

**POVERTY, VULNERABILITY, AND CHILD LABOUR: EVIDENCE FROM
UGANDA.**

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Abstract

Notwithstanding a decade of unprecedented social and economic reforms in Uganda, poverty, vulnerability, and child labour severely undermine the government's overarching goal of poverty eradication. This thesis unfolds by disclosing unprecedented insight on the relationship between vulnerability and poverty, the merits of quantitative vis-à-vis qualitative approaches to poverty analysis, and the role of child labour in Uganda.

Chapter I generates the first ever appraisal of vulnerability in Uganda. The findings support the hypothesis that during the past decade, alongside sharp reductions in poverty, vulnerability to poverty in Uganda declined from 57% in 1992/93 to 25% in 1999/00. Such results highlight the importance for policy makers to distinguish between the effective implementation of poverty-prevention and poverty-reduction programmes.

Chapter II deepens our understanding of poverty in Uganda, by integrating the country's qualitative and quantitative data, enriching information from one approach with that from the other, and merging the findings from these two approaches into one set of policy recommendations. The results show that this dual approach to poverty analysis enriches the discussion of poverty trends by drawing attention to aspects of poverty and well-being neglected by simple construction of poverty indicators.

Since poverty of the household is an important determinant of agricultural child labour (ILO, 1992), chapter III investigates the extent to which children contribute to the

household's agricultural activities. The conclusion that children play an important role in the farming activities of Ugandan agricultural households is supported by two key findings: (i) Child labour accounts for approximately 9% of the household's annual agricultural earnings; and (ii) on the bases that most child labour is performed on the family farm and smoothly functioning labour markets are rare, land ownership increases the household's demand for child labour in agricultural activities.

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INTRODUCTION

(i) THE CONTEXT

Uganda's modern history begins in January 1986, when the National Resistance Movement (NRM) guerrillas captured power in Kampala. This NRM government inherited a society in which improvements in institutions and service delivery would inevitably take a long time. Good opportunities existed, however, to reduce poverty in the short run by ending predatory taxation of exports, stabilizing the currency, and achieving peace after a long period of conflict (Collier and Reinikka, 2001).

In May 1987, under the watchful eye of the International Monetary Fund (IMF) and the World Bank (WB), the government committed itself to tightening both budgetary and monetary policies so as to control inflation and achieve macroeconomic stability. The IMF responded by disbursing \$73 million as import support, and the World Bank released \$55 million as an Economic Recovery Credit. These concessions were shortly followed by promises of debt rescheduling and additional aid worth \$250 million.

After a decade of adjustment reforms (1987-1997), Uganda came to be known as a star pupil of the multilateral institutions and had, by most accounts, undergone an unprecedented economic transformation. In April 1998 the IMF described Uganda's economy as one of the strongest performing in Africa. This was no small accomplishment for a country whose real gross domestic product (GDP) per capita

had declined by a full 40% between 1971 and 1986, the year in which the government of Yoweri Museveni came to power.

According to the Ministry of Finance, Planning and Economic Development (MoFPED, 2004a), Uganda has been extremely fortunate to receive consistent financial support from a number of development partners over the past decade. Without this support, government would have been unable to finance half of its planned expenditure, as domestic revenues have been, and remain, insufficient to cover expenditure needs. Indeed, without this support, government probably would not have achieved the significant reduction in poverty witnessed by all since the early 1990s.

Notably, however, this support has come at a cost. The budget deficit has almost doubled, and debt burden is once again threatening to become unsustainable, in spite of the generous debt relief Uganda received under the Highly Indebted Poor Countries (HIPC) initiative. Recent experience suggests that a high fiscal deficit, funded by donor aid, is not compatible with the government's objective of poverty reduction. Aid flows into the Ugandan economy in 2003/04 amounted to over US\$1bn, and exceeded the value of Uganda's export earnings by more than US\$100m. Such large aid flows placed appreciation pressures on the exchange rate, diminishing the price incentive for export production, and reducing the international competitiveness of Ugandan products. Moreover, the current level of the exchange rate is on the verge of rendering the maize, tea and tobacco sectors unprofitable, and squeezing profits in other export sectors such as coffee and cotton by lowering the farm gate prices being paid in Shillings to farmers (MoFPED, 2004a).

These sectors are the income backbone of the rural economy. Due to the structure of the economy, affected farmers cannot switch easily to a more profitable export sector such as flowers, which would require a large initial investment, or diversify into fish when they do not live by a lake shore. Further, the farmers do not have the capital or the technology to add value instantly to their output. A fall in the profitability of their products on account of exchange rate appreciation has a direct knock-on effect on their income levels, which in turn lowers demand for locally produced goods and services, thus slowing economic growth in all sectors of the economy, not just agriculture.

