of limited practical use for national governments and statistics offices. As a result, the UN Statistics Division in its official guide to monitoring progress towards the MDGs advises that two indicators should be used: (A) Proportion of

⁴ See: <http://www.un.org/millenniumgoals/>

⁵ See: <http://go.worldbank.org/UVQMEYED00>

population below \$1 (PPP) per day and (B) Poverty headcount ratio (% of population below the national poverty line), and it is explicitly stated that: *“For monitoring country poverty trends, indicators based on national poverty lines should be used, where available”* (United Nations 2003: xi).

For reporting purposes, when possible, the World Bank has started listing the two types of indicators side by side in its flagship World Development Report and the UN Statistics Division includes both measures on its website dedicated to monitoring progress towards the MDGs. For purposes of monitoring MDG1/1 a division of labour as such has thus been established whereby World Bank issues its estimates of national, regional and global levels of poverty using the US\$1/day poverty line, and national statistics offices issue their estimates using the national poverty lines. But what do we do when this division of labour generates contradictory evidence on the poverty trajectory? The remainder of this paper discusses this challenge.

2.2 Overview of the poverty estimates in Uganda

The two main sources that track progress towards MDG1/1 in Uganda are reflected on Figure 1. The graph shows the incidence of poverty for Uganda according to the national MDG report from 2007 (UN 2007) and the updated figures from the World Bank’s PovcalNet.⁶ According to the first source, which is based on estimates by national authorities in UBOS (2006), the incidence of poverty has been reduced from 55.7 percent in 1992/1993 to 31.1 percent in 2005/2006. The long-term decline in the incidence of poverty was briefly interrupted between 1999/2000 and 2002/2003 when the incidence increased from 33.8 to 37.7 percent. Nevertheless, over the period poverty reduction has proceeded with great speed and fast enough for the country—assuming a linear extrapolation of current trends—to be on track to meet the nationally defined target under MDG1/1, which is set to half the value of the incidence observed in 1992/1993, or 28 percent, by 2015. The slightly more

⁶ The World Bank requests that all outputs from PovcalNet should cite the source as “PovcalNet: the on-line tool for poverty measurement developed by the Development Research Group of the World Bank” and provide the web link to PovcalNet: <http://iresearch.worldbank.org/PovcalNet/>.

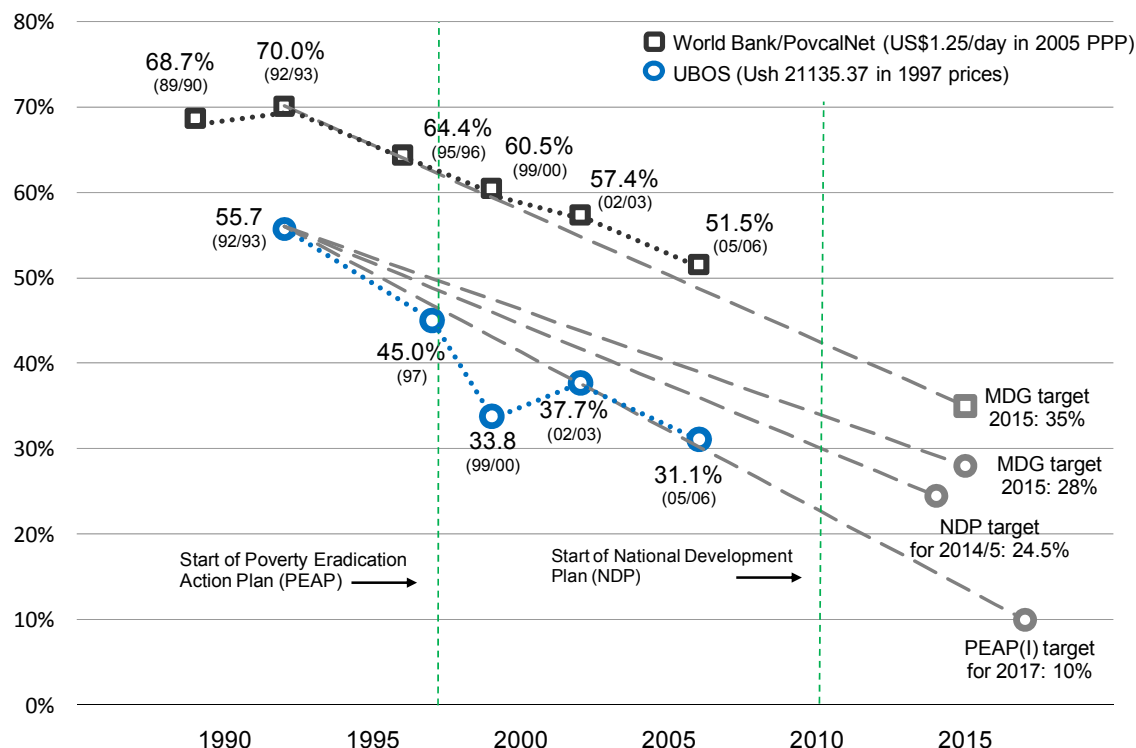
ambitious target set out in the new National Development Plan that began implementation in 2010, of reducing poverty to 24.5 percent by 2014/2015 also seems within reach. In fact, progress has been so fast that the country appears to be on track to reach the even more ambitious goal of the first PEAP in 1997, which was to reduce poverty incidence to 10 percent in 2017. It is also this earlier target that is reported in the MDG report.

Figure 1 also includes the poverty incidence estimates released by the World Bank based on its international “dollar a day” poverty line, which is expressed in US\$ Purchasing Power Parities (PPP) to facilitate international comparison (more on this below). This time series begins in 1989 but also shows a downward trend from 1992 as the national poverty estimates. However, it is also evident that there are some important differences. Firstly, the World Bank estimates of poverty are much higher: 64 higher percent to be precise using the most recent figures. Secondly, while the overall trend is down for both measures the progress in poverty reduction is slower under the World Bank estimates. In fact, extrapolating the past rate of progress Uganda is slightly off-track in terms of meeting the MDG target that is derived as a proportion of poverty incidence in 1992. Using World Bank estimates the PEAP target also appears unattainable. Thirdly, the increase in poverty observed when using the UBOS estimates in the middle of the period is not evident from the PovcalNet data as poverty incidence falls from 60.5 percent to 57.4 percent between 1999/2000 and 2002/2003.

More details on the poverty incidence data is provided in Table 1, which includes the figures from a variety of sources that have computed estimates based on the nine household surveys that UBOS has conducted since the late 1980s. The characteristics of the different surveys, the Household Budget Survey (HBS), the Integrated Household Survey (HIS), the Monitoring Surveys (MS) and the Uganda National Household Surveys (UNHS) and issues related to survey design and execution will be discussed in more detail below. In row 1-12 on Table 1 are listed the studies undertaken by national authorities or researchers working with local institutions. Most of these studies present own estimates while a few, including the MDG report (row 11), base their estimates on the works of others (mostly on UBOS

1999, 2003 and 2006). Small discrepancies in the early studies (row 1-3) appear to be a result of continuous cleaning of the raw data (Appleton 1998). However, studies conducted after the 2002/2003 survey had to take into consideration the inaccessibility of certain parts of the country due to insecurity, an issue also discussed further below.

Figure 1: Trends and targets of poverty incidence in Uganda



Source: UBOS (2006), Ministry of Finance, Planning and Economic Development (2004), UN (2007) and PovcalNet (Accessed June 2010).

In the past, World Bank estimates for Uganda were reported less regularly and prior to the update of PovcalNet in October 2008 the most recent World Bank estimate that appears to be for 1992 as reported in the World Development Report (WDR) 2000/2001 (row 16). The two earlier figures are reported for 1989 are 50 percent (row 13) and 69.3 percent (row 14-15) although the former is supposed to cover an extended period of time between 1981 and 1995. Since the late 1990's the WDR has reported side-by-side the poverty estimates generated by the World Bank and those generated by national authorities. However, for Uganda this has

happened only twice, in WDRs of 1999/2000 and 2000/2001. Moreover, the WDR of 2002 reported the national estimate for 1999/2000 but omits data for this year in the five subsequent editions of the report.

Table 1: Estimates of poverty incidence in Uganda (%)

	89/90	92/93	93/94	94/95	95/96	97	99/00	02/03	05/06
	HBS	HIS	MS-1	MS-2	MS-3	MS-4	UNHS-1	UNHS-2	UNHS-3
UBOS affiliated research									
1. Appleton (1998)		55.6	50.3	49.2	45.6				
2. Appleton (1999)		55.5	52.5	50.1	48.5	44			
3. Appleton (2003)		55.7	51.2	50.2	49.1	44.4	35.1		
4. UBOS (2003)		55.7				44.4		38.8	
5. UBOS (2003)							33.8 ¹	37.7 ¹	
6. Appleton and Ssewanyana (2003)		55.7				44.4 ¹	33.8	37.7 ¹	
7. Okidi <i>et al.</i> (2004)		55.7				45	33.8 ¹	37.7 ¹	
8. Kappel <i>et al.</i> (2005)		55.7					33.8 ¹	37.7 ¹	
9. UBOS (2005)		56.4						38.8	31.1
10. UBOS (2005)		55.7 ¹					33.8 ¹	37.7 ¹	28.9 ¹
11. MDGR (United Nations 2007)		55.7				45	33.8 ¹	37.7 ¹	31.1
12. Ssewanyana and Okidi (2007)		56.4						38.8	31.1
Mean (1-12)		55.81	51.33	49.83	47.73	44.53	34.02	38.11	31.38
Standard deviation (1-12)		0.318	1.106	0.551	1.872	0.393	0.531	0.569	0.550
World Bank publications									
13. WDR97	50.0 ^{2,3}								
14. WDR98/99	69.3 ²								
15. WDR99/00	69.3 ²	55.0							
16. WDR00/01	55.0/36.7 ²								
17. WDR02							35.2		
18. WDR03		55.0							
19. WDR04									
20. WDR05						44.0			
21. WDR06		55.0				44.0			
22. WDR07							33.8	37.7	
23. WDR08 (World Bank 2008b)							33.8	37.7	
24. World Bank (2006)		55.7						37.7	
25. Unstat.un.org (Accessed Jun 10)							33.8	37.7	
26. PovcalNET (Accessed Jun 10)	68.7 ²	70.1 ²			64.4 ²		60.5 ²	57.4 ²	51.5 ²

Notes: ¹ The source explicitly states that the estimate is based on a data sample that excludes Kitgum, Gulu, Bundibugyo, Kasese and Pader districts
² Uses international poverty line expressed in US\$ PPP
³ Period covers 1981-95

Sources: As indicated and various annual editions of the World Bank's World Development Report (WDR).

Other international sources including the Poverty and Vulnerability Assessment by World Bank (2006), the WDR of 2008 and the website of the UN Statistics Division all use the national estimates generated by UNOS. It is also clear from the table that there is some divergence in which surveys are included in the various reports. Early national studies (Appleton 1998, 1999, 2003) report incidence for the Monitoring Surveys on the 1990's while more recent studies omit these (UBOS 2005, Ssewanyana and Okidi 2007) altogether or include only MS-4 (UBOS 2003, Appleton and Ssewanyana 2003, UN 2007). PovcalNet on the other hand includes MS-3 and along with the early WDRs it is the only source also to include the HBS of 1989/1990.

This brief overview of poverty estimates from the national and international sources suggests a number of discrepancies notably in terms of level of poverty incidence and the degree of poverty reduction over the period, which leaves open the question about whether Uganda is on track to meet the MDG1/1 target.

3. Diagnosing divergence in poverty estimates

This section presents a diagnostic framework for analysing the differences between estimates of poverty. The framework is applied to explore the differences between national and international estimates of poverty in Uganda but it should be general enough to guide a comparison of any two (or more) sets of poverty estimates whether for one country over several time periods or between different countries.

3.1 A diagnostic framework

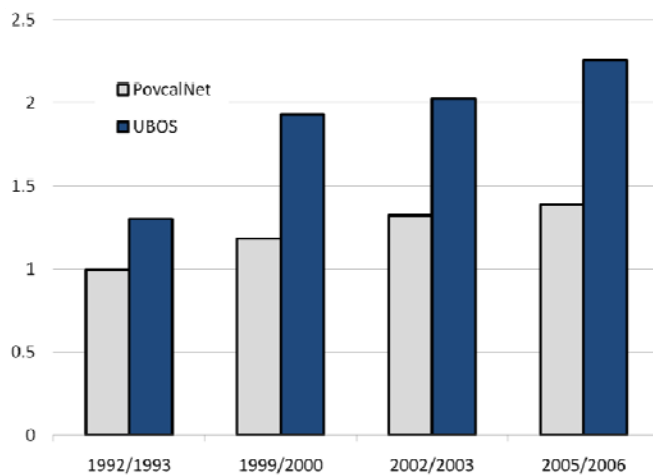
In the proposed diagnostic framework a distinction is made between “proximate” and “ultimate” causes of the divergence in poverty estimates. For understanding proximate causes it is useful to think of poverty measures as being determined by three elements: the relative inequalities in the measure of welfare, differences in the mean value of that measure, and differences in the cut-off point that separates the poor from the non-poor, again using the same measure of welfare. Any difference

between two poverty estimates for two distributions A and B can therefore be written as:

$$\Delta P = P_A - P_B = P_A(\mu_A; z_A; L_A) - P_B(\mu_B; z_B; L_B)$$

where P is the poverty measure, z is the poverty line, μ is the mean of the welfare measure and L represents the Lorenz-curve. From the online version of PovcalNet it is possible to get information about all three determinants of P and these can be compared with the micro-data that is made available by UBOS to provide proximate causes of ΔP .

Figure 2: Comparison of normalised welfare measures



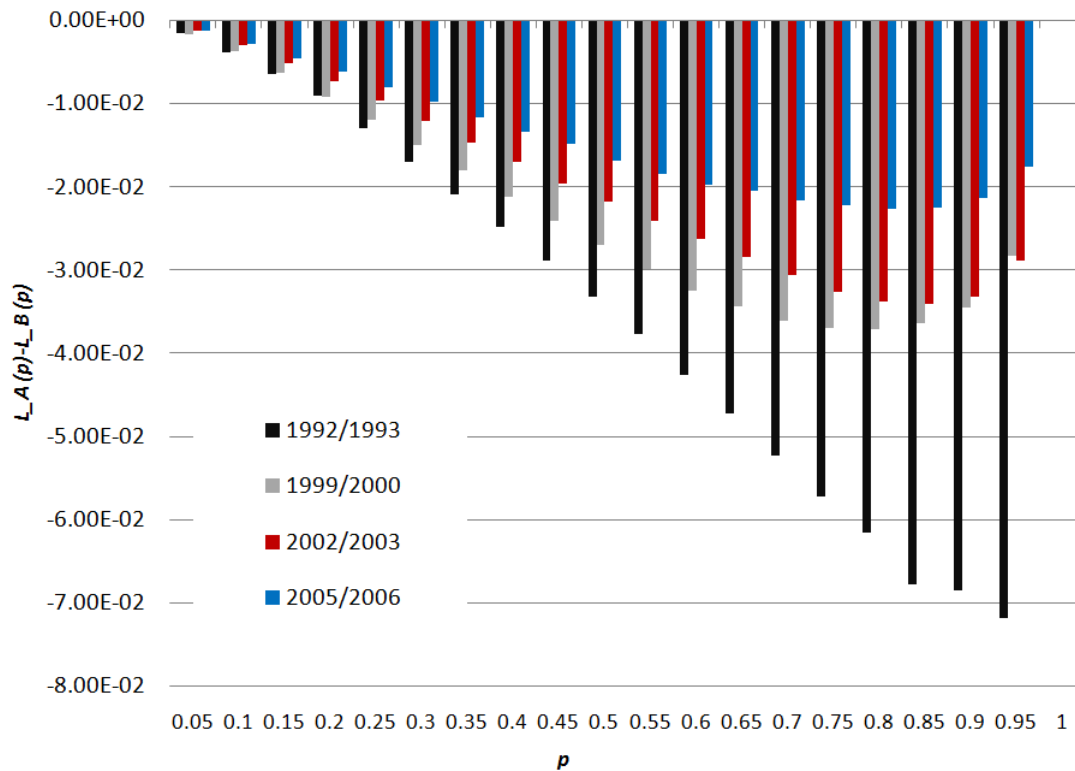
Sources: Author's calculations based on data from PovcalNet and UBOS.

Note: Welfare measures are normalised by the respective poverty lines.

Figure 2 compares the mean levels of the welfare measures (μ) used by UBOS and PovcalNet normalised by their respective poverty lines (z). There are some noteworthy results. Firstly, normalised mean levels of welfare for UBOS estimates were higher than PovcalNet throughout the period. Secondly, the difference was growing over the period: in 1992/1993 the difference between the two sets of normalised welfare measures was 31 percent rising to 63 percent in 2005/2006. Thirdly, changes were uneven over the four surveys. While the normalised welfare measure drawn from PovcalNet increased by 19 percent between 1992/1993 and 1999/2000 the corresponding increase was 48 percent in the estimates from UBOS.

However, in the next period the picture was reversed. Between the surveys in 1999/2000 and 2002/2003 the normalised welfare measure for PovcalNet increased by 12 percent, while the UBOS measure increased by 5 percent. These results point to a much faster reduction in poverty using the national data on mean welfare and the national poverty line. But this will also depend on differences in the relative inequalities.

Figure 3: Differences in cumulative shares of welfare by ranked quin-quintile (PovcalNet-UBOS)



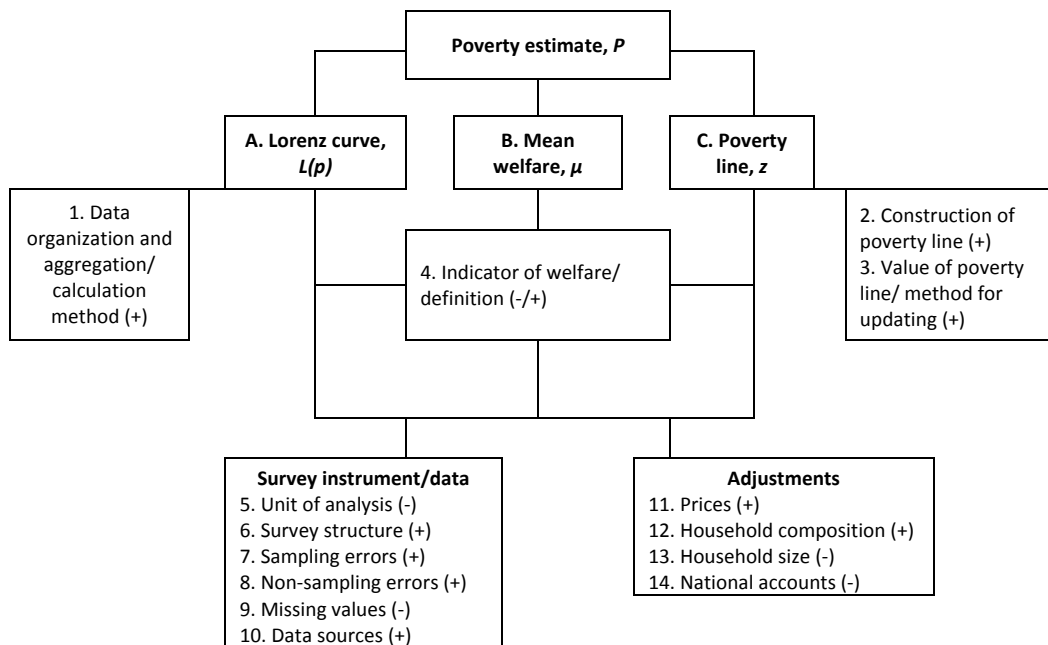
Sources: Author's calculations based on data from PovcalNet and UBOS.

Differences in relative incomes can be gauged on Figure 3, which shows the differences in the cumulative measure of welfare at quin-quintiles (5 percent) for the two distributions. These differences are all negative, indicating that the Lorenz curve for PovcalNet estimates are lower than UBOS estimates for every survey-to-survey comparison. In other words, the welfare distribution used in PovcalNet displays a greater degree of inequality (in technical terms, the UBOS estimates of inequality second order dominate the PovcalNet estimates). Whereas the

differences in mean levels of welfare seemed to have increased over time, the differences between the two sets of estimates in terms of the relative inequalities appear to have narrowed over the course of the four surveys. Clearly, this is not an indication that inequality has fallen (in fact it has increased as will be shown below), but just that the differences in inequality between the two sources of the poverty estimates have reduced.

This initial investigation into the proximate causes suggest that the differences in poverty measures are a result of differences in the mean level of welfare and/or the poverty line, as well as the relative inequalities in the distribution of welfare. With lower levels of normalised mean welfare levels and a greater degree of inequality it is not a surprise that PovcalNet generates higher estimates of poverty.

Figure 4: Causes of differences in poverty estimates



Notes: Proximate causes of divergent poverty estimates are numbered alphabetically and underlying causes are numbered numerically. An underlying cause that is likely to impact the comparison of estimates on poverty in Uganda is indicated with (+). Causes that may be important in other types of comparisons are indicated with (-).

It is possible to link these proximate causes with a total of 14 possible ultimate causes related to a range of methodological issues that affecting directly or indirectly the main elements of the poverty estimates. These ultimate causes, and

which of the proximate causes they are likely to influence, are presented on Figure 4, which will serve as a checklist for the diagnostic analysis that follows. Ultimate causes are drawn from the extensive empirical and theoretical literature on poverty measurement (e.g. Deaton 1998; Datt 1998; Ravallion 1998; Lanjouw and Ravallion 1995; Ravallion and Bidani 1994). Issues related to data organisation and disaagregation of data affect directly the estimation of the Lorenz curve (item 1 on Figure 4) as explained further below. Generally, the level of the poverty line will be directly affected by the way it is constructed and how it is updated (2-3). A series of causes are grouped as reflecting differences in the survey instruments and the underlying data (5-10), and another series of causes are grouped as reflecting differences in the way a number of possible data adjustments are being made (11-14). These are linked to the estimates of poverty either directly or indirectly through the indicator of welfare (4) as will be explained further below.

The remainder of this section discusses those potential underlying that can be ruled out early on as having an impact in the comparison of international and national poverty estimates in Uganda. The next section is devoted to those issues that are found likely, on the basis of the limited meta-data available in PovcalNet, to have an impact and the magnitude of these is assessed.

3.2 Issues that can be ruled out

A number of ultimate causes can be ruled out fairly quickly in the specific case of comparing the poverty estimates in Uganda. Both sets of estimates by the World Bank and UBOS/EPRC in Uganda are based on consumption expenditure data from household surveys conducted by UBOS over the past several decades. These surveys are listed on Table 2. Consumption expenditure is collected using recall questions on a range of common and infrequent food and non-food expenditure. It is therefore possible to rule out that the discrepancy in poverty estimates accrues from differences in the definition of welfare (item 4 in Figure 4) for instance if one source used income and another using expenditure. However, a number of issues related to the survey data and survey instrument, and adjustments made to the data, affect the estimation of the welfare measure causing the differences in the mean and

distribution of the welfare measure discussed above. This is also the main reason that “Welfare measure/definition” is placed centrally in the graphic presentation of the diagnostic framework, because it may work on its own or in combination with other causes to affect the poverty measure. In other words, while there is consistency in the broad definition of welfare, how that welfare is estimated is a different matter.

Table 2: The household surveys

Survey Round	Dates	Sample size
Household Budget Survey (HBS)	Apr. 1989 - Mar. 1990	4,595
Integrated household survey (IHS)	Mar. 1992 - Mar. 1993	9,925
Monitoring survey 1 (MS-1)	Aug. 1993 - Feb. 1994	4,925
Monitoring survey 2 (MS-2)	Jul. 1994 - Jan. 1995	4,925
Monitoring survey 3 (MS-3)	Aug. 1995 - Jun. 1996	5,515
Monitoring survey 4 (MS-4)	Mar. 1997 - Nov. 1997	6,654
Uganda National Household survey 1 (UNHS-1)	Aug. 1999 - Jul. 2000	10,696
Uganda National Household survey 2 (UNHS-2)	May. 2002 - Apr. 2003	9,711
Uganda National Household survey 3 (UNHS-3)	May. 2005 - Apr. 2006	7,417

Source: Ssewanyana and Muwonge (2004) and UBOS (2006).

The next issue that can be ruled out relates to the unit of analysis (item 5), which for both sets of estimates is the household, as household consumption expenditure forms the basis for the poverty estimates. When computing measures of poverty, UBOS and EPRC in Uganda weigh estimates by the size of the household so that the incidence of poverty is expressed as a percentage of individuals. It is not immediately clear from the PovcalNet meta-data how this is done but presumably this is done before the aggregated data on the welfare distribution and the mean incomes entered into the database by World Bank country teams. The main argument for weighting poverty measures by household size is that poor households are typically larger, so the share of poor individuals exceeds the share of poor households, and for most types of poverty analysis the interest is primarily in people as individuals. That is also why MDG1/1 refers to the share of the population below the poverty line, not the share of households.

The organisation of the data and associated methods is another factor that can be ruled out fairly quickly (item 1). This issue arises from the fact that PovcalNet relies on distributional data that is typically available only in grouped form, such as income shares of deciles of household ranked by per capita income.⁷ In the national poverty reports, estimates of poverty incidence is computed directly using unit data and the formula for the normalised FGT index (after Foster, Greer and Thorbecke, 1984), or:

$$P(z; \alpha) = \frac{\sum_{i=1}^n h_i w_i (z - y_i)_+^\alpha}{\sum_{i=1}^n h_i w_i z^\alpha}$$

where y_i is consumption expenditure for household i and $y_i \leq z$, n is the sample size and h_i and w_i are weights that account for the number of household members and the probability weight of the household that is linked to the sampling structure, respectively. The poverty aversion parameter, α , takes a value of 0 in case of the poverty headcount (H). For the poverty gap (PG) then $\alpha = 1$ and for the squared poverty gap (SPG) then $\alpha = 2$.

However, when using grouped data the approach is to use parametric specifications of the underlying Lorenz curve, from which a range of poverty and inequality measures can be calculated. Two functional forms are used to estimate the Lorenz curve in PovcalNet referred to as General Quadratic (CQ), and Beta-Lorenz curve (Datt 1998). H is then computed using the established relationship between the inverted Lorenz curve $L'(p)$ and the distribution function, which when evaluated at the poverty line is: $L'(H) = \mu/z$. Other poverty measures are given by: $PG = H - (\mu/z)L(H)$, and SPG is estimated as the integral of $[1 - (\mu/z)L'(p)]^2$ over the range of (0, H).⁸

In Table 3 the FGT poverty measures and other commonly poverty and welfare measures are computed using the Uganda household survey data for 1992/1993 and 2005/2006 using the data in grouped form and in unit data form. The grouped form

⁷ The meta-data for Uganda in PovcalNet indicates that the micro-data was available but the computations use the grouped format (<http://iresearch.worldbank.org/PovcalNet/doc/UGA.htm#3>; accessed June 2010).

⁸ See Datt (1998) for details on the estimation of these measures under the two Lorenz curve specifications.

data was generated from the household surveys and inputted into the downloadable version of the Povcal software that allows users to conduct welfare analysis using the PovcalNet methodology outlined above.⁹ Data can be entered in a variety of way, but in this case the inputs were: percentage of the population in a given class interval of incomes and the mean income of that class interval (“type 5” in the Povcal terminology).

Table 3: Poverty and inequality measures from unit and grouped data

	Fractiles	Best fit Lorenz-curve	Mean (USh)	FGT poverty measures:			Watts	Gini	MLD
				$\alpha=0$	$\alpha=1$	$\alpha=2$			
1992/1993									
Grouped data	5	Beta	23861.58	56.2	20.9	10.3	30.1	35.8	22.2
	10	Beta	23861.58	56.2	20.9	10.3	30.1	35.8	22.1
	20	Beta	23861.58	56.1	20.9	10.3	30.0	35.7	22.0
Unit data	N=9923		23862.48 (22932.71- 24792.25)	56.4 (54.2- 58.6)	20.9 (19.7- 22.1)	10.3 (9.6- 11.1)	30.0 (28.4- 32.6)	35.7 (34.2- 37.3)	21.6 (19.7- 23.4)
2005/2006									
Grouped data	5	Beta	39472.85	31.1	8.8	3.5	11.3	40.2	27.5
	10	Beta	39472.85	31.2	8.9	3.6	11.4	40.1	27.3
	20	GQ	39472.85	31.4	8.9	3.3	11.7	39.9	26.6
Unit data	N=7421		39469.73 (37743.8- 41195.65)	31.1 (29.2- 33.0)	8.8 (8.1- 9.4)	3.5 (3.2- 3.9)	11.5 (10.7- 12.3)	39.9 (38.4- 41.4)	26.4 (24.4- 28.4)

Notes: GQ = General Quadratic Lorenz-curve, Beta = Beta Lorenz-curve. MLD = Mean Log Deviation. Poverty line = USh 21135.17. Means are in 1997 prices. Figures in brackets represent 95% confidence intervals estimated on the unit data using Stata's svy command and the survey sampling structure.

Source: Author's computations based on UBOS data for the full sample surveyed.

As a test of robustness grouped data in three different fractiles were tested for quintiles, deciles and quin-quintiles and the results are presented for whichever Lorenz-curve estimate fitted the data best (generally the two fits were very close). The unit form data is run using automated routines in STATA10 that allow for specification of the survey structure and estimates of standard errors.¹⁰ From the presented results it is clear that the using grouped form data provides estimates

⁹ <http://go.worldbank.org/YMRH2NT5V0>

¹⁰ The analysis in this paper draws on the comprehensive collection of automated routines contained in the Distributive Analysis for STATA Package (DASP) by Araar and Duclos (2006).

that are quite close to the estimates from the unit data and within the margin of error at conventional levels of confidence. Actually, sampling variability appears to be more important than the organisation of the data (item 7). This should be sufficient evidence to rule out the use of grouped form data in PovcalNet as a source of divergence in poverty estimates in Uganda. This also corresponds with Datt's own tests using data on India that support the validity of the parametric approach.

The treatment of missing and zero-values (item 9) can have great influence on estimates of poverty incidence (Szekely *et al.* 2000). However, this tends to mostly affect income-based poverty measures as most households are likely to report some consumption expenditure even if they have no income, e.g. subsistence farmers. In the 2005/2006 survey UBOS thus dropped just 5 households due to missing or zero values leading to a reduction in the number of households used in the analysis from 7,426 to 7,421 (UBOS 2006: 52).¹¹ Given this small number, differences in treatment is unlikely to lead to significant differences in results.

As part of the poverty analysis stage it is customary to make a series of adjustments to the data and the poverty line. Two such common adjustments do not play a role in explaining the divergence in poverty estimates in Uganda. These relate to adjustments for economies of scale (item 13) and the use of national accounts multipliers (item 14). There is ample evidence that adjusting for economies of scale can have large impact on measures of poverty although there is little consensus especially when it comes to the size of possible scale economies. Often in empirical studies economies of scale are included as part of sensitivity and robustness tests (Lanjouw and Ravallion, 1995). Neither the national estimates of poverty nor those generated by PovcalNet include adjustments for economies of scale.

Moreover, in some countries household expenditure are adjusted using national accounts data, which is a subject of considerable methodological debate (e.g Deaton 2001). However, no such adjustments have been conducted on the Uganda data neither for the MDGR nor the PovcalNet estimates. According to Chen and Ravallion (2008) consumption estimates from national accounts data are used

¹¹ These numbers differ slightly from those in Table 2 and as shall be explored further there are also some discrepancies when it comes to the sample size figures reported in PovcalNet.

in the global estimates to fill gaps for countries with only few surveys. However, PovcalNet reports only country estimates for survey years. In other words, national accounts adjustments seem to affect regional and global estimates of poverty but not country level estimates of poverty as presented in PovcalNet. Indeed the PovcalNet metadata states that per capita survey mean at local currency used in the case of Uganda.

4. Underlying causes for divergence in poverty estimates

This section explores those issues that are likely to play a role on explaining the divergence in the national and international estimates and seeks to quantify the impact of these differences. First addressed are issues related to the value and construction of the two poverty lines, then the impact of differences in adjustments for household composition, organisation of the data and sampling issues are discussed, and finally the role of price adjustments.

4.1 The construction and value of the poverty line

Poverty lines can differ in construct in a number of ways and in turn poverty estimates can be highly sensitive to the specification of the poverty line. Given the important differences between the poverty lines used in the national and international estimates it is useful to briefly highlight the methodology underlying each.

The Ugandan poverty line

The poverty line in Uganda was developed in Appleton (1999) and has since formed the basis for analysis of income poverty of the household survey data collected by UBOS. The poverty line follows the Cost of Basic Needs (CBS) approach presented in Ravallion and Bidani (1994) and consists of a food and a non-food component. The food component was originally estimated based on the consumption patterns of the 1993/1994 MS-1. First a food basket was identified with 28 of the most frequently consumed food items by households with less than median income. These food items were then converted into their caloric equivalent and scaled to generate 3,000

calories *per adult equivalent* day using as reference the WHO estimates for an 18-30 year old male. Whilst the 3000 calorie per adult equivalent requirement seems rather high compared to that assumed in poverty lines for other countries, the per capita requirement is not so far from requirements assumed in other studies (Appleton, 1999).

The associated food poverty line is national and uniform across geographical regions. Non-food requirements are estimated as the non-food expenditure of those households whose *total expenditure* is just equal to the food poverty line. The resultant poverty line is thus what Ravallion (1998) refers to as the “lower bound” value in contrast to the “upper bound” poverty line generated through an estimate of non food expenditure of households whose *food expenditure* is equal to the food poverty line. The estimation method for non-food items allows different locations to have different non-food requirements for instance as urban dwellers often have to pay more for given accommodation than those residing in rural areas. This way the non-food component allows for regional variation unlike the food component. As a result Uganda has nine poverty lines, for urban and rural each of the four administrative regions (that is, Central, Eastern, Northern and Western), and one national poverty line (Table 4).

Table 4: Uganda poverty lines (in 1997 Uganda Shilling) per adult equivalent

Region	Total Poverty line	Food poverty line
Central rural	21322.23	15327.45
Central urban	23149.64	15327.45
Eastern rural	20651.86	15327.45
Eastern urban	22125.24	15327.45
Northern rural	20871.98	15327.45
Northern urban	21799.82	15327.45
Western rural	20308.17	15327.45
Western urban	21625.72	15327.45
National	21135.37	15327.45

Source: Author's communication with EPRC.

While the household surveys are conducted by UBOS the poverty estimates are computed by independent researchers at the Economic Policy Research Center (EPRC) following the methodology outlined above. The first poverty line was expressed in 1993 prices and has since been rebased to 1997 prices by using the national CPI to inflate the food and non-food components separately.

The International Poverty Line

For the purposes of measuring global poverty the international poverty line of the World Bank aims to apply a common standard for all countries anchored in the poverty experiences of the poorest ones. The basic idea is to make sure that two people who command the same purchasing power over commodities are classified consistently as either poor or non-poor irrespective of whether they live in same or different countries. There are two major methodological challenges involved in setting the poverty line. The first is to define a common unit of measurement that allows for comparability across countries. The second is to derive a uniform poverty threshold for distinguishing the world's poor from the non-poor. The way both of these methodological challenges are resolved have implications for the comparability of the international and national poverty lines and are thus key to begin understanding the different results in poverty levels and trends as highlighted above.

The common unit of measurement is the Purchasing Poverty Parities (PPP) as established by the International Comparison Programme (ICP) of the World Bank, a major statistical collaboration to collect prices of comparable goods in countries around the world.¹² In the most recent 2005 round of the ICP, price data

¹² The reason market-based exchange rates are not used to convert national currencies into a common unit of measurement is that these reflect demand and supply of currencies used in international transactions, and do not necessarily reflect differences in price levels especially for goods and services that are not subject to international trade. In labour surplus economies found in most developing countries such 'non-tradables' are typically relatively cheaper than in more developed countries, and thus purchasing power for developing nations will tend to be understated using market exchange rates.

was collected in 146 participating countries, including 48 in Africa (World Bank, 2008).

Uganda participated for the first time in 2005 with UBOS collecting price data for 683 items, amounting to 11,000 quotes per month, over a 12 month period (personal communication with UBOS). Price points were in both urban and rural areas but senior statisticians at UBOS confirm the “urban bias” also reported by World Bank (2008) and Chen and Ravallion (2008) as some prices, especially for non-food items, are generally more readily available in urban areas. However, the general perception is that the design and management, under the African Development Bank for the Africa-region, represents a significant improvement compared to earlier rounds of the ICP and that the PPP values in Uganda are now more reliable as they are based on “actuals” rather than a regression estimate.¹³ According to the documentation of the ICP, the 2005 round was “the most extensive and thorough effort ever to measure PPPs across economies” (World Bank, 2008:9).

The second major step in establishing the IPL is to estimate one common threshold that can be applied to country level PPPs. For this purpose Ravallion *et al.* (2008) regresses per capita expenditure on the PPP value of poverty lines for 75 countries with a lower bound determined by the conditional mean value of the poverty lines for the 15 poorest countries, of which Uganda is one.¹⁴ The international poverty line is thus estimated at US\$ 37.983 or the equivalent of US\$ 1.25/day. This figure is considerably higher than the 1993 estimate of US\$1.08/day, which adjusted for US inflation is equal to US\$ 1.45/day in 2005. However, the lowering of the international poverty line is not surprising given the general downward revision of the PPPs for the poorest countries (including Uganda) that was the outcome of the latest ICP round. The overall effect of the downward

¹³ PPPs for non-benchmark countries (65 in 2005) are imputed based on an estimate of the PPP GDP/cap values of the benchmark countries regressed on GNI/cap and the secondary gross enrolment rate, both from the World Development Indicators (see World Bank 2008:164 for details).

¹⁴ The others are: Malawi, Mali, Ethiopia, Sierra Leone, Niger, Gambia, Rwanda, Guinea-Bissau, Tanzania, Tajikistan, Mozambique, Chad, Ghana and Nepal. As only two countries are included from outside sub-Saharan Africa, the global standard for absolute poverty is very much determined by this region.

revision in the poverty line has been a significant upward revision in the global estimate of poverty from less than one billion in 2004 to 1.4 billion people in 2005.

The “dollar a day” poverty line continues to serve as one of the most referenced development indicators and among its virtues is its simplicity, applicability across countries and its anchoring in actual poverty lines of the poorest countries (Deaton 2001). However, the international poverty line also continues to be the subject of debate for its sensitivity to the revision of base year and the use of PPP conversion factors that capture the price level of a general basket of goods and not necessarily one consumed by the poor (Reddy and Pogge 2005; Deaton 2001).

Comparing poverty lines

Given these inherent differences in the two sets of poverty lines it is useful to compare the implicit value of the two poverty lines for the two base years used in Uganda. In order to achieve comparison there is a need to adjust for price changes and the construction of the poverty lines (items 2 and 3 in Figure 4).

The procedure is to first convert the international poverty line of US\$1.25/day per capita estimated at the ICP base year ($Z_{us\$,icp\ base\ year}$) into local currency using the PPP exchange rate ($PPP_{us\$,icp\ base\ year}$) for that year as provided by ICP (World Bank 2008). Then the local currency units (Ush) that are equivalent to the IPL at each survey year, t , can be obtained by deflating using the consumer price index (π), or:

$$Z_{ush,t} = Z_{us\$,icp\ base\ year} * PPP_{us\$,icp\ base\ year} * \left[\frac{\pi_t}{\pi_{icp\ base\ year}} \right]$$

Table 5 contains the computations of this for the years 2005, 1997 and 1993. It is possible to compare directly the level of the World Bank poverty line with the national poverty lines for 1993 and 1997, the two years for which the Ugandan poverty has been computed. The international poverty line in US\$ PPP is converted into Ugandan Shilling and then the national poverty line in local currency is converted into US\$ PPP using the same approach. It is clear that the Ugandan poverty line equivalent is slightly higher but quite close to 1.25 in USD/PPP; Ush

21,091 compared to the 21,135 national poverty line. However, it is also clear that using that when using 1993 as a baseline the national poverty line translates into a higher poverty line in PPP values. The sensitivity to the choice of base year has been discussed extensively in the context of the PPPs and the international poverty line, and is a particular source of complication when comparing across countries or when using different PPP estimates (Reddy and Pogge 2005; Deaton 2001). The divergence in poverty lines in Uganda between 1997 and 1993 when converted using the 2005 value is an indication that the World Bank and UBOS are using different CPI estimates for the adjustments at least prior to 1997. However, with 1997 as the base-year, differences are minor.

Table 5: Comparing the real values of the poverty lines

	Z_{us,icp\ base\ year}$	PPP_{us,icp\ base\ year}$	$\left[\frac{\pi_t}{\pi_{icp\ base\ year}} \right]$		$Z_{ush,t}$	
					Day	Month
Conversion from US\$ PPP to local currency						
2005	1.25	745	1.000		931	28,310
1997	1.25	745	0.745		694	21,091
1993	1.25	745	0.545		508	15,429
Conversion from local currency to US\$ PPP						
1997	1.25	745	0.745		695	21,135
1993	1.33	745	0.545		541	16,443

Sources: Authors calculations based on data from PovcalNet, Appleton (1999) and EPRC.

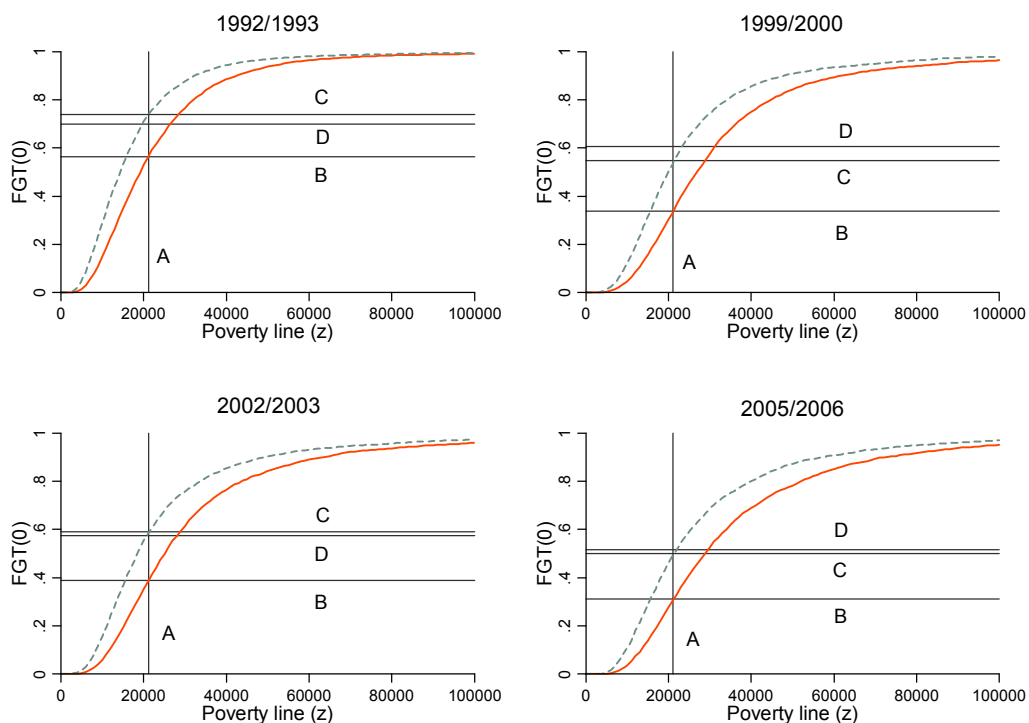
4.2 Adjusting for household composition

As noted above the common unit of analysis underlying both sets of poverty estimates is household consumption expenditure. However, the two approaches differ when it comes to adjusting for the composition of the household. In PovcalNet household expenditure is divided by the number of household members so that expenditure is expressed in per capita terms. UBOS uses a measure of adult equivalents instead that weighs differently household members according to their age. Full details of these weights are given in Appleton (1999) but the main feature is that all persons under 18 are weighted less than one, (e.g. those less than 1 years

old are weighted 0.273 and those aged 16-18 are weighted 0.95) and everyone above 18 are weighted 1. The basic reasoning is that the consumption threshold of a child is lower than of an adult e.g. as minimum required nutritional intake is lower. This way among households of equal size and per capita expenditure those households with the most and the youngest children will have a higher adult equivalent income.

The impact of adjusting for adult equivalents is important for the poverty estimates as is illustrated on Figure 5. The figure displays FGT-curves for $\alpha = 0$, or cumulative density functions at different values of the poverty line, for the four surveys, and for two measures of welfare; per capita consumption expenditure (dashed curve) and adult equivalent consumption expenditure (solid curve) all in 1997 prices.

Figure 5: FGT curves (1997 prices)



Source: Author's computations based on UBOS data.

Notes: Dashed curve represents household consumption expenditure per capita. Solid curve represents household expenditure adjusted for adult equivalents. A is the poverty line of USh 21135, B is the level of poverty when using adult equivalents, C is the level of poverty when using the per capita welfare measure and D is the level of poverty from PovcalNet.

Results from the four surveys are presented in panels where line A marks the official poverty line of 21,135 Ush/month in 1997 prices. In 2005/2006 this point represents the 31.1 percent poverty estimate indicated by line B. Line C indicated the level of poverty that is generated by using the welfare measure adjusted to reflect per capita expenditure. Again for 2005/2006 the estimate is 49.9 percent, which is very close to the PovcalNet estimate of 51.5 percent as indicated by line D. For all years the Line C is above Line B, indicating that for a fixed poverty line the household expenditure per capita will generate a higher poverty estimate than expenditure per adult equivalent (in technical terms there is first order stochastic dominance). The proximity of Line C to Line suggests that a key explanation for the difference between the national and international poverty estimates lies in the different ways that household composition is accounted for.

4.3 Data sources and sampling

While UBOS has sought to maintain comparability between the surveys over time, invariably changes do occur and such changes need to be separated from actual changes in economic and social welfare. These types of non-sampling errors (item 8 in Figure 4) include: differences in the timing and duration of the surveys, the coverage of the sampling frame, design of the survey instrument, geographical coverage and panel elements (UBOS 2006).¹⁵ One specific challenge relate to the representativeness of the household surveys. The sample design has broadly remained the same since 1992/93 using a two-stage stratification design. However, the sampling frame was changed after the 2002 Census. With given rapid population growth in Uganda some concern has been raised over the comparability of the sampling frames. Also, implementation of the 1999/2000 survey suffered from funding problems, which forced the sample size to be cut in the middle of the

¹⁵ UBOS uses the “recall method” to capture expenditure of households as compared to the diary method used in some countries. In the IHS of 1992/1993 the consumption module was open-ended unlike the other surveys where potential items are listed and read by the enumerators, which is also the reason why the MS-1 survey was used instead as a basis for the food basket used in the poverty line. The recall period varies according to the type of good with some changes between surveys. The consumption sub-module has also been modified over time to include “new” areas of consumption such as mobile phones and to capture the same item in its different forms.

survey. To compensate for the change UBOS adjusted the sample weights and is confident that the weighted 1999/2000 survey adequately represents the population (World Bank 2006).

Moreover, with a high degree of insecurity in some parts of the country, not all surveys have been able to cover the entire country. This remains a challenge for understanding changes in poverty trends and typically poverty measures over time will seek comparability by exclude the results from a number of districts (Gupta 2004; UBOS 2006). While UNHS-1 had excluded the districts of Bundibugyo, Gulu, Kasese and Kitgum, UNHS-2 excluded certain parts of Gulu and Kitgum along with Pader, a new district previously part of Kitgum. The estimates in Table 6 labelled “Fixed sample” are run only using districts that were included in all the surveys. When the 2002/2003 UNHS-2 estimates are revised to exclude these districts from the sample the incidence of poverty is revised down slightly from 38.8 to 37.7 percent while the revision for 2005/2006 UNHS-3 implies a lowering from 31.1 percent to 28.9 percent. The official MDG Report seems to be inconsistent in its reporting of poverty incidence data using “Fixed sample” estimates for the 1992/1993 IHS, UNHS-1 and UNHS-2 but not for the UNHS-3 as reflected on Figure 1.

For purposes of future MDG Reporting it would be advisable to distinguish between estimates according to which sample they are based on. When assessing long-term progress towards MDG attainment the relevant figures are from the “Full sample” 56.4 percent in 1992/1993 and 31.1 percent in 2005/2006 or a reduction of 45 percent. In other words the omission of the poorest districts in the analysis increases mean consumption per adult equivalent and lowers the proportion of the poor. However, it is not clear from the meta-data of PovcalNet whether similar adjustments have been made and thus whether comparability between survey data from the different years has been established (item 6 in Figure 4). Nor is it clear the extent to which the sample structure is taken into account to weight the data.

In Table 6 findings are also presented for poverty estimates using just one national poverty line instead of the 8 regional ones.¹⁶ There is very little difference in the estimates of poverty, maximum 1 percentage point, and none of these differences are statistically significant. This particular aspect of the construct of the poverty line (item 2 in Figure 4) is thus of limited impact on the diverging poverty estimates. These findings are robust to the survey year selected, the choice of sample and irrespective of whether or not adjustments are household composition. This is in line with findings by Appleton (2003) for the earlier years.

Table 6: Regional and national poverty lines

	Whole sample			
	1992/93	1999/00	2002/03	2005/06
Regional poverty lines	56.4% (54.2%-58.6%)	33.8% (31.6%-36.0%)	38.8% (36.8%-40.8%)	31.1% (29.2%-33.0%)
National poverty Line	57.4% (55.2%-59.6%)	34.8% (32.6%-37.0%)	39.6% (37.5%-41.6%)	31.5% (29.5%-33.5%)
	Fixed sample			
	1992/93	1999/00	2002/03	2005/06
Regional poverty lines	55.7% (53.4%-58.0%)	33.8% (31.6%-36.0%)	37.7% (35.6%-39.7%)	28.9% (26.9%-30.8%)
National poverty line	56.6% (54.3%-58.9%)	34.8% (32.6%-37.0%)	38.5% (36.4%-40.6%)	29.3% (27.2%-31.3%)

Notes: "Whole sample" includes all districts covered in the survey that year whereas "Fixed sample" only includes districts that were covered in all the surveys, i.e. excluding Bundibugyo, Gulu, Kasese, Kitgum and Pader.

Source: Author's computations based on UBOS data.

4.4 The role of price adjustments

The final set of issues that will be explored in this paper relates to the role of prices in estimating poverty incidence (item 11 in Figure 4). As explained above the measure used by World Bank and PovcalNet adjusts the international poverty line by the PPP conversion factor, which is deflated using consumer price indices. The measure of household consumption is converted using the real PPP values. In

¹⁶ For purpose of calculations in this paper the difference is that under the regional poverty line estimates the household consumption expenditure is normalised using the ratio of the regional poverty line to the national poverty line. For the national poverty line estimates, the welfare variable was not normalised. The same national poverty line of Ush 21135 was used in both cases. The values of the regional poverty lines are listed in Table 4.

Uganda the adjustment process is a bit more elaborate. Two sets of adjustments are made. The first is infrequent and, as mentioned earlier, is to rebase the poverty line using the national CPI to deflate the food and non-food components separately.

The second set of adjustments takes place after every new survey. Three conversions are made to express the consumption aggregate in constant prices:

1) Revaluation of home food consumption into market prices using the median unit values from the household consumption data. This is done separately for the four administrative regions sub-stratified into rural and urban, making 8 sub-regions.

2) Spatial price variations, which are found to be significant both within and across regions, are accounted for by using price ratios according to the same 8 sub-regions to the national weights of the CPI.

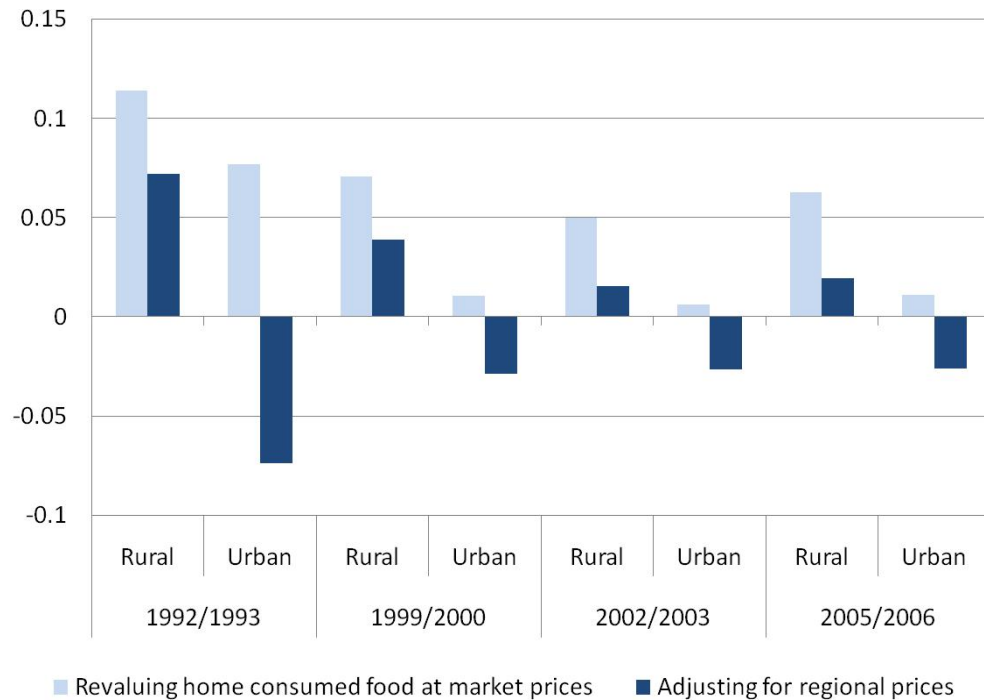
3) Inter-temporal price variations are accounted for by adjusting the consumption aggregate for inflation using the average all-item CPI for the survey period but without taking into account the particular month a household was interviewed.¹⁷

In the application of 3), World Bank/PovcalNet and UBOS share the approach although it is a problematic one that neglects possible differences in the changes in prices according to regions and zones. As shown by Appleton and Ssewanyana (2003) these differences can be significant and have a distinct pattern of faster increases in prices in urban areas. In this situation using CPI to update the poverty line and the consumption aggregate will underestimate the purchasing power of the rural areas, where most of the poor live. In turn, this will tend to exaggerate poverty levels. This is well-acknowledged but UBOS chooses to use the CPI adjustments because of its more regular production rather than use less-frequent survey based information. For PovcalNet/World Bank it is also a matter of convenience and standardisation given data availability. Since UBOS and PovcalNet use a similar

¹⁷ Consumption expenditure is deflated differently according to the recall period: 7-day and 30-day recall items are deflated using the average of CPI in the current and previous months for all the survey period and taking the average; whereas 365-day recall items are deflated using the average CPI for the survey period and the equivalent of survey period before the survey (Ssewanyana and Muwonge, 2004).

approach in accounting for inter-temporal price changes it is less likely that this is a source of diverging poverty estimates. Obviously this is dependent on the use of comparable CPI numbers, which has not been possible to verify for either of the two sources, although the discussion above suggested that this might be a problem at before 1997.

Figure 6: Adjustments to household consumption expenditure



Sources: UBOS (2003, 2006); Appleton (1999).

The two first adjustments are also potential sources of divergence in as much as one or both are not taken into account in the PovcalNet data. Both types of adjustments tend to have a positive impact on household expenditure in rural areas. The combined upward adjustment for rural areas is around 10 percent where it is typically negative for urban households as depicted on Figure 6. The effects of leaving out these adjustments would be to lower the absolute and relative level of rural household incomes and raise the overall level of poverty. However, given the lack of detailed information on the consumption aggregate it is not possible at this stage to determine with certainty whether differences in the price adjustments can further explain the unexplained elements of the diverging poverty

estimates. However, given the mismatch in values between the per capita means of household consumption reported in PovcalNet and those reported by UBOS these are likely factors.

4.5 Summary of effects of underlying causes

In Table 7 all the likely underlying causes of divergence in the poverty estimates are summarised. The starting point in (line a) are the estimates from the MDG Report followed by the changes in that estimate that is attributable to each of the adjustments discussed above (lines b-f). Finally, all these adjustments are combined to produce poverty new estimates with (line g) and without the sampling weights (line h). The net result from this ‘peeling off’ from the national poverty estimates a series of standard and highly relevant adjustments is quite dramatic and makes the new estimates move quite close to those of PovcalNet. From the outset the national estimates were anywhere from 56 percent to 80 percent of the international ones. However, the adjustments made bring the two sets of estimates into a 5-6 percent difference. It is particularly interesting to note that between line g and h, i.e. through the un-weighting of the estimates, the increase in poverty between 1999/2000 and 2002/2003 disappears, just as it does in the estimates from PovcalNet.

Table 7: Difference in poverty estimates

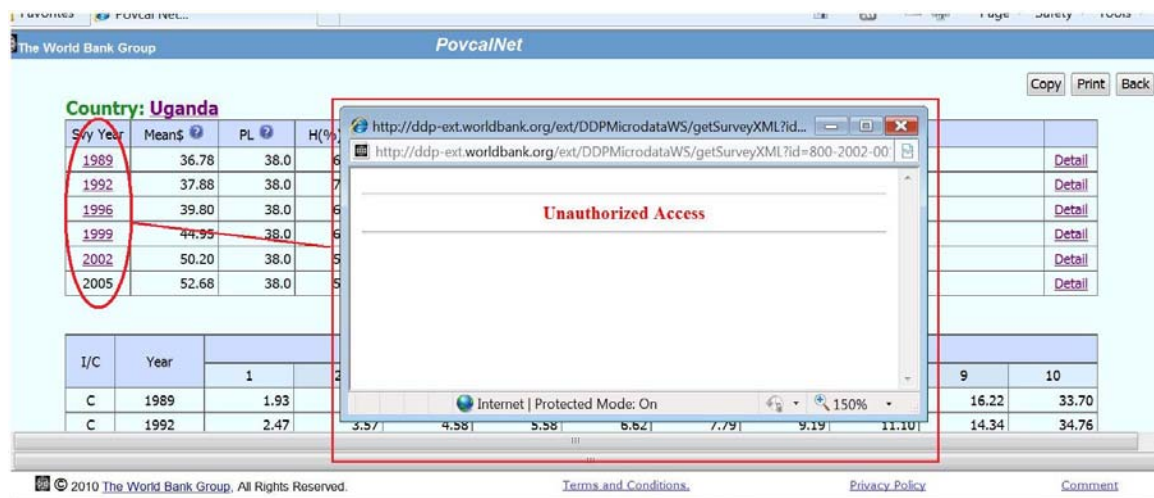
	1992/1993	1999/2000	2002/2003	2005/2006
a. MDGR/UBOS estimates	0.557	0.338	0.388	0.311
b. Full sample	0.564	0.338	0.388	0.311
c. National poverty line	0.574	0.348	0.396	0.315
d. Lower value of poverty line	0.563	0.337	0.386	0.309
e. Per capita	0.739	0.547	0.589	0.499
f. Price adjustments	0.658	0.405	0.424	0.352
g. All adjustments (b-f)	0.801	0.607	0.620	0.541
h. All adjustments + un-weighted	0.741	0.578	0.548	0.539
i. PovcalNet	0.700	0.605	0.574	0.515
j. Difference before adjustments (a/i)	80%	56%	68%	60%
k. Difference after adjustments (h/i)	106%	95%	96%	105%

Source: Author’s computations based on UBOS data.

4.5 Meta-data: issues in access and quality

A final word before concluding needs to be said about the meta-data for the two sources since limitations, especially in the data sources in PovcalNet, has complicated this exercise and made the investigation into the underlying causes quite speculative. On the side of UBOS the meta-data is quite strong, and this is probably facilitated by the implementation of the Uganda National Data Archive (UNDA), which provides a catalog of surveys, their meta-data and the data itself on a web-based platform. A total of 10 Censuses and surveys are currently covered including the four UNHS used in this paper. Information on the computation of the poverty line, and the different adjustments made to the welfare variable, is partially available in research papers and reports from UBOS and EPRC but could in the future be added to the UNDA or another depository in UBOS to increase transparency.

Figure 7: Access to survey information in PovcalNet



Source: PovcalNet online version accessed June 2010..

The meta-data from PovcalNet is less complete. According to PovcalNet the household survey data comes from “World Bank country teams”, and the meta-data section on MDG1/1 from the UN Statistics Division reads: “Only nationally representative surveys that are of good quality, contain sufficient information to produce a comprehensive consumption or income aggregate, and allow for the

construction of a correctly weighted distribution of per capita consumption or income are used.”¹⁸ Under meta-data section the issue of missing values is referred to only in relation to yearly observations of the poverty indicator, which “is calculated only in years and for countries for which suitable survey data are available.”

It is unclear which criteria the World Bank and the UN Statistics Division has established to determine whether a survey is “of good quality” and why it is the “World Bank country team” and *not* the National Statistics Office directly that supplies the data (item 10 in Figure 4). In the information that accompanies country computations in PovcalNet¹⁹ UBOS is listed under “Survey Conductor” and “Data Access”. In this context it is a bit puzzling that the World Bank has decided to include the HBS from 1989 in PovcalNet, and have thus found it to be of “good quality”, when this survey is no longer used by UBOS and researchers for its lack of comparability with other surveys.²⁰ The meta-data section of PovcalNet holds additional pieces of information that creates uncertainty about what is included in the data base. For instance the sampling size of MS-2 and MS-3 is stated as 5,000 even as UBOS/EPRC report sampling sizes of 4,925 and 5,515 respectively (Ssewanyana and Muwonge, 2004). PovcalNet also refers to a National Integrated Household Survey of 1996 with a sample of 29,745 but according to UBOS the only household survey conducted in 1996 was MS-3 with a sample size of 6,654. As depicted on Figure 7, users of PovcalNet are not authorised to access the specific information regarding the surveys, which is problematic in terms of transparency. Moreover: the section in the meta-data file on the CPI used for adjustment is missing; information about the sample design is limited and not up to date; the section 6 on “Documentation” is blank, and; under the subsection on “Details of consumption and/ income aggregates” the information is noted as “N.A.” As

¹⁸ <http://mdgs.un.org/unsd/mdg/Metadata.aspx?IndicatorId=1> (accessed June 2010).

¹⁹ <http://iresearch.worldbank.org/PovcalNet/doc/UGA.htm#3> (accessed June 2010).

²⁰ Appleton (1999) points to overestimation of consumption in the HBS and attributes this to sampling issues as mean household size was a full one person higher in the HBS than in the census in 1991 and in the subsequent household surveys.

mentioned above it has also not been possible to find information regarding the application of probability weights to the survey sample data.

5. Conclusions

This paper has explored differences in the poverty estimates from Ugandan authorities and the World Bank. These differences have been linked to proximate causes in the specification mean level of welfare and the distribution of that welfare. The underlying causes for the divergence appear to be attributable to differences in adjustments of price variability between urban and rural areas, adjustments to household composition and the probability weights associated with the sampling structure. But issues related to transparency of the meta-data especially when it comes to the PovcalNet have also been raised.

Since the national poverty estimates are constructed to reflect local circumstances such as spatial price differences and the consumption patterns of the poor, as well as the country and time-specific composition of households, the measure used by UBOS and used for national MDG reporting measure is clearly favoured over the “dollar a day” measure for measuring national level poverty and for tracking progress towards national and international development goals. The adjustments made by national authorities to the Uganda data and the way that the poverty line is derived follow standard practice in poverty measurement. When assessing the overall question as to whether Uganda is on track to meet MDG1/1 the answer is thus clearly in the affirmative given the rapid downward trend in poverty trends as expressed by the national poverty line. This is also corroborated by other types of data that reflect other dimensions of welfare and methodological approaches such as those related to household assets and physical features of the households (UBOS 2006; Younger 2003).

Nevertheless, as this paper has pointed to there are a series of opportunities for strengthening the way national and international agencies measure and report poverty estimates. The key recommendations of this study are:

1. The World Bank's PovcalNet is a great innovation and a tremendous source of information on poverty in the developing world. However, the preceding analysis has highlighted the potential for strengthening the meta-data section of PovcalNet in particular so that it is clear which surveys have been included and why, what if any adjustments have been made and some notes on comparability e.g. as sampling changes over time. Better sourcing of information on the applied PPP conversion factors would also be useful. This could be achieved by completing the missing information in the already existing meta-data features of PovcalNet, granting user access to the currently restricted areas that holds information about each of the survey and/or adding new information. Insufficient documentation in secondary databases of the World Bank is not a new issue (Pyatt 2003; Székeley & Hilgert 1999) and this paper finds applies to PovcalNet as well.
2. The commitment by the World Bank to publish national and international poverty estimates side by side in its flagship publications is noteworthy but follow-through needs to be consistent as the example from Uganda clearly shows. Moreover, a real question is whether it is sufficient to just publish the numbers together or whether efforts should be made to include a clear statement of guidance for how to interpret and compare the numbers. Country-level debates can be frustrated (as has been the case in Uganda) when there is ambiguity in the numbers, and official data can lose credibility when viewed next to very different numbers from reputable institutions such as the World Bank and the United Nations.
3. In its current form PovcalNet allows users to change only the level of poverty line. Future versions might add more options for users, to test for sensitivity of results including for differences in household composition. As the availability of unit data expands this should become increasingly feasible. As this study has documented, whether or not probability weights are applied to the sample survey data influences the estimates quite profoundly and this issue needs to be addressed in PovcalNet.

Obviously none of these suggestions for improvements will address the fundamental criticisms with regards to the setting of the international poverty line, its sensitivity to choice of base year and the use of PPP conversions, which have led some to suggest that the dollar-a-day poverty measure be abandoned altogether and alternate approaches for measuring global poverty be established (Pogge and Reddy 2005; Deaton 2001). Although some divergence is unavoidable proposals for establishing new global measures of poverty will be particularly helpful if they generate estimates that do not contradict national level measures.

4. At the national level, this study has shown MDG progress reporting in Uganda should be mindful that only comparable poverty estimates are used, notably considering the differences in sampling in the 1999/2000 survey. The practice in the 2007 MDG report of inconsistent reporting should be avoided. One way would be to present the two sets of estimates for all districts (full sample) and those that are common in all the surveys (fixed sample) side by side. With the acceleration of economic and social development in northern Uganda in recent years including these districts in poverty trends and analysis is essential.
5. UBOS is considering a revision of its poverty line due to changes in consumption patterns. In the likely event that such a revision takes place it would be advisable to continue computing poverty estimates based on the original set of expenditure weights. This would facilitate comparability and given the baseline proximity to 1990 this would also facilitate MDG reporting. However, national authorities need to be mindful of issues related to welfare consistency in comparison of poverty over time should the poverty line be changed to take into account changing patterns of consumption. Two additional issues should also be considered. Firstly, the food poverty line could be allowed to vary across regions to reflect the large regional variations in diet, the cost effectiveness of different staples in providing calories, and regional differences in income levels. Such an exercise would be particularly

interesting given the insignificant differences in poverty estimates that was found in this paper between the application of the current 8 regional poverty lines (that reflect only variation in the non-food component of the poverty line) or just one national line. Secondly, an upper bound poverty line could be included whereby non-food expenditure are estimated at the level of *total food expenditure* of households around the food poverty line, in comparison with current more austere definition of using *total expenditure*. Sometimes countries report both types of poverty lines side by side as to represent different severities of poverty. Finally, Uganda is in the process of implementing an overdue collection of consumer price data in rural areas, which will be essential to better capture the heterogeneity of changes in price levels.

6. Greater transparency is needed in the procedure for computing national level poverty measures, rebasing the poverty line and adjusting consumption expenditure to fixed-price units. While much of this information is available in a series of excellent reports and papers, and through support from officials and researchers working on the household data, there is a need to systematically collect, file and make available this information.
7. For purposes of facilitating comparability of poverty estimates in the longer term, greater efforts should be made in the African region and sub-regions for coordinating the compilation of poverty statistics and for harmonising methodologies and survey cycles. This would facilitate future cross-country comparability in an area where little exists today. National statistics offices and international development partners such as the UN and the World Bank should play key roles in coordinating such an initiative.

Ultimately, even if the national and international poverty estimates serve different purposes, it should be expected that they broadly reflect similar levels and changes in welfare. As this paper has shown, this is clearly not the case in Uganda.

That should not take away from the great achievements the country has made nor the challenges it has faced along the way and the challenges that remain.

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