



United Nations
University

WIDER

World Institute for Development Economics Research

Discussion Paper No. 2003/90

Regional or National Poverty Lines?

The Case of Uganda in the 1990s

Simon Appleton*

December 2003

Abstract

Absolute poverty lines are often derived from the cost of obtaining sufficient calories. Where staples vary across regions, such poverty lines may differ depending on whether they are set using national or regional food baskets. Regional poverty lines are open to the objection that they may be contaminated by income effects. This paper explores this issue by focussing on Uganda, a country where widening spatial inequalities in the 1990s have caused concern. Conflicting results from earlier studies have suggested that the spatial pattern of poverty in Uganda is very sensitive to whether national or regional food baskets are used in setting poverty lines. We confirm this suggestion by comparing the spatial profile of poverty in 1993 using national and regional poverty lines. However, since the regions consuming the more expensive staple sources of calories are also those with higher incomes, using simple regional poverty lines is problematic. Instead, a method of setting regional poverty lines is considered that adjusts for income differentials between regions. Even with this adjustment, the use of regional food baskets implies a markedly different

Keywords: Uganda, poverty, inequality

JEL classification: I32, O15

Copyright © UNU-WIDER 2003

*School of Economics, University of Nottingham

This study has been prepared within the UNU-WIDER project on Spatial Disparities in Human Development, directed by Ravi Kanbur and Tony Venables.

UNU-WIDER gratefully acknowledges the financial contributions to the 2002-2003 research programme by the governments of Denmark (Royal Ministry of Foreign Affairs), Finland (Ministry for Foreign Affairs), Norway (Royal Ministry of Foreign Affairs), Sweden (Swedish International Development Cooperation Agency—Sida) and the United Kingdom (Department for International Development).

spatial profile of poverty in Uganda to the use of a national food basket. It is argued that a preference for regional or national poverty lines depends on how one conceives of welfare.

Acknowledgements

The author is grateful for comments from participants at the UNU-WIDER Conference on Spatial Inequality and Development in Africa, held at Oxford University during 21-22 September 2002, and from two anonymous referees. Thanks also go to the Ugandan Bureau of Statistics for access to the data. A revised version of this paper is to be published in the first 2004 issue of the *Journal of African Economies*.

The World Institute for Development Economics Research (WIDER) was established by the United Nations University (UNU) as its first research and training centre and started work in Helsinki, Finland in 1985. The Institute undertakes applied research and policy analysis on structural changes affecting the developing and transitional economies, provides a forum for the advocacy of policies leading to robust, equitable and environmentally sustainable growth, and promotes capacity strengthening and training in the field of economic and social policy-making. Work is carried out by staff researchers and visiting scholars in Helsinki and through networks of collaborating scholars and institutions around the world.

www.wider.unu.edu

publications@wider.unu.edu

UNU World Institute for Development Economics Research (UNU-WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Camera-ready typescript prepared by Lorraine Telfer-Taivainen at UNU-WIDER
Printed at UNU-WIDER, Helsinki

The views expressed in this publication are those of the author(s). Publication does not imply endorsement by the Institute or the United Nations University, nor by the programme/project sponsors, of any of the views expressed.

ISSN 1609-5774
ISBN 92-9190-566-6 (printed publication)
ISBN 92-9190-567-4 (internet publication)

1 Introduction

Monetary measures of absolute poverty in a country are commonly obtained by comparing real incomes with a single national poverty line. When such lines are not arbitrarily drawn, they are usually anchored by referring to people's calorie requirements. For example, the Cost of Basic Needs (CBN) approach to setting a poverty line first estimates the cost of meeting calorie requirements and then includes a mark-up for non-food needs (Ravallion 1998). However, if there are marked regional differences in the staple foods consumed within a country, it could be argued that these should be considered when setting poverty lines. For example, rather than costing a national food basket, it might be better to cost separate regional food baskets and hence derive regional poverty lines. This may be important empirically if the staples consumed in different regions vary substantially in the cost of the calories they provide. In such a situation, the regional poverty line for an area consuming food with a higher cost of calories may be markedly higher than a poverty line set nationally. Adopting regional rather than national poverty lines would thus change the spatial profile of poverty in a country. This could have substantial implications for policy if government expenditure in a location is partly influenced by how poor the area is estimated to be.

It is important to note at the outset that this is not an issue of appropriate price deflation. Conceptually, the issue is whether we should compare *real* income—after dealing appropriately with regional differences in prices—with a single national poverty line or with a poverty line specific to the region. Although food baskets may vary across regions due to differences in relative prices, they may also vary due to differences in tastes, income and the availability of particular foods. Nor is the issue essentially one of an absolute versus a relative concept of poverty—tying the poverty line(s) to calorie requirements means that our concern is essentially with absolute poverty whether we adopt national or regional poverty lines.

The presence of regional differences in food baskets could be viewed as irrelevant when making simple comparisons of real income. One could simply compare distributions of income without reference to a poverty line *per se*, for example, by plotting generalized Lorenz curves. However, it is nonetheless relevant when introducing the concept of a poverty line or lines. A specific focus on poverty, rather than generalized comparisons of income, is common because of the high priority currently assigned to poverty reduction in economic policy-making in developing countries. Poverty reduction is explicitly the overarching goal of many development agencies such as the World Bank and the UK's Department for International Development. Some reform-minded African countries have a similar preoccupation. The government of Uganda's Poverty Eradication Action Plan of 1997 is an early example of this and can be regarded as a forerunner of the Poverty Reduction Strategy Papers subsequently required from all recipients of World Bank aid

(Mackinnon and Reinikka 2002). Given such an emphasis on poverty reduction, it is important to consider carefully how progress is to be measured.

More fundamentally, regional differences in food baskets become an issue when we cease to focus on income as the sole and final measure of welfare, but rather view it instrumentally as a major factor influencing the attainment of basic needs such as, but not exclusively, nutritional ones. The limitations of income as a final measure of welfare are readily apparent and have long been recognised, notably by Sen (1985) and in recent work asserting the multidimensionality of poverty (e.g. see World Bank 2001). Measures of income-poverty do provide useful summary information about exposure to various deprivations. However, it is important to consider how income maps into the fulfilment of specific needs. Regional differences in food baskets may be one important factor that affects the mapping from income to needs. Implicitly, advocates of regional poverty lines argue that simple comparisons of real income may be inadequate. They would claim that individuals in areas where the staple is an expensive source of calories need higher real incomes in order to meet their nutritional requirements and so may be worse off than individuals in other areas with the same income.

In this paper, we explore this issue by taking the example of Uganda in the 1990s. Uganda is a relevant case because there are large regional variations in diet within the country, with no less than six major food staples being eaten. Costing a national food basket based on the mean consumption of the poor can be questioned, given that no poor Ugandan is likely to regularly consume all six staples. This might matter little if the various alternative staples were equally cost-effective means of obtaining calories. However, in practice, one of the most popular but also most localized staples—matooke (plantain or green bananas)—is a rather expensive source of calories compared to others such as maize. Furthermore, matooke is consumed mainly in higher income regions of central and western Uganda, and not at all in the lowest income region, the north. The importance of this is suggested by a comparison between the conventional poverty estimates for Uganda, based on a national food basket and the work using regional poverty lines by Jamal (1998). Allowing for regional variation in the staples consumed, Jamal obtained results for 1989/90 that directly contradicted the spatial pattern of poverty incidence conventionally found using a national poverty line. Using regional poverty lines, Jamal found no difference in the incidence of rural poverty between the lowest and highest income regions, the north and the centre. In this paper, we use data from 1993/94 to investigate these claims. We devise estimate poverty lines base on regional food baskets that permit poverty estimates that are directly comparable to the ones usually cited based on a national food basket. To anticipate our results, we show that—as suggested by Jamal’s findings—the regional pattern of poverty in Uganda is extremely sensitive to whether regional versus national food baskets are used to set poverty lines.

A fundamental concern with regional poverty lines is that they may be contaminated by income differentials between regions. For example, urban households may eat more

expensive foods than rural areas simply because they have higher incomes. To allow for this when setting the poverty line seems wrong. This objection lies at the heart of Ravallion's (1998) critique of the Food Energy Intake method for drawing poverty lines and his preference for the Cost of Basic Needs method. The same point may apply when considering regional poverty lines in Uganda, since the areas eating the more expensive source of calories are also those with the higher real incomes. Simple regional poverty lines (such as those of Jamal) that may be contaminated by such income effects are unattractive for that reason. The main contribution of the present paper is to devise and illustrate a method for setting regional poverty lines so that they are not influenced by regional differences in real incomes. We term the resulting lines income-adjusted regional poverty lines. We show that in the case of Uganda, they imply a different spatial pattern of poverty to simple regional poverty lines but one that nonetheless diverges markedly from the conventional one obtained from based on a national food basket. This demonstrates that, even after appropriate income-adjustment, poverty comparisons may be very sensitive to whether regional or national poverty lines are used.

The remainder of this paper is organized as follows. Section 2 documents the regional variations in growth and poverty reduction in Uganda in the 1990s. Arguably growing spatial differences in living standards—between urban and rural areas, between the north and the centre regions—are the most pronounced and worrying inequalities to emerge in Uganda in the period. As such, they provide the motivation for the more detailed investigation of the measurement of regional differences in poverty provided in the remainder of the paper. Section 3 uses data for 1993/94 to see how the estimated spatial pattern of poverty varies if we adopt poverty lines that allow for regional variation in food baskets. Section 4 then presents a method of constructing regional absolute poverty lines that is not affected by income differentials between regions. Section 5 steps back from detailed empirical analysis to discuss the normative issues involved in choosing between national and regional poverty lines. Section 6 concludes.

2 Regional variations in growth and poverty in Uganda in the 1990s

During the 1990s, according to national accounts estimates, Uganda enjoyed economic growth rates that were among the fastest in the world. A series of six large household surveys conducted by the government corroborated this growth and showed that it was broadly shared across the income distribution, leading to substantial poverty reduction (Appleton 2001a,b).¹ However, the surveys also revealed substantial spatial inequality in both initial levels of welfare and subsequent economic growth.

¹ These surveys were designed to be nationally representative, although in some years up to four districts were excluded due to insecurity. We exclude these districts in the calculations for Table 1 and in the rest of the paper. The four districts covered 6.9 percent of the population in the 1991 census and their exclusion from the 1993/94 survey raises the poverty headcount in that period by half a percentage point.

Table 1: Consumption per adult equivalent by region, 1992-2000

| Location | Pop. | HIS 1992/93 | MS-1 1993/94 | MS-2 1994/95 | MS-3 1995/96 | MS-4 1997/98 | UNHS 1999/00 | Growth |
|---------------|---------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------------|
| | share 1992 | | | | | | | rate 1992/00 (%) |
| National | 100 | 6900 | 7281 | 7659 | 7759 | 8078 | 9731 | 4.64 |
| Rural | 87.6 | 6091 | 6327 | 6712 | 6742 | 7127 | 8108 | 3.86 |
| Urban | 12.4 | 12608 | 13885 | 14342 | 14273 | 14264 | 19986 | 6.21 |
| Central | 30.6 | 8865 | 9860 | 10983 | 10672 | 10958 | 13783 | 5.95 |
| East | 27.9 | 6115 | 6085 | 5681 | 6463 | 6739 | 8356 | 4.21 |
| West | 24.2 | 6449 | 6527 | 6839 | 7371 | 7369 | 9355 | 5.02 |
| North | 17.3 | 5317 | 5403 | 5677 | 5525 | 6226 | 5675 | 0.88 |
| Central rural | 22.7 | 6861 | 7635 | 8995 | 8383 | 8957 | 10065 | 5.17 |
| Central urban | 8.0 | 14564 | 16044 | 16815 | 15731 | 15874 | 22563 | 5.90 |
| East rural | 25.4 | 5866 | 5783 | 5411 | 6066 | 6336 | 7845 | 3.92 |
| East urban | 2.5 | 8633 | 9765 | 8945 | 11877 | 11455 | 13743 | 6.27 |
| West rural | 23.1 | 6223 | 6307 | 6563 | 7066 | 7097 | 8703 | 4.52 |
| West urban | 1.1 | 11299 | 11219 | 12264 | 13014 | 12589 | 19429 | 7.31 |
| North rural | 16.5 | 5195 | 5203 | 5506 | 5276 | 5988 | 5408 | 0.54 |
| North urban | 0.8 | 7677 | 8029 | 8181 | 8633 | 9406 | 10594 | 4.34 |

Notes: Consumption data are in Uganda shillings per adult equivalent per month (1989 prices). Estimates exclude the districts of Bundibugyo, Gulu, Kasese and Kitgum. Growth rates are computed as the log difference between the last and first year values, divided by the number of intervening years.

Source: author's calculations from UBOS survey data.

Table 1 reports mean household private consumption per adult equivalent in the six household surveys conducted in the 1990s.² The data is expressed in constant (1989) prices.³ There was considerable spatial variation in the levels of consumption in the start year of 1992/93. On average, consumption per adult equivalent was twice as high in urban areas as in rural areas. Within rural areas, the Central Region had the highest income followed by the Western and then Eastern Regions.⁴ Rural areas of the Northern Region averaged the lowest income, with mean income 25 percent lower than in rural areas of the Central Region. The spatial pattern of growth has tended to exacerbate pre-existing income inequalities between locations. Mean consumption per adult equivalent rose by a rate of 4.6 percent per annum between 1992 and 2000 in the country as a whole. However, the

² Adult equivalence scales were based on age-sex variations in calorific requirements computed according to WHO (1985) guidelines; see Appleton (2001a) for details. No adjustment was made for economies of scale of consumption. This is because there is no consensus on the appropriate method for adjustment and the alternative methods imply greatly differing economies of scale (Lanjouw and Ravallion 1995).

³ The Consumer Price Index (CPI) was used to adjust for inflation over time. Regional differences in food prices were adjusted using a regional food price index computed from unit values of purchases in the surveys; see Appleton (2001a) for details.

⁴ In this paper, for brevity, we sometimes refer to our welfare measure, real private consumption per adult equivalent, as simply 'income'.

corresponding growth rates were much higher in urban areas (6.2 percent) than in rural areas (3.9 percent). Within rural areas, those regions with higher initial incomes grew more rapidly. Incomes in rural areas of the Central Region grew by 5.2 percent per annum, western rural by 4.5 percent, and eastern rural by 3.9 percent. In Northern rural, incomes were almost stagnant—growing by only 0.5 percent per annum.

Table 2: Poverty headcount by region, 1992-2000

| Location | Pop. share 1992 | IHS 1992/93 | MS-1 1993/94 | MS-2 1994/95 | MS-3 1995/96 | MS-4 1997/98 | UNHS 1999/00 | Fall in |
|---------------|-----------------|-------------|--------------|--------------|--------------|--------------|--------------|---------------------|
| | | | | | | | | poverty 1992/00 (%) |
| National | 100 | 55.7 | 51.2 | 50.2 | 49.1 | 44.4 | 35.1 | 37 |
| Rural | 87.6 | 59.7 | 55.6 | 54.3 | 53.7 | 48.7 | 39.0 | 35 |
| Urban | 12.4 | 27.8 | 21.0 | 21.5 | 19.8 | 16.7 | 10.1 | 64 |
| Central | 30.6 | 45.6 | 34.5 | 30.3 | 30.4 | 27.9 | 20.1 | 56 |
| East | 27.9 | 58.8 | 57.6 | 65.3 | 58.4 | 54.3 | 37.3 | 37 |
| West | 24.2 | 53.1 | 53.9 | 50.9 | 46.3 | 42.8 | 28 | 47 |
| North | 17.3 | 72.2 | 69.3 | 63.5 | 70.2 | 59.8 | 64.8 | 10 |
| Central rural | 22.7 | 54.3 | 41.9 | 36.3 | 37.4 | 34.5 | 25.6 | 53 |
| Central urban | 8.0 | 20.8 | 13.9 | 12.6 | 14.8 | 11.8 | 7.0 | 66 |
| East rural | 25.4 | 60.6 | 59.8 | 67.1 | 60.4 | 56.8 | 39.2 | 35 |
| East urban | 2.5 | 40.4 | 31.4 | 43.4 | 31.6 | 25.2 | 17.4 | 57 |
| West rural | 23.1 | 54.3 | 55.3 | 52.1 | 47.9 | 44.0 | 29.4 | 46 |
| West urban | 1.1 | 28.9 | 24.7 | 25.6 | 16.8 | 19.7 | 5.6 | 81 |
| North rural | 16.5 | 73.0 | 70.7 | 64.9 | 72.5 | 61.8 | 66.7 | 9 |
| North urban | 0.8 | 55.2 | 51.4 | 41.8 | 41.2 | 34.0 | 30.6 | 45 |

Notes: Estimates exclude the districts of Bundibugyo, Gulu, Kasese and Kitgum. The fall in poverty is one minus the ratio of the headcount for 1992/93 to that for 1999/00.

Source: author's calculations from UBOS survey data.

These spatial differences in growth performance have led to corresponding variations in poverty reduction, when poverty is measured by a money metric standard. Table 2 reports headcount estimates for the poor by region, using poverty lines derived in Appleton (2001a) following the approach of Ravallion and Bidani (1994).⁵ We elaborate on this approach later, but for now it can simply be noted that these poverty lines roughly correspond to the dollar-a-day line commonly used when making intercountry comparisons. In 1992, using these poverty lines, 56 percent of Ugandans were classified as poor, falling to 35 percent in 1999/2000. This is a substantial fall in poverty—a proportionate reduction of over one-third—to have occurred within a period of eight years. The extent of poverty reduction varied in line with the spatial differences in growth rates. The drop in urban poverty was the most pronounced, with the headcount falling by two-

⁵ We focus on the headcount index because of its ease of interpretation; other P-alpha poverty indicators are reported in Appleton (2001a,b) and give similar results.

thirds. Poverty rates fell by over a half (53 percent) in rural areas of Central Region, by just under a half (46 percent) in rural Western Region and by over a third (35 percent) in rural areas of Eastern Region. However, the fall in poverty in rural areas of the north was very modest, at under a tenth (9 percent). Consequently, the regional differences in the average levels of income and poverty are much more acute at the end of the 1990s than they were at the start. In 1992/93, 73 percent of those in rural areas of Northern Region were classified as poor as was 54 percent of those in rural areas of Central Region. By 1999/2000, 62 percent of those in the Northern Region's rural areas are still estimated to be below the poverty line compared to just 26 percent of those in rural Central Region.

The poverty statistics presented in Table 2 have been adopted by Uganda's government for use in the policy debate. The marked and rising spatial inequalities in poverty are a cause for concern for policymakers, particularly in the context of the country's move towards fiscal decentralization to the district level. Arguments have been made within the finance ministry for increased funds for social sector services to be allocated to the north given its higher rates of poverty, defined as in Table 2. It should be noted that, following Ravallion and Bidani (1994), non-food requirements were allowed to differ by location.⁶ Consequently, in this paper we are not, strictly speaking, contrasting a single national poverty line with regional poverty lines. However, the key distinction from the point of view of this paper is between poverty line(s) set based on a single food basket and those based on region-specific food baskets. In this respect, Table 2 represents results obtained by estimating the cost of sufficient calories from a single national food basket—specifically, the average food basket consumed by the poorest 50 percent of Ugandans.⁷

This approach of using a common national food basket is questionable given the differences in the type of staples eaten in Uganda. Some staples are consumed throughout the country, notably sweet potatoes, cassava and maize. However, others such as sorghum and millet, are largely confined to certain areas, often in the east and north of the country. Moreover, one of the main staple crops—matooke (otherwise known as plantain or green bananas)—cannot be grown in certain areas of the country and is consumed in only negligible amounts in those parts. These regional differences in the staples consumed are potentially important because the staples vary in the cost of the calories that they provide. For example, sorghum is a rather low-cost source of calories in Uganda whereas matooke is relatively expensive.

⁶ Ravallion and Bidani (1994) estimate non-food requirements as the non-food expenditure when total expenditure equals the food poverty line. This is done using a regression model for the foodshare that includes regional dummy variables. Different predictions are made for each region, with the result that urban areas in particular are assigned higher non-food requirements.

⁷ The poverty line is only 'essentially' national because, following Ravallion and Bidani (1994), it allows non-food requirements to vary by region. In particular, non-food requirements are taken to be the predicted non-food spending of households whose total consumption is just equal to the food poverty line. The predictions are obtained from a model of the foodshare that includes regional dummies as explanatory variables. One rationale for this procedure is that it may adjust for regional differences in non-food prices (e.g. housing), about which we have no data.

Work by Jamal (1998) suggests that using regional rather than national food baskets may substantially alter the spatial profile of poverty in Uganda. Jamal estimated poverty in Uganda in 1989/90 based on some simple assumptions about the differing composition of regional food baskets. Rural areas of Central Region, and, to a lesser extent, of Western and Eastern Regions were assumed to obtain calories from the relatively expensive source matooke, which in the north was assumed to be replaced by low-cost millet. Using such regional food baskets, Jamal calculated rural Eastern Region to be the poorest area in the country with poverty in rural Northern Region not differing appreciably from that in the remaining rural areas of the country. This ordering is very different from that observed in Table 2, where the north is consistently the poorest region. The difference in ranking does not arise because of any changes in the spatial distribution of welfare over time. Instead, it stems from the use of regional rather than national food baskets. When the 1989/90 data was analysed using a national poverty line, it generated the same welfare ranking of regions as is shown for later years in Table 2 (World Bank 1993).

3 Regional versus national poverty lines revisited; analysis of the 1993 survey

A comparison of the results of Jamal (1998) with those in Table 2 (or from World Bank 1993) suggests that the choice of regional or national poverty lines will have a major impact on estimates of the spatial pattern of poverty in Uganda.⁸ In this section, we aim to confirm this inference by presenting poverty statistics that are strictly comparable to those presented in Table 2, except that they use poverty lines based on regional rather than national food baskets. We carry out the exercise using the 1993/94 First Monitoring Survey, since this was the survey from which the national food basket used for Table 2 was derived.⁹ This work is important since most of the policy debate in Uganda has referred to the poverty statistics in Table 2 and, hence, used poverty lines based on a national food basket.

We construct regional poverty lines using a variation of the method of Ravallion and Bidani (1994) that was used by Appleton (2001a) to construct a national poverty line for Uganda. Recall that the method anchors the poverty line on the cost of obtaining sufficient calories. This approach is potentially indeterminate because there is an infinite number of

⁸ It is well known that poverty indices are often quite sensitive to small changes in the poverty line. However, what is important here is the poverty profile—specifically, its spatial pattern—is not robust to the choice of regional versus national food baskets.

⁹ The reason for using MS-1 for computing the national poverty line was that it was the only truly national survey (no districts had to be excluded because of insecurity) and because it was the first of a series of surveys that shared a virtually identical set of questions on consumption. With the earlier 1989 and 1992 surveys, there were concerns that variations in the format of the consumption questions may have led to problems of comparability (Appleton 1996).

Table 3: Composition of regional food baskets (percent of total calories) of poorest 50 percent of Ugandans

| | Eastern rural | Eastern urban | Central rural | Central urban | Western rural | Western urban | Northern rural | Northern urban | All Uganda |
|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|-------------|
| Matooke | 1.9 | 3.8 | 17 | 5.4 | 26.3 | 17.7 | 1.9 | 0.5 | 12.2 |
| Sweet potatoes | 30.2 | 18.2 | 24.5 | 17.2 | 30.7 | 29.2 | 20.3 | 19.2 | 27.1 |
| Cassava | 31.6 | 16.5 | 29.4 | 33 | 15 | 10.8 | 20 | 19.9 | 22.8 |
| Irish potatoes | 0 | 0.4 | 1 | 0.1 | 0.3 | 0.5 | 0 | 0.1 | 0.3 |
| Rice | 0.3 | 3.5 | 0.6 | 0.8 | 0 | 0 | 0.1 | 0.2 | 0.2 |
| Maize (grain/cob) | 1.4 | 1 | 0.9 | 0.8 | 0.6 | 0.3 | 1.4 | 3.3 | 1.1 |
| Maize (flour) | 8.8 | 16.1 | 5.4 | 15.9 | 4.6 | 5.1 | 4.2 | 6.7 | 6.0 |
| Bread | 0 | 0.1 | 0.1 | 0.1 | 0 | 0 | 0.1 | 0 | 0.0 |
| Millet | 8.5 | 12 | 2.3 | 0 | 2.9 | 0.8 | 6.7 | 8.4 | 5.3 |
| Sorghum | 2.6 | 7.5 | 0 | 0.1 | 3.8 | 9.4 | 14.6 | 8.2 | 5.4 |
| Beef | 0.4 | 0.8 | 0.5 | 0.5 | 1 | 0.8 | 0.6 | 1.2 | 0.6 |
| Other meat | 0.1 | 0.1 | 0.2 | 0 | 0 | 0 | 0.2 | 0.3 | 0.1 |
| Chicken | 0.1 | 0.1 | 0.1 | 0 | 0 | 0 | 0.2 | 0.2 | 0.1 |
| Fresh fish | 0.9 | 0.9 | 0.6 | 1.7 | 0.1 | 0.1 | 0.1 | 0.6 | 0.4 |
| Smoked fish | 1.3 | 2.1 | 0.8 | 2.6 | 0.2 | 0.6 | 1.4 | 2.1 | 0.9 |
| Eggs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Milk | 0.4 | 0.4 | 0.9 | 0.8 | 0.3 | 0.5 | 0.1 | 0.1 | 0.4 |
| Cooking oil/ghee | 0.6 | 1.7 | 0.9 | 1.9 | 0.3 | 0.6 | 0.8 | 3.1 | 0.6 |
| Passion fruits | 0 | 0.2 | 0 | 0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 |
| Sweet bananas | 1.3 | 0.5 | 1.7 | 0.4 | 1.9 | 1.3 | 2.1 | 0.7 | 1.7 |
| Onions | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.3 | 0.1 |
| Tomatoes | 0.2 | 0.5 | 0.3 | 0.3 | 0.1 | 0.1 | 0.1 | 0.3 | 0.1 |
| Cabbages | 0.1 | 0.2 | 0.1 | 0.1 | 0 | 0 | 0 | 0.1 | 0.1 |
| Beans (fresh) | 0 | 0.1 | 1.2 | 0.1 | 1 | 0.7 | 0.6 | 0.2 | 0.6 |
| Beans (dry) | 5 | 4.5 | 6.9 | 8.3 | 9.2 | 18.1 | 9.9 | 9.1 | 7.9 |
| Groundnuts | 1.2 | 2.6 | 1.3 | 2 | 0.9 | 1.6 | 2.5 | 1.9 | 1.4 |
| Sim-sim (sesame) | 0.9 | 1.1 | 0.2 | 0 | 0 | 0.1 | 11.7 | 9.7 | 3.0 |
| Sugar | 2.3 | 5.1 | 3.1 | 7.8 | 0.6 | 1.3 | 0.2 | 3.5 | 1.5 |

Source: Author's calculations from First Monitoring Survey 1993/94.

food baskets that could provide a given amount of calories. In deriving the results given in Table 2, Appleton (2001a) took the average food basket of the poorest 50 percent of Ugandans (ranked by real consumption per adult equivalent). Comparable regional poverty lines can be constructed using looking at the average food baskets *in each region*. To maintain the focus on the poor, we continue to confine ourselves to the poorest 50 percent Ugandans (defined nationally by their household consumption per adult equivalent) and look at how their average diet varies across regions. Since Table 1 shows that regions differ in their average living standards, this procedure will result in a larger sample of these low income Ugandans living in certain regions, such as Northern rural. However, by

confining our food baskets to those consumed by the poorest 50 percent of Ugandans nationally, we can limit, but as will be seen later not entirely eliminate, the extent to which regional differences in food baskets are driven by regional differences in income.

Table 3 shows the resulting regional food baskets. It uses the mean consumption of the poorest 50 percent of Ugandans (defined nationally) in the various regions of the country and from that estimates the share of calories provided from different foods. Six staple crops account for 80 percent of the calories consumed by the poor in Uganda.¹⁰ Sweet potatoes and cassava are consumed in substantial quantities in all regions. Maize is also eaten throughout the country, although consumption tends to be higher in urban areas. The other three staples are distinctly localized. Matooke is a major source of calories in rural areas of the Western and Central Regions, accounting for 26 percent and 17 percent of calories obtained, respectively. However, it is scarcely consumed in the Northern and the Eastern Regions. Sorghum and millet provide a fifth of all calories in rural northern areas, but only 2 percent of calories in rural central areas.

These regional variations in food baskets are potentially important because the staples differ in the cost of the calories that they provide. Table 4 shows the cost of calories from different foods, based on the median prices in the 1993 survey. Of the main Ugandan staples, sorghum is the cheapest source of calories. Matooke is the most expensive source of calories, costing 2.7 times as much per calorie as sorghum. Sweet potatoes and cassava are reasonably low-cost, only around a third more expensive than sorghum. They are followed by maize, with maize flour costing over 50 percent more than sorghum. Millet is the second most expensive staple, costing 2.2 times as much per calorie as sorghum.

We can use the information in Table 4 to derive regional food poverty lines, based on the cost of obtaining sufficient calories given the typical food basket of the poor in each region. We estimate the cost of obtaining 3,000 calories per day (our estimate of the requirements of a man working in subsistence agriculture). Table 5 reports the resulting food poverty lines—labelled *simple* regional food poverty lines—in constant prices per month (using median survey prices). These regional food poverty lines are perhaps best understood by comparing them with the national food poverty line. The lowest food poverty line is for Northern Region rural areas, being 12 percent below the national food poverty line. This reflects the absence of high cost matooke in the northern food basket and the substantial proportion of calories obtained from low-cost sorghum. The food poverty line for Eastern Region rural—the other location where matooke consumption is generally lower—is also below the national food poverty line, although the shortfall is a modest 5 percent. The food poverty lines for western areas and also for northern urban areas are all somewhat higher (3-6 percent higher) than the national food poverty line. Although the Western Region is the most dependent on matooke, the effect of this on the cost of the western food basket is somewhat offset by high consumption of sweet potatoes, a low-cost

¹⁰ Other important sources of calories are beans (for all regions) and sim-sim (sesame) in the north.

source of calories. The food poverty lines for central areas and for eastern urban areas are substantially higher (14-16 percent higher) than the national food poverty line. It is also noticeable that the food poverty lines for urban areas in the north and east are markedly higher than those for rural areas, although similar differentials do not arise in the Central and Western Regions.

Table 4: The cost of calories from alternative food sources in Uganda, 1993/94

| Food item | Price (sh/kg) | Calories/kg | Retention | Cost of calories (sh/kcal) |
|------------------|---------------|-------------|-----------|-------------------------------|
| Matooke | 67 | 770 | 0.5 | 0.174 |
| Sweet potatoes | 63 | 1020 | 0.7 | 0.088 |
| Cassava | 200 | 2557 | 0.89 | 0.088 |
| Irish potatoes | 250 | 750 | 0.85 | 0.392 |
| Rice | 700 | 3600 | 1 | 0.194 |
| Maize (grain) | 400 | 3470 | 0.9 | 0.128 |
| Maize (flour) | 350 | 3540 | 1 | 0.099 |
| Bread | 1300 | 2490 | 1 | 0.522 |
| Millet | 300 | 3231 | 0.65 | 0.143 |
| Sorghum | 200 | 3450 | 0.9 | 0.064 |
| Beef | 1100 | 2340 | 0.8 | 0.588 |
| Other meat | 1000 | 2340 | 0.75 | 0.570 |
| Chicken | 1167 | 1460 | 0.61 | 1.310 |
| Fresh fish | 467 | 1030 | 0.6 | 0.756 |
| Smoked fish | 583 | 3005 | 0.7 | 0.277 |
| Eggs | 2000 | 1490 | 0.88 | 1.525 |
| Milk | 400 | 640 | 1 | 0.625 |
| Cooking oil/ghee | 1400 | 8570 | 1 | 0.163 |
| Passion fruits | 382 | 920 | 0.75 | 0.554 |
| Sweet bananas | 50 | 1160 | 0.56 | 0.077 |
| Tomatoes | 192 | 200 | 0.95 | 1.011 |
| Cabbages | 125 | 230 | 0.78 | 0.697 |
| Beans (fresh) | 400 | 1040 | 0.75 | 0.513 |
| Beans (dry) | 350 | 3300 | 0.75 | 0.141 |
| Groundnuts | 600 | 2350 | 0.93 | 0.275 |
| Sim-sim | 222 | 5930 | 1 | 0.037 |
| Sugar | 1000 | 3750 | 1 | 0.267 |

Notes: Prices are median market prices from 1993/94 household survey

Source: Author's calculations from First Monitoring Survey 1993/94.

To see what this would imply for estimated poverty statistics, we need to obtain a total poverty line, making allowance for non-food requirements. As with the national poverty line, we estimate non-food requirements as the predicted non-food spending of a household with total consumption just sufficient to meet the cost of its calorie requirements. This

prediction is made from a simple model of the food share (Ravallion and Bidani 1994). Among the explanatory variables are controls for income and seven dummy variables for each region (the four official regions, urban and rural separately, with one location dropped as a default), so that the predictions for each region are allowed but income is held constant. Table 5 reports the regional poverty lines estimated using this method. Scaling up the food poverty lines to allow for non-food requirements does little to alter the pattern of results across regions per se. Instead, the main effect is to raise the poverty line for urban areas compared to rural areas, since urban households subsisting on the food poverty line tend to spend proportionately more on non-food items than do comparable rural ones.

Table 5: Poverty lines for Uganda 1993 estimated using three alternative methods

| | Food poverty line | | | Total poverty line | | |
|----------------|-------------------|-----------------|--------------------------|--------------------|-----------------|--------------------------|
| | National | Simple regional | Income-adjusted regional | National | Simple regional | Income-adjusted regional |
| Central rural | | 13041 | 11773 | 15947 | 18048 | 16299 |
| Central urban | | 13284 | 11481 | 17314 | 20089 | 17293 |
| Eastern rural | | 10933 | 11256 | 15446 | 14711 | 15101 |
| Eastern urban | | 13098 | 11126 | 16548 | 18940 | 15982 |
| Western rural | | 12103 | 13552 | 15189 | 15990 | 17785 |
| Western urban | | 11958 | 12569 | 16174 | 16925 | 17677 |
| Northern rural | | 10038 | 10690 | 15610 | 13626 | 14525 |
| Northern urban | | 11823 | 10776 | 16304 | 16756 | 15246 |
| National | 11463 | | | | | |

Note: 1993 shillings per month (survey median prices)

Source: Author's computations from Monitoring Survey 1993 data.

Table 6 reports estimates of P-alpha poverty indicators using a variety of poverty lines, for three values of alpha (Foster, Greer and Thorbecke 1984).¹¹ Alongside the estimates of the indicators, we give the standard errors of these estimates using the formulae of Kakwani (1993). These standard errors can be used informally to see if the differences in poverty estimated using alternative poverty lines appear relatively large.¹²

¹¹ The P-alpha class of poverty indicators is defined as $P\alpha = 1/n \sum_{i=1,n} \max[(z-c_i)/z, 0]^\alpha$ where z = the poverty line; n = population size; c_i = welfare of person i and α is a measure of inequality aversion. When $\alpha = 0$, the measure reduces to the simple headcount measure (percentage of population in poverty).

¹² Formal testing is problematic because the alternative poverty estimates are based on the same sample and thus cannot be regarded as independent.

Table 6: Poverty rates in 1993 under alternative methods of constructing the poverty line

| Location | Using a national food basket | | | Using regional food baskets lines | | | Using income-adjusted regional food baskets | | |
|---------------|------------------------------|----------------|-----------------|-----------------------------------|----------------|----------------|---------------------------------------------|----------------|-----------------|
| | P0 | P1 | P2 | P0 | P1 | P2 | P0 | P1 | P2 |
| National | 51.2 (0.74) | 16.9 (0.32) | 7.48 (0.19) | 52.7 (0.74) | 17.2 (0.32) | 7.62 (0.19) | 53.3 (0.74) | 17.9 (0.33) | 8.09 (0.19) |
| Rural | 55.6 (1.05) | 18.6 (0.46) | 8.27 (0.28) | 56.4 (1.04) | 18.7 (0.46) | 8.30 (0.27) | 58.0 (1.04) | 19.8 (0.47) | 8.97 (0.29) |
| Urban | 21.0 (0.85) | 5.5 (0.27) | 2.02 (0.13) | 26.9 (0.92) | 7.4 (0.32) | 2.90 (0.16) | 20.7 (0.84) | 5.3 (0.27) | 1.95 (0.13) |
| Central | 34.5 (1.27) | 10.4 (0.48) | 4.26 (0.26) | 43.5 (1.32) | 13.8 (0.54) | 6.00 (0.31) | 36.0 (1.28) | 10.8 (0.49) | 4.50 (0.26) |
| East | 57.6 (1.40) | 19.7 (0.65) | 9.06 (0.40) | 55.4 (1.41) | 18.2 (0.63) | 8.23 (0.38) | 55.9 (1.41) | 18.8 (0.64) | 8.58 (0.39) |
| West | 53.9 (1.48) | 17.4 (0.61) | 7.31 (0.35) | 56.8 (1.47) | 19.2 (0.64) | 8.38 (0.37) | 65.3 (1.41) | 23.5 (0.68) | 10.85 (0.42) |
| North | 69.3 (1.63) | 24.6 (0.83) | 11.57 (0.54) | 59.8 (1.73) | 19.3 (0.78) | 8.55 (0.47) | 63.4 (1.70) | 21.5 (0.80) | 9.79 (0.50) |
| Central rural | 41.9 (1.98) | 12.9 (0.78) | 5.39 (0.43) | 51.8 (2.01) | 16.8 (0.86) | 7.48 (0.50) | 44.0 (1.99) | 13.5 (0.79) | 5.73 (0.44) |
| Central urban | 13.9 (1.24) | 3.3 (0.36) | 1.10 (0.15) | 20.5 (1.44) | 5.2 (0.46) | 1.91 (0.21) | 13.9 (1.24) | 3.3 (0.36) | 1.10 (0.15) |
| East rural | 59.8 (1.94) | 20.6 (0.91) | 9.56 (0.57) | 56.7 (1.96) | 18.7 (0.89) | 8.52 (0.54) | 58.1 (1.95) | 19.7 (0.90) | 9.07 (0.55) |

| | | | | | | | | | |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| East urban | 31.4 | 8.1 | 3.00 | 38.8 | 11.5 | 4.62 | 29.9 | 7.3 | 2.66 |
| | (1.89) | (0.62) | (0.30) | (1.99) | (0.74) | (0.38) | (1.87) | (0.59) | (0.28) |
| West rural | 55.3 | 17.8 | 7.52 | 58.2 | 19.8 | 8.63 | 67.0 | 24.1 | 11.19 |
| | (2.06) | (0.87) | (0.49) | (2.05) | (0.90) | (0.53) | (1.95) | (0.96) | (0.59) |
| West urban | 24.7 | 7.4 | 2.73 | 27.1 | 8.2 | 3.17 | 29.4 | 9.0 | 3.62 |
| | (1.82) | (0.63) | (0.28) | (1.88) | (0.67) | (0.31) | (1.93) | (0.71) | (0.34) |
| North rural | 70.7 | 25.3 | 11.97 | 60.3 | 19.5 | 8.68 | 64.7 | 22.2 | 10.14 |
| | (2.22) | (1.15) | (0.75) | (2.39) | (1.08) | (0.65) | (2.33) | (1.12) | (0.70) |
| North urban | 51.4 | 15.2 | 6.33 | 53.0 | 16.2 | 6.83 | 45.6 | 12.9 | 5.22 |
| | (2.56) | (1.03) | (0.58) | (2.56) | (1.05) | (0.60) | (2.55) | (0.97) | (0.53) |

Note: Standard errors in brackets.

Source: Author's computations from Monitoring Survey 1993/94.

The estimates for the poverty headcount using a national food basket have already been presented in Table 2 and it is interesting to note that the overall level of poverty in the country as a whole is fairly robust to whether national or regional food baskets are used. However, the spatial pattern of poverty is sensitive to the issue. Using regional poverty lines rather than a national poverty line leads to a marked rise in urban poverty, with the headcount rising from 21 to 27 percent. This is largely driven by the large increase in poverty in Central Region urban areas, where the headcount rises from 14 to 21 percent. More generally, using regional poverty lines leads to a sharp increase in the estimated level of poverty in Central Region as a whole (the headcount rises from 35 to 44 percent) and a corresponding fall in poverty rates for Northern Region (headcount falling from 69 to 60 percent). These differences in results mirror the contrast observed for the earlier 1989/90 survey when comparing Jamal's (1998) estimates based on regional poverty lines with those of the World Bank (1993) using a national poverty line. The issue of regional or national poverty lines is one that has important implications for the spatial profile of poverty in Uganda.

4 Income-adjusted regional poverty lines

A key problem with regional food baskets is the extent to which they merely reflect differences in income. Are the food baskets for urban areas and for Central Region more expensive simply because people in these locations have higher incomes? Although we have limited this effect by focussing on the diets of the poorest 50 percent of all Ugandans defined nationally, even within this half of the population, the spatial pattern of income differentials observed in the full sample persists (Table 7 refers). Even among the bottom half of the population, households in urban areas have higher incomes than those in rural areas; those in Northern Region have the lowest mean incomes and those in Central Region the highest. The food baskets of lower income households in Central Region may include more expensive staples because such households, although of low income, are nonetheless better off than lower income households in other areas.

Regional poverty lines that are not influenced by regional differences in income can be constructed by modelling the consumption of particular food items as a function of income. This allows us to predict how consumption will vary across regions at a common level of income. This procedure is analogous to the method proposed by Ravallion and Bidani (1994) to estimate non-food requirements. One issue is what level of income should be used to predict regional food baskets. The national poverty line was constructed based on the food basket of lower income Ugandans, those in the bottom half of the income distribution ranked by consumption per adult equivalent. Hence we predict regional food baskets at the mean income of the poorest 50 percent of the Ugandan population. When constructing the national poverty line we identified 27 types of foods but, for simplicity, we focus on regional differences only in the consumption of the six major staples.

Table 7: Mean consumption per adult equivalent of poorest 50 percent of Ugandans, by region

| Location | Mean consumption per adult equivalent 1989 Ugandan shillings per month |
|----------------|---------------------------------------------------------------------------|
| Central rural | 4,086 |
| Central urban | 4,580 |
| Eastern rural | 3,810 |
| Eastern urban | 4,340 |
| Western rural | 3,940 |
| Western urban | 4,265 |
| Northern rural | 3,702 |
| Northern urban | 3,899 |
| National | 3,897 |

Source: Author's calculations from First Monitoring Survey, 1993

These staples provide 80 percent of calories for poorer Ugandans. We treat the remaining food items exactly the same as we did when constructing a national food poverty line and put equal amounts of them in the food baskets set for each region. By contrast, we predict consumption of each of the six main staples separately for each region, evaluating at the mean income of the poorer half of the Ugandan population. We then scale upwards the predicted quantities until they are sufficient to meet 80 percent of calorie requirements computed according to WHO guidelines. The key step in this analysis is the modelling of the quantity consumed (in kilograms), y , of each of the six major staples. We use Tobit models to allow for the high proportion of zeroes in the data and prevent negative values being predicted:

$$\begin{aligned}
 y^* &= \beta'x + \varepsilon \\
 y &= 0 && \text{if } y^* \leq 0 \\
 y &= y^* && \text{if } y^* > 0
 \end{aligned}$$

Among the explanatory variables, x , the controls for income and location are of most interest to us.¹³ We control for income using the log of household consumption per adult equivalent and its square. Location is captured by seven dummy variables, one for each region, entered urban and rural areas separately. From the Tobit models, we predict the quantity of staple consumed in each region when household income equals that of the mean of the poorer half of the Ugandan population. Since we use Tobit models, the appropriate predictions are given by the formula (Greene 2003:763):

¹³ The models also control for the log of household size, the proportion of household members in particular demographic groups and a dummy variable for a female household head.

$$E(y | x) = \Phi\left(\frac{\beta'x}{\sigma}\right)(\beta'x + \sigma\lambda)$$

and

$$\lambda = \frac{\phi(\beta'x / \sigma)}{\Phi(\beta'x / \sigma)}$$

Table 8 reports the results of this analysis, presenting the predicted share of calories obtained by the poorer half of the population from each of the six major staples. Maize is predicted to be the single largest source of calories for poorer Ugandans in most regions. Averaging over the country as a whole, it is predicted to provide around two-fifths of all calories from staple foods. Maize is more important in urban areas but markedly less important in western rural areas. In rural areas of the Western Region, matooke is the dominant staple of poorer people, providing over half of all calories from staple foods. Matooke is also important for poorer Ugandans in Central Region, but provides a smaller share of calories than cassava. Nationally, cassava is predicted to provide around a quarter of all calories obtained by poorer households from staple foods—like maize, it is of lesser importance in Western Region. Sweet potatoes are predicted to provide around 10 percent of all calories from staples nationally, with millet providing 5 percent and sorghum scarcely below 1 percent. Sorghum is important for northern rural areas, however, being predicted to account for 16 percent of calories from staples.

Table 8: Predicted composition of regional food baskets (% of total calories) of poorest 50 percent of Ugandans

| | Central rural | Central urban | Eastern rural | Eastern urban | Western rural | Western urban | Northern rural | Northern urban | All Uganda |
|----------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|-----------------------|
| Matooke | 18.8 | 12.1 | 5.9 | 4.5 | 49.8 | 31.6 | 1.8 | 1.1 | 12.2 |
| Sweet potatoes | 8.0 | 6.4 | 11.5 | 6.4 | 11.1 | 8.3 | 6.3 | 6.3 | 27.1 |
| Maize | 41.7 | 52.5 | 47.9 | 59.2 | 17.5 | 37.4 | 43.9 | 60.3 | 22.8 |
| Millet | 0.9 | 2.0 | 8.8 | 5.8 | 3.6 | 2.9 | 6.4 | 3.3 | 0.3 |
| Cassava | 30.6 | 26.9 | 21.3 | 18.5 | 14.6 | 17.3 | 26.0 | 20.5 | 0.2 |
| Sorghum | 0.0 | 0.1 | 4.6 | 5.5 | 3.4 | 2.4 | 15.6 | 8.4 | 1.1 |

Source: Author's calculations from First Monitoring Survey, 1993

In order to compute income-adjusted regional poverty lines, we take the food baskets for the poor predicted in Table 8 and use them to assess the cost of providing 80 percent of calorie requirements. These costs are then added to the cost of providing 20 percent of calorie requirements from non-staple sources, as computed for the national poverty line. The resulting food poverty lines are reported as the third method of calculating poverty lines in Table 5 presented in constant 1993 prices. Also presented are total poverty lines, where non-food requirements are estimated following the method of Ravallion and Bidani (1994) as the predicted non-food spending of households with consumption just equal to

the food poverty line. Even controlling for income, regional differences in the type of staples eaten can give rise to very different costs of obtaining sufficient calories. This can be seen by comparing the poverty lines estimated using national and income-adjusted regional food baskets. The two sets of lines are broadly similar in the case of Central and Eastern Regions. However, in Western rural, the heavy dependence on matooke—an expensive source of calories—leads to an income-adjusted food poverty line that is 18 percent higher than the national line. By contrast, in Northern rural, where sorghum provides a low-cost source of calories, the income-adjusted food poverty line is 7 percent below the national line. It should also be noted that the income-adjusted food poverty lines differ markedly from the simple regional ones. In particular, the simple method implied a noticeably higher food poverty line for Central Region—a result that disappears if we adjust for regional income differences. Controlling for income also moderates the tendency for the food poverty lines for the poorer Eastern and Northern Regions to be below the national food poverty line. However, it is noticeable that the income-adjusted method leads to a larger rise in the food poverty line for matooke-dependent rural areas of Western Region than did the simple regional poverty line.

Table 6 shows the poverty statistics for 1993 when using the income-adjusted regional food baskets. This generates somewhat higher overall national poverty statistics than either national or simple regional food baskets. However, the most marked differences are in the spatial pattern of poverty. Interestingly, urban poverty rates mirror those estimated with a national poverty line and are markedly lower than those estimated with simple regional poverty lines. This implies that urban food baskets—even of low-income Ugandans—are more expensive than rural food baskets because of income differences rather than some irreducible difference in tastes. Similarly, the increased poverty in Central Region from use of simple regional food baskets appears to be merely a product of income effects. As might be expected from the comparison of poverty lines, the use of income-adjusted regional food baskets does little to alter poverty rates estimated using a national poverty line in Central and Eastern Regions. However, there is marked change in poverty rates in Western and Northern Regions. With poverty lines derived from income-adjusted regional food baskets, the Western Region, rather than the Northern Region, emerges as the poorest in the country. The changes in poverty estimates from those with a national poverty line are dramatic. The headcount for Western rural rises from 55 percent with a national food basket to 67 percent with an income-adjusted regional food basket. The headcount for Northern rural falls from 71 percent to 65 percent. These results can be understood given the high consumption of matooke, a relatively expensive source of calories, even among low-income households in Western Region and the greater consumption of cheap sources of calories, such as sorghum, in the Northern Region.

5 Should we allow for regional variation in food baskets? Normative issues

We have shown that allowing for regional differences in food baskets leads to substantial changes in the spatial pattern of poverty in Uganda. However, the fact that using regional

food baskets does make a difference does not imply that they should be used. Which approach—regional food baskets or national food baskets—is preferred? The case for income-adjusted regional food baskets clearly dominates that for simple regional food baskets. If one household chooses to consume more expensive food, simply because it has a higher income, does not give grounds for setting a higher poverty line. In Uganda, removing this effect by computing income-adjusted regional food baskets leads to different results from those obtained using simple regional food baskets. In particular, the food baskets for urban and central areas appear to be more expensive simply because of income differences rather than irreducible differences in taste. Nonetheless, using income-adjusted regional food baskets still gave sharply different results from using a national food basket. In our estimates for 1993 using income-adjusted food baskets, poverty in the main matooke-eating region, the west, appears sharply higher than before. Indeed, the west appears slightly poorer than the north, conventionally viewed as the most deprived part of the country. Consequently, at least in Uganda, removing the contaminating effect of income differentials does not mean that using regional poverty lines give the same results as poverty estimates based on a national food basket.

Whether (income-adjusted) regional food baskets should be used when setting poverty lines is ultimately a matter of rather subtle value judgements rather than one with an uncontroversial technical solution. It depends on how one conceives welfare. Concern with regional food baskets arises from particular significance being attached to meeting food needs. This fits naturally with the common approach to thinking about poverty in terms of satisfying a variety of basic human needs. In recent years, there has been a widespread acceptance of the view that welfare is multidimensional.¹⁴ There may be disagreements over precisely what dimensions of welfare there are, and how they can be traded off against each other. But it is probably uncontroversial that, for low-income countries such as Uganda, basic food needs are an important dimension. If this is accepted, then certain areas of a country may require more income to meet their basic calorie requirements. This may be a *prima facie* case for setting a higher poverty line in those regions. Some might argue that this case is nonetheless unpersuasive, since under a multidimensional approach to poverty and welfare, it would be better to measure nutritional outcomes directly (e.g., calories consumed relative to requirements), dispensing with poverty lines and monetary measures of welfare. This conclusion does indeed seem to be shared by many advocates of multidimensional approaches to welfare and poverty. However, rejecting any interest in monetary indicators of welfare may be unnecessarily purist. It is clear that nutritional outcomes are not the only dimensions of welfare. Non-food spending affects the attainment of a variety of outcomes that can be considered intrinsically valuable, but are harder to

¹⁴ Work by Sen (1985), among others, has been influential in promoting this view. Initially, this work was one inspiration for the *Human Development Report*, which took a multidimensional view of welfare. In the 1990s, it was common to juxtapose this approach with a money metric view of welfare, sometimes (arguably mistakenly) ascribed to the rival publication, the *World Development Report*. However, the *World Development Report 2000-2001* showed the widespread acceptance of a multidimensional approach to poverty.

quantify and directly observe than nutritional ones. As a single summary measure, private incomes are likely to be better proxy for attainment in a range of dimensions of welfare than a nutritional indicator. Emphasis on meeting basic needs (or capabilities) need not preclude an interest in data on private incomes and poverty lines as providing useful, albeit imperfect and incomplete, information when making welfare comparisons.¹⁵

The case for setting poverty lines that reflect regional differences in food baskets could be put as follows, taking Uganda as an example. In western Uganda, people by custom prefer matooke, a relatively expensive source of calories. Consequently, other things (e.g., the health environment) being equal, they are likely to obtain inferior nutritional outcomes with a given amount of income than those in other parts of the country are. They are thus likely to be poorer, at least in the dimension of nutrition. They may also sacrifice attainments in other areas in order to try to meet nutritional goals. In this respect, it is interesting that the food share is estimated to be highest in the west, controlling for income (Appleton 2001a). To the extent that adequate levels of nutrition are not obtained, one might expect this to have negative causal impacts on other dimensions of welfare. These causal impacts may be direct—for example, poor nutrition may lead to poor health—or it may work more generally by poor nutrition lowering the productivity of labour. This amounts to a fairly persuasive case that regional poverty lines should reflect local food baskets, since these food baskets will affect how much income is needed to attain desirable outcomes in a variety of dimensions of welfare.

What is the case against regional food baskets? There is likely to be opposition from some economists, accustomed to thinking in terms of welfare as some single variable, utility, rather than as having multiple dimensions. Utility may be implicitly be construed as associated with some psychological state (e.g., happiness) or as preference satisfaction. Either way, no particular importance may be attached to meeting calorie requirements. The calorific anchor often used to set the poverty line could be regarded as unimportant, merely one way to resolve the problem of the heap inherent in setting a poverty line.¹⁶ From such a viewpoint, the lower calorie consumption of western Ugandans might not be seen as a cause for concern to the extent that they could have met their calorie needs by buying cheaper foods. Western Ugandans could be perceived as obtaining some benefits that offset their lower calorie attainment.¹⁷ These benefits may be viewed in psychological

¹⁵ Real private income is probably the most important factor in determining the extent to which households can meet their food needs. Consequently, it is appropriate to consider the extent to which incomes map into nutritional outcomes. The argument is that income is interestingly not something of intrinsic value (an ‘end’) but an important determinant of attaining things of value (a ‘means’).

¹⁶ The ‘problem of the heap’ refers to the philosophical conundrum of how many grains of sand constitute a heap. Generically, this is the problem of drawing a cut-off line in terms of the value of a continuous variable that distinguishes meaningful categories. Setting poverty lines is one instance of this problem, since it is problematic to say that a person living on a particular poverty line (say, a \$1 a day) is poor whereas one living just fractionally above it (say on \$1.01 a day) is not similarly disadvantaged.

¹⁷ As one referee put the argument, ‘should a region with a strong preference for champagne and caviar have a higher poverty line because of its observed price of calories is high?’.

terms—western Ugandans presumably enjoy their chosen food baskets more than a more calorific one with less matooke. Alternatively, it may be thought unnecessary to inquire into consumers’ motivation; the fact that western Ugandans have revealed a preference for their actual food baskets could be regarded as implying that their welfare is at least as high as if they had chosen a more calorie efficient one. If given a specific psychological underpinning, the argument against regional food baskets may not be compelling. It may be true that western Ugandans may enjoy their matooke-based diet more than they would the diet of similar income people in other regions. However, it is unclear that an *interpersonal* comparison could show they enjoyed their food more than people with similar incomes in other regions do. Tastes in food are likely to be strongly influenced by habits acquired in childhood and after. Someone who has acquired a taste for a specific food may prefer it. This does not mean they enjoy their food more than another person accustomed to eating a different staple enjoys that alternative food.¹⁸ Arguably, the stronger variant of the argument against using regional food baskets to set poverty lines would be based on utility conceived more generally in terms of preferences, rather than one which tries to give the concept of utility a specific psychological underpinning.

In part, therefore, the issue of regional versus national poverty lines may depend on one’s concept of welfare. Those who conceive welfare as preference (utility) may support a national poverty line, while those conceiving welfare in multidimensional terms may be inclined towards regional poverty lines (if they are interested in assessing monetary measures of welfare at all). The choice can also be illuminated by a related distinction. Specifically, the choice may be influenced by whether one is concerned with the actual *attainment* of food needs (amongst other needs) or with people’s *ability* to attain food needs. Given their matooke-based diets, people in western Uganda of a given income are less likely to actually attain their food needs, measured in terms of calorie requirements, than are people of the same income in northern Uganda. However, people in western Uganda are just as physically capable of exchanging their shillings for low-cost sources of calories as those in the north. Does one measure welfare and well being in terms of outcomes or in terms of opportunities?¹⁹ Equivalently, in Sen’s (1985) terminology, is one concerned with functionings or with capabilities? In most of the non-technical literature spawned by Sen’s work, the terms ‘functionings’ and ‘capabilities’ are used as synonymous but here we have identified one issue where the distinction between the two appears to be crucial.

¹⁸ This is quite aside from the more general problems with the nineteenth century interpretation of utility in terms of psychological states—difficulties that led to twentieth century economists interpreting it purely in terms of preferences.

¹⁹ This distinction can be related to the earlier contrast between utility-based and multidimensional concepts of welfare. The advocate of money metric or utility-based approaches to welfare could be seen as focusing on measuring opportunities, whereas a basic needs approach more naturally leads to an emphasis on outcomes in terms of actually meeting of needs.

6 Conclusions

This paper has documented the rising regional inequalities within Uganda during its period of strong growth in the 1990s. However, it has shown that the measurement of poverty rates within regions is very sensitive to whether the poverty line is set using national or regional baskets. It should be noted in passing that the sensitivity analysis was conducted at the beginning of the growth period, 1993. The subsequent divergence in growth performance across regions means that this is unlikely to provide a good guide as to the relative positions of the regions in more recent years. Even using regional poverty lines, it seems unlikely that poverty in the Central Region in 1999 would be comparable to that in the Northern Region. Nonetheless, the general methodological point remains and the quantitative comparison of poverty rates in the different areas is still likely to be very sensitive to the approach taken.

It is not clear whether this issue of regional versus national poverty lines is one peculiar to Uganda. And, if not, for how many other countries it may be an issue. For the issue to be important there must be regional differences in diet after compensating for income differentials. Such differences are likely to be commonplace; the case of China, with a rice-eating south and a wheat-eating north, is particularly salient. However, what is also required is that regional diets differ markedly in the implied cost of calories. Here, the relative inefficiency of matooke as a source of calories may be a more idiosyncratic Ugandan feature.

Showing that (income-adjusted) regional poverty lines give different results to national lines does not, of course, imply that they are to be preferred. Ultimately, the choice depends on value judgements. This paper has sought to tease out possible arguments both for and against the alternative approaches, rather than to promote one in particular. It was suggested that those who think in terms of welfare as multidimensional could be more interested in regional poverty lines, whereas those viewing welfare in terms of utility may be unsympathetic. The choice may also depend on whether one is concerned with what individuals actually *attain*, for instance in terms of nutrition, or with what they *could* attain. In Uganda, at least, areas consuming expensive sources of calories could choose to eat cheaper sources. Perhaps the main point is simply that, due to regional differences in diets, people in some areas will have inferior nutritional outcomes to those attained by people with the same income living elsewhere. Whether governments should respond to this, by setting regional poverty lines, by other means (e.g. nutritional interventions) or indeed should respond at all, is a matter for debate.

References

- Appleton, S. (1996). 'Problems of measuring changes in poverty over time: The case of Uganda 1989-1992', *Institute of Development Studies Bulletin* 27(1):43-55.
- Appleton, S. (2001a). 'Changes in poverty and inequality', in P. Collier and R. Reinnikka (eds) *Uganda's recovery: The role of farms, firms and government*, World Bank: Washington DC.
- Appleton, S. (2001b). 'Poverty in Uganda 1999/2000: Preliminary estimates from the UNHS' (mimeo), School of Economics, University of Nottingham.
- Greene, W. (2003). *Econometric Analysis*, Pearson Education: New Jersey.
- Foster, J., J. Greer and E. Thorbecke (1984). 'A class of decomposable poverty measures', *Econometrica* 52:761-6.
- Jamal, V. (1998). 'Changes in poverty patterns in Uganda, in H.B. Hansen and M. Twaddle (eds) *Developing Uganda*, James Currey: London.
- Kakwani, N. (1993). 'Statistical inference in the measurement of poverty', *Review of Economics and Statistics* 75(4):632-9.
- Lanjouw, P. and M. Ravallion (1995). 'Poverty and household size', *Economic Journal* 105(433):1415-34.
- Mackinnon, J. and R. Reinikka (2002). 'How research can assist policy: The case of Ugandan economic reforms', *World Bank Research Observer* 17:267-92.
- Ravallion, M. (1998). 'Poverty lines in theory and practice', *Living Standards Measurement Study Working Papers* 133, World Bank: Washington DC.
- Ravallion, M. and B. Bidani (1994). 'How robust is a poverty line?', *World Bank Economic Review* 8(1):75-102.
- Sen, A. (1985). *Commodities and capabilities*, Elsevier: Amsterdam.
- WHO (1985). 'Energy and protein requirements', *WHO Technical Reports* 724, WHO: Geneva.
- World Bank (1993). *Growing out of poverty*, World Bank: Washington DC.
- World Bank (2001). *World Development Report 2000/01: Attacking Poverty*, Oxford University Press: New York.