Agriculture remains overwhelmingly the most important sector in this land locked country, and coffee is, by far, the most important export crop. Agriculture alone accounts for the majority of export earnings, contributes approximately 40% of GDP, and provides a livelihood to nearly 90% of Uganda's labour force. The potential consequences of increased vulnerability among farming communities could be devastating. To illustrate with an example, according to Basu and Van (1998), the phenomenon of child labour is often taken to be the product of avaricious entrepreneurs seeking cheap labour and/or selfish parents who would prefer enjoying leisure while their children work. While this common description of entrepreneurs may well be accurate, that of the parents may be mischaracterized. Thus, while not denying that child labour takes place in all societies, children working as a mass phenomenon may be a reflection not of parental selfishness, but of abject poverty and the parents' concern for the household survival.

It seems plausible to expect that parents would not send their children to work if their own wages were higher or employment opportunities better (see Anderson, 1971; and Vincent, 1981). As an illustration of the historical evidence, there are the writings of a considerable number of economic historians of 18th and 19th century England in which notice is taken of the fact that children made a considerable contribution to their own support and to household income and that child labour-force participation rates were high by contemporary standards. Nonetheless, in the late 18th and early 19th century in England, “parents were desperately unhappy about the situation their children were in but could do nothing about it Poor Relief was refused to a family if it contained children capable of work”.¹

The defining moment of Uganda’s development was in 1997 when the Poverty Eradication Action Plan (PEAP) became Uganda’s national development framework and medium term planning tool. The PEAP guides the formulation of policy and implementation of programmes through the sector-wide approach and decentralization. The ultimate objective of the PEAP remains the improvement of the quality of life of the poor, and the population as a whole. By its very nature, the PEAP is a highly dynamic plan of action, with the aim to respond as promptly and effectively as possible to the needs of the nation.

In the context of the PEAP, research has had a powerful impact on policy in Uganda, affecting the climate of opinion, improving the quality of the policy debate, and helping focus policy and intervention on poverty reduction (Mackinnon and Reinikka, 2002). Moreover, it has yielded several important findings on returns to different

¹ Basu K. & Van P. H., pg. 413, 1998

services. For instance, it has shown that returns to primary education are positive, with productivity and incomes rising 4 to 5 percentage points per year of education (Appleton, 2001c; Appleton and Balihuta, 1996; Appleton and Mackinnon, 1995; Deininger, 2003). Primary education appears to have similar proportional productive benefits in various income generating activities (e.g. farming, non-farming, and wage employment), and it creates externalities that are larger than the direct benefits (Appleton and Balihuta, 1996). Education also has a major impact on health, with parents' knowledge about the causes of diarrhea and malaria having a significant independent impact on their children's survival (Mackinnon, 1995). Finally, research has shown that agricultural extension has a positive impact on agricultural productivity, largely through increased use of fertilizer (Deininger and Okidi, 2001).

Government's commitment to poverty reduction focuses on private sector development and export-led growth. Notably, private investment and export growth require a number of supportive measures such as low and stable inflation and interest rates, a competitive exchange rate, and growth in domestic savings. These targets can only be achieved by a gradual reduction in the fiscal deficit and donor aid dependency.

Contrary to the perception that government's economic strategy is based solely on reducing its fiscal deficit (at the expense of depleting public spending and worsening social welfare), however, official data from the Ministry of Finance, Planning and Economic Development clearly shows that over the past decade, government has given higher priority to increasing public expenditure than reducing the fiscal deficit. Over the past fifteen years, government expenditure on the health and education

sectors alone as a percentage of the budget more than doubled (from less than 15% to 35%). Today, government spending on both health and education amounts to over 800Bn Shillings, with education having the largest share of any sector in the budget. Further, two of the biggest achievements in Uganda's poverty reduction strategy have been the provision of Universal Primary Education (UPE), and an extensive programme of health systems reforms to improve the sector's performance. As a direct result of these policies, between 1997 and 2002, primary school enrollment, out-patient attendances and immunization nearly doubled. Most importantly, a number of studies have shown disproportional higher increases in service utilization by the poorest segments of the population (e.g. Foster and Mijumbi, 2002; Deininger and Mpuga, 2004; Ssewanyana et al., 2006).

All the evidence above openly supports Uganda's quantitative analysis of poverty dynamics which suggests that during the 1990s income poverty fell dramatically, from over one half of the population in 1992 to nearly one third in 2000. According to the Ministry of Finance, Planning and Economic Development (MoFPED, 2004), the poverty reduction of the 1990s was achieved through a very high rate of consumption growth, and high rates of GDP growth. Between 1992 and 1997, a critical factor in consumption growth was the increased prices that producers received for their crops. Because agricultural marketing was liberalised, farmers were able to benefit from the increase in the world price of coffee. The unit export price for Ugandan coffee tripled from 0.82 US\$/kg in 1992/93 to a peak of 2.55 US\$/kg in 1994/95. Hence, the most dramatic poverty reductions were experienced by cash crop farmers.

Alongside survey based poverty assessments, qualitative analysis of poverty in Uganda has considerably extended our understanding of poverty beyond private consumption without conflicting with the evidence from the quantitative household surveys (Mackinnon and Reinikka, 2002). Income poverty, or consumption shortfall, rarely emerged as the most prominent manifestations of poverty in people's overall description of changes in their conditions. Communities structured their trend analysis around different events which stood for them as significant historical happenings, turning points or crises in their lives. Their choice of benchmarks is itself a useful insight into what matters most to them. The periods span varied from community to community, and in some cases trend analysis went back in time as long as the longest living memory, or even beyond it. While analysing the issues of vulnerability and child labour highlighted above, part motivation for this thesis is to provide insight into the debate of the relative merits of quantitative vis-à-vis qualitative approaches to poverty analysis.

(ii) THE RESEARCH ISSUES

While it has long been demonstrated (Rosenzweig and Binswanger, 1993; Banerjee and Newman, 1994) that considerations of risk and uncertainty are key to understand the dynamics leading to and perpetuating poverty, it is only recently that policy makers have taken a more active interest in trying to incorporate considerations of risk and vulnerability into their strategies to reduce poverty (Christiaensen and Subbarao, 2001). As a clear indication that vulnerability is a central preoccupation of the poor, participants of the Uganda Participatory Poverty Assessment Project (UPPAP, 2000) identified vulnerability as a primary cause of poverty. Local people

defined vulnerability as (i) the likelihood that a person or group of people who were currently breaking even would deteriorate and eventually result in the person or the group becoming poorer; (ii) a condition in which an event or situation can easily predispose one to the likelihood of becoming poorer; and (iii) inability of some members of the community to meet their basic needs exposes them to poorer living standards (UPPAP, 2000). The first goal of this thesis is to quantify the severity of vulnerability by generating the first quantitative assessment of vulnerability in Uganda, a country at the forefront of poverty analysis.

To further deepen our understanding of poverty in Uganda, this thesis' second goal is to examine the relationship between the country's rich quantitative and qualitative sources of data. Complementarities between the qualitative and the quantitative traditions in poverty analysis have been recognised, but the tensions are ever present. Analysts and policy makers are directing innovative approaches to design effective poverty reduction strategies combining these two methodologies.

Combining quantitative and participatory methods is useful to fully utilize data in an aim to achieve greater robustness. The application of either method on occasion may fail, but it is less likely that both methods would fail in a given instance. Together, the two methods will generate different types of information about a common problem thus yielding greater complementarities (Appleton and Booth, 2001). Bourguignon (in Kanbur et al., 2001) likens the value of combined methods to the advantage of seeing a mountain from two perspectives: "By considering various perspectives, one can obtain a fuller understanding of a multi-dimensional subject".

On this note, Appleton and Booth (2001) argue that participatory methods are more suited to exploratory research, while survey-based methods are more useful for establishing or refuting simple general propositions (e.g. that consumption poverty decreased over time, and/or that girls in Uganda under-perform in examinations). The latter may also be used for statistical analysis, testing models that quantify the contribution of various factors to observed outcomes. However, more in-depth methods of investigation are required to identify the cultural or institutional factors at play.

The discussion above does not suggest that there is substantial scope for directly comparing participatory and survey results, as a means of validating each other. To a quite significant extent, while in Bourguignon's (in Kanbur et al., 2001) metaphor both are looking at the same mountain, they are looking at different features using methods that are non-comparable. That said, there are certainly opportunities for mutual learning that take proper account of these differences.

On the basis that poverty at the household level has often been identified as an important factor determining child labour (ILO, 1992), the final goal of this thesis is to investigate the determinants of agricultural child labour in Uganda. Notably, more than 70% of child labour worldwide is found in the agricultural sector. Moreover, Africa has the highest child participation rate in the world, and East Africa (where child labour is mostly a rural phenomenon) has the highest incidence of child labour within the African continent (ILO, 1996, 1996a).

Grootaert and Kanbur (1995) argued that the absence of systematic data collection on the incidence of child labour has affected the amount of research done on its determinants. Most research has been based on case studies covering a sub-national area, often one or a few villages, at best a province or region. Furthermore, dearth of direct data on child labour has led many researchers to focus on the determinants of school attendance. Although school attendance cannot be considered the inverse of child labour, this literature is important because one can certainly make the argument that whatever promotes school attendance is likely to deter child labour. The literature on the determinants of school enrolment has indeed established two relevant effects:

(i) There is a substitution effect between schooling of girls and the labour force participation of mothers. When mothers go to work in the market, girls are more likely to stay home. In this sense, the opportunity cost of girls' schooling is not their forgone wages, but those of the mothers; (ii) the most important determinants of school enrolment are parents' education (especially mothers' education) and household income level. There is an income effect from mothers' earnings which will at some point establish a preference for "quality" children. What this means for child labour is that in poor households, when mothers need to enter the labour force, child labour will increase because usually girls will be pulled out of school to take over domestic work. If this does not occur then their entry into school will be delayed. As income increases, the income effect of the mother's work will outweigh the substitution effect and child labour will decrease. This process will likely be affected by a number of societal factors, viz. the level of development, the level of social expenditure, cultural factors, and the phase of demographic transition. Most case studies of child labour do indeed identify poverty of the household and low level of parental education as important factors in determining child labour (ILO, 1992).

With increasing availability of large nationally representative household surveys for low income countries, a new generation of work on child labour has emerged (see Canagarajah and Coulombe, 1997; Cockburn, 2000; Grootaert and Patrinos, 1998; Kassouf, 1998; Patrinos and Psacharopoulos, 1997; Jensen and Nielsen, 1997; Ray, 2000; Bhalotra and Heady, 2001). On the basis that the existing results are diverse corresponding to the diversity of regions and age groups studied, and to the variety of specifications used (Bhalotra, 2007), this thesis contributes to improve our understanding of the determinants of child labour in poor agricultural settings.

(iii) THE DATA

Since 1989, the Uganda Bureau of Statistics (UBoS) has endeavored to collect and update nationally representative data on a wide range of economic, social, and demographic indicators for monitoring welfare in Uganda. Without such timely, accurate, and reliable data, the PEAP could not have served as a model for Poverty Reduction Strategy Papers (PRSPs) across the world (Ssewanyana and Muwonge, 2004).

The survey programme revived in 1989 has since then conducted 9 nationally representative household surveys (see table 1), with the 1992/93 Integrated Household Survey (IHS) acting as the baseline for subsequent surveys. In addition to the Uganda National Household Survey series, government initiated two Participatory Poverty Assessments (UPPA-1, 2000; UPPA-2, 2002) to reflect its continued efforts to bring the perspectives of poor Ugandans into the formulation and implementation of

strategies for poverty reduction. While these data sources have been diverse in nature and objectives, they have played a critical role in poverty analysis and monitoring.

Table 1: Uganda National Household Survey Series: 1989-2005/06

Survey round	Period of data collection	Number of months	Sampled households
Household Budget Survey (HBS)	April 1989 – March 1990	12	4,595
Integrated Household Survey (IHS)	March 1992 – March 1993	13	9,924
Monitoring Survey – 1 (MS-1)	August 1993 – February 1994	7	4,925
Monitoring Survey – 2 (MS-2)	July 1994 – January 1995	7	4,925
Monitoring Survey – 3 (MS-3)	August 1995 – June 1996	11	5,515
Monitoring Survey – 4 (MS-4)	March 1997 – November 1997	9	6,654
Uganda National Household Survey – I (UNHS-I)	August 1999 – July 2000	12	10,687
Uganda National Household Survey – II (UNHS-II)	May 2002 – April 2003	11	9,711
Uganda National Household Survey – III (UNHS-III)	May 2005 – April 2006	12	7,426

The quantitative data for this thesis come from two of the eight rounds of the Uganda national household surveys: (i) The Integrated Household Survey (IHS) 1992/93, and the Uganda National Household Survey (UNHS-I) 1999/00. The IHS and the UNHS-I both aim at collecting data on all socio-economic aspects of the household comprising household characteristics. Both are spread over a period of 12 months adopting IPNS design (Interpenetrating Network of Sub-samples), and draw on a large sample of approximately 10,000 households. The wide coverage of different sites is a particular strength of the data. In turn, the IHS 1992/93 and the UNHS-I 1999/00 cover 1,018 and 1,400 communities.

The choice of this data was motivated by two key considerations. First, these two surveys form the basis of a two wave panel, covering 1,309 households. The obvious advantages of panel data are that, in principle, they permit the estimation of vulnerability within a more general framework, allowing for the inclusion of time-

invariant household-level and dynamic effects. Second, the IHS 1992/93 includes a Labour Force Survey Questionnaire, which represents one of the first large nationally representative household surveys for low income countries documenting activity, employment and time use for both adults and children. As such, it provides a unique opportunity to improve our understanding of child labour in Uganda. Notably, the Labour Force Survey Questionnaire was not replicated in the UNHS-I 1999/00.

Since 1992, the main sample of analysis has consistently been geographically stratified to ensure representation at different levels: national, rural/urban, region, and rural/urban within each region. Representation at the district level remains restricted to a few districts. The list of Enumeration Areas (EAs) prepared for the 1991 Uganda Population and Housing Census served as the sampling frame for all surveys with the exception of the UNHS II and UNHS III. The sampling frame for the latter group was derived from the list of EAs based on the cartographic work for the 2002 Uganda Population and Housing Census.

As a caveat, insecurity in certain parts of the country partly affected the coverage of both the IHS 1992/93 and the UNHS-I 1999/00. Incomplete information poses an important challenge for monitoring and understanding changes in poverty over time. This is especially the case for a few parishes in the districts of Karamoja, Kabale, Kisoro and Kasese in the IHS 1992/93, and the districts of Bundibugyo, Kasese, Gulu and Kitgum in the UNHS-I 1999/00. For comparability purposes, the districts of Bundibugyo, Kasese, Gulu and Kitgum are omitted from poverty analysis.² Clearly,

² These districts accounted for 5.8% and 6.1% of the national population in the 1991 and 2002 Population and Household Census, respectively.

the omission of some of the poorest districts increases mean consumption per adult equivalent and lowers the proportion of Ugandans living below the poverty line.

The qualitative data for this thesis come from Uganda's two Participatory Poverty Assessments (UPPA-1, 2000; UPPA-2, 2002). UPPA-1 (2000) is a major attempt by the government of Uganda to bring together the voices and perspectives of the poor into central and local governments' policy formulation, planning and implementation, as well as strengthening and complementing quantitative poverty monitoring. This first data collection exercise took place in 36 communities in 9 districts of Uganda, on a pilot basis, between 1998 and 2000. UPPA-2 (2002) was designed to deepen our understanding of poverty, and to evaluate communities' experiences with government policies that had resulted from the findings of UPPA-1 (2000). To this end, UPPA-2 (2002) was complemented by a Participatory Poverty and Environment Assessment (PPEA), a study on child poverty, and a village census covering 36 out of the 60 UPPA-2 research sites. This second data collection exercise was implemented in 60 sites in 12 districts between 2001 and 2002.

(iii.a) MEASURING INCOME POVERTY

Since 1992/93, consumption expenditure has been Uganda's dominant measure of income poverty. The construction of the consumption aggregate is based upon three sub-components of consumption expenditure, namely (i) food, beverage and tobacco, (ii) semi-durable and frequently purchased goods and services, and (iii) durable goods and services. Information is collected on item by item basis within each sub-component, and expenditures are captured at household, rather than individual level.

After calculating the sub-component expenses to a uniform 30-day month reference period, and prior to being aggregated into one consumption aggregate suitable for poverty analysis, each sub-component is subjected to a series of price adjustments.³ Notably, while the Uganda Bureau of Statistics (UBoS) collects information on non-consumption expenditure items such as taxes, transfers, and contribution to funerals, these expenses are not included in the consumption aggregate.

As a caveat, the household roster in the socio-economic modules of the IHS 1992/93 and the UNHS-I 1999/00 collects individual information on usual and regular members and visitors. Poverty analysis is restricted to usual members only. These are members who have lived within the household for a period of six months or more. To make poverty comparisons across households with different household size and composition in terms of sex and age, the consumption aggregate is adjusted using an adult equivalence scale.

(iii.b) THE POVERTY LINE

The absolute poverty line as derived by Appleton et al. (1999) corresponds to Uganda's official poverty line. Appleton et al.'s (1999) poverty line is anchored to the cost of meeting basic needs with a focus on caloric requirements. As such, it is derived on the basis of caloric requirements adjusted for age, sex, and daily activities as laid out by WHO (1985). In estimating the minimum cost of attaining caloric requirements, the authors focused on the food basket consumed by the poorest 50% of

Ugandans in 1993/94. During the 1993/94 monitoring survey, the poorest 50% consumed 1,373 calories per person per day, which was scaled up by a factor of 2.19 to generate 3,000 calories, the amount WHO (1985) recommends for an 18-30 year old male adult subsistence farmer (performing moderate activity). The food basket consisted of 28 major food items including staple and non-staple. These food items were converted into their caloric equivalent using West et al.'s (1988) caloric equivalent and retention scales.

Appleton et al. (1999) further applied Ravallion and Bidani's (1994) regression based approach to estimate non-food requirements, allowing for regional and rural/urban location. The minimum cost of attaining 3,000 calories per day and the cost of non-food requirements were combined to generate the absolute total poverty line.

Table 2: The poverty live	
Region	Absolute poverty line
Central rural	21,322
Central urban	23,150
Eastern rural	20,652
Eastern urban	22,125
Northern rural	20,872
Northern urban	21,800
Western rural	20,308
Western urban	21,626
Uganda	21,409

Uganda's official poverty line (see table 2) continues to rely on the food basket derived from the 1993/94 survey period. The validity of the 1993/94 food basket in 2000 is questionable given that subsequent surveys have continued collecting information on new areas of consumption, and that food consumption patterns have

³ (i) Revaluation of home food consumption into markets prices; (ii) spatial price variation; and (iii) inter-temporal price variation.

changed over the past decade. Notably, however, the 1993/94 remains the only truly nationally representative survey covering the entire country.

(iv) STRUCTURE OF THE THESIS

Uganda's wealth of data sources for poverty analysis is reflected in the abundance of existing literature documenting a variety of aspects of poverty in Uganda. Despite such efforts, a number of gaps in understanding the depth and width of poverty in Uganda remain. This thesis is structured in three main sections, respectively, disclosing insight on the relationship between vulnerability and poverty in Uganda, exploring the merits of quantitative vis-à-vis qualitative approaches to poverty analysis, and outlining the main determinants of agricultural child labour in Uganda.

According to Hoddinott and Quisumbing (2003), interventions designed to address vulnerability are becoming increasingly prominent, but their design and implementation are hampered by the relative novelty of the concept. In order to promote appropriate forward-looking anti-poverty interventions, chapter I aims to go beyond cataloguing of who is currently poor and who is not, to an assessment of households' vulnerability to poverty. In doing so, it focuses on the notion of vulnerability as the probability of becoming poor, and uses it to generate the country's first quantitative vulnerability profile.

Chapter II aims to deepen our understanding of poverty by bridging the gap between Uganda's rich sources of quantitative and qualitative data in order to identify what kinds of integration seem most profitable in the Ugandan case. Researchers could and

should explore innovative ways to collect some numerical information in participatory poverty appraisals (PPAs). The palatability of qualitative studies alone with policy makers and others would be greater if site selection could be put into a sampling frame, preferably the same frame as for the nationally representative household survey. The PPA exercise, for example, might be done using its characteristic methodology as before, while placing the results in a broader analytical context. By the same token, the introduction of participatory questions in a standard household survey could in fact provide a more thorough attempt at defining and measuring poverty even in standard income/consumption terms. Moreover, initial participatory exercises could suggest questions for inclusion in standardized surveys.

Exploiting these opportunities may not require a close integration of the survey and participatory exercises at the technical level. Technically, it may be sufficient to have an iterative sequence in which each exercise is informed and guided by the results of the previous ones. In terms of process, efforts might be aimed at an institutional establishment that allows such learning to occur naturally and without unnecessary acrimony.

On account that household poverty is often associated with child labour, chapter III focuses on a detailed analysis of the determinants of child labour in Uganda's traditional small-holder agriculture, where labour-supply is the main constraint on expanding acreage. To the extent that child labour deters school attendance and prevents the accumulation of human capital, long term poverty alleviation may be severely compromised. Numerous studies indicate that increases in earnings are associated with additional years of education, with the rate of return varying with the

level of education. Most importantly, in agriculture, evidence suggests positive effects of education on productivity among farmers using modern technologies, but less impact, as might be expected, among those using traditional methods. In Thailand, farmers with four or more years of schooling were three times more likely to adopt fertilizer and other modern inputs than less educated farmers. In Nepal, the completion of at least seven years of schooling increased productivity in wheat by over a quarter, and in rice by 13% (Stewart et al., 1998).

While government efforts to enact a policy to protect children against the dangers of child labour are under way,⁴ according to the Uganda Bureau of Statistics (UBoS, 2003), 15% of the total population aged between 5 and 17 is engaged in child labour. A striking feature of the Ugandan economy is the typically large proportion of children in the labour force that are primarily engaged in unpaid self-employment (i.e. 88%). Self-employment, where the dominant unit of production is the family, is particularly pervasive in agriculture and fisheries, accounting for 87.7% of children engaged in these sectors.

Any estimate of child labour depends on how we define “child” and “labour” and on the quality of the statistics available. In Ashagrie’s (1993) own words, a child is classified as “labourer” if the child is “economically active”. Governments and international organisations usually treat a person as economically active or “gainfully employed” if the person does work on a regular basis for which she is remunerated or which results in output destined for the market. On this note, the ILO often

⁴ Legal interventions are enshrined in the Constitution of Uganda 1995 [Chapter 1, Article 34(4)], the Employment Decree 1975 and the Children’s Status 1996. Uganda is also a signatory to the UN convention to eliminate child labour.

distinguishes between “child work” and “child labour”, the latter being used to describe the more pejorative part of “child work”, whereas “child work” in itself could include doing light household chores and can actually have some learning value”. Following Basu (1999), this thesis shall use “work” and “labour” interchangeably, while referring to what the ILO calls “child labour”.

Finally, while summarizing the main conclusions, chapter IV highlights the originality of this work. In doing so, it also identifies future research opportunities emerging from the substantive results, and discusses key policy implications.

CHAPTER I

MEASURING HOUSEHOLD VULNERABILITY IN THE CONTEXT OF POVERTY ERADICATION: EVIDENCE FROM UGANDA

1.1 INTRODUCTION

This chapter aims to extend Uganda's poverty diagnostic analysis by presenting the advantages of broadening the scope of poverty assessments to include an analysis of vulnerability to poverty. Within the framework of poverty eradication, vulnerability can be defined as the *ex-ante* risk that a household will, if currently non-poor, fall below the poverty line, or, if currently poor, remain in poverty (Chaudhuri, 2002). Defined in this way, the notion of vulnerability is distinguished from the concept of poverty, which is an *ex-post* measure of a household's well-being – or lack thereof.

On the bases that poverty reflects deprivation on multiple fronts, vulnerability to poverty need also embrace a multidimensional construct. In order to empirically assess the extent to which various characteristics of households make them more or less vulnerable to poverty, however, the notions of poverty and vulnerability need to be made more concrete. In line with Uganda's long standing tradition of poverty analysis, this chapter focuses on poverty defined in terms of a single measure, namely current consumption expenditure. It follows that in this framework a household will be considered vulnerable if, and only if, it faces a high probability of experiencing future shortfalls in consumption expenditure.

Taken as a stochastic phenomenon, the current poverty level of a household may not necessarily be a good guide to the household's expected poverty in the future. Drawing on these arguments, broadening the scope of poverty assessments to include an analysis of vulnerability is beneficial on at least four accounts (Chaudhuri, 2003). First, a re-conceptualization in terms of vulnerability to poverty, which, by definition, has to be forward-looking, emphasizes the importance of risk and uncertainty in understanding the dynamics leading to and perpetuating poverty.

Second, a focus on vulnerability to poverty highlights the distinction between ex-ante poverty-prevention and ex-post poverty-alleviation interventions. As a common example, consider a situation where public health interventions are aimed at reducing the national incidence of some disease. Information is available on both the incidence of disease in different regions, as well as on the fraction of the population in different regions that is at high risk of contracting the disease. On the one hand, funds for treatment of those already afflicted should clearly be directed to regions where the incidence of the disease is highest. On the other, funds for preventive measures (such as vaccinations) ought to be directed to regions where the fraction of the population at risk is the largest. Notably, these two sets of regions need not coincide. Regions with a higher incidence of the disease may also be regions where the risk of contracting the disease is concentrated among those afflicted. So the fraction of the population at risk may well be lower than in other regions where the incidence of the disease is lower.

Third, policies directed at reducing vulnerability to poverty will be instrumental in reducing poverty. In the absence of sufficient assets or insurance to smooth consumption, unpredicted shocks may lead to irreversible losses, such as distress sale

of productive assets, reduced nutrient intake, or interruption of education that permanently reduces human capital (Jacoby and Skoufias, 1997), locking their victims in perpetual poverty. Vulnerable people often engage in risk mitigating strategies to reduce the probability of such events occurring. Yet, these strategies yield typically low average returns. By implication, when people lack the means to smooth consumption in the face of variable incomes, they are often trapped in poverty through their attempts to steer clear of irreversible shocks (Murdoch, 1994; Barrett, 2001).

Last, but not least, vulnerability to poverty is an intrinsic aspect of well-being. Exposure to risk and uncertainty about the future adversely affects current well-being. According to Bardhan and Udry (1999), people who live in the rural areas of poor countries must cope not only with severe poverty but with extremely variable incomes. This is most apparent for the majority who are directly dependant upon agricultural income. Weather variation, the incidence of disease, pests and fire, and a host of other less obvious factors cause family yields to fluctuate unpredictably. Variations in the price of marketed output can also cause farm profits to vary. Fluctuations in income can present an acute threat to people's livelihoods even if, on average, incomes are high enough to maintain a minimal standard of living. Occasional famines provide the most egregious examples of the consequences of risk in poor societies, but risk also generates more commonplace worries such as the consequences of a bad harvest for a family's ability to afford school fees for children, or the implications of a wage-earner's illness for the ability to provide a healthy diet for the household.

The structure of this chapter is as follows: Section 1.2 reviews the literature, and outlines the empirical strategy. On account of the fact that vulnerability (as defined at the outset) is the risk that a household will experience consumption poverty in the future, while the poverty status of a household is concurrently observable, the level of vulnerability is not. We can estimate or make inferences about whether a household is currently vulnerable to future poverty, but we can never directly observe a household's current vulnerability level.

An assessment of vulnerability is, therefore, innately a more difficult task than assessing who is poor and who is not. To assess a household's vulnerability to poverty we need to make inferences about its future consumption prospects. Such efforts require a framework for thinking explicitly about both the inter-temporal aspects and cross-sectional determinants of consumption patterns at the household level.

Over the last two decades, a large literature has developed which addresses precisely these issues (e.g. Deaton, 1992; and Browning and Lusardi, 1995 for excellent overviews). This literature suggests that a household's consumption in any period will, in general, depend on a number of factors, viz. the household's wealth, current income, expectations of future income (i.e. lifetime prospects), uncertainty attached to future income, and ability to smooth consumption in the face of various income shocks. Each of these will in turn depend on a variety of household characteristics, those that are observable and possibly some that are not, as well as a number of features of the aggregate environment (macroeconomic and socio-political) in which the household finds itself.

Section 1.3 presents the data, while describing trends and patterns of poverty in Uganda during the 1990s. Finally, section 1.4 discusses the key results, and section 1.5 summarizes the main conclusions of the analysis.

1.2 LITERATURE REVIEW

In much of the recent work on the vulnerability of different segments within a population (e.g. Glewwe and Hall, 1998; Cunningham and Maloney, 2000), vulnerability is defined in terms of exposure to either *adverse shocks to welfare*, or *poverty*.⁵ The aim of this section is to review three separate approaches to assessing the extent of vulnerability: (i) Vulnerability as uninsured exposure to risk; and (ii) Vulnerability as losses due to poverty and risk exposure; and (iii) Vulnerability as the probability of becoming poor.

The fact that household consumption is sensitive to shocks means that a much larger number of households are actually vulnerable to poverty than typically recorded from the analysis of cross-section surveys (Dercon and Krishnan, 2000). Shocks may be covariant (e.g. rainfall) or idiosyncratic (e.g. illness) and, in the absence of effective risk management tools, they impose a welfare loss to the extent that they lead to a reduction in consumption.

Assessing vulnerability as uninsured exposure to risk has three major attractions: (i) It directly links vulnerability to specific shocks to losses in consumption; (ii) The estimated coefficients provide an estimate of the magnitudes of these impacts net of the mitigating role played by private coping strategies and public responses. By quantifying the impact of these shocks, this approach identifies which risks would be

⁵ In a separate paper, Cunningham and Maloney (2000a) take a step towards bridging this gap by considering exposure to adverse shocks, weighted by a household's initial position in the distribution of welfare.

an appropriate focus of policy; and (iii) it can be applied to a variety of welfare measures, not just consumption.

There are also some limitations that should be borne in mind. First, the approach is data intensive. Second, unlike methods that measure vulnerability as expected poverty, this approach does not produce a summary statistic determining that X% of the population is vulnerable. Third, vulnerability measures based on expected poverty attempt to predict (ex-ante) the probability that a household may become poor during a fixed time interval, whereas the degree of consumption insurance focuses on the extent to which households are successful (ex-post) at insulating their consumption from changes in their income opportunities and other shocks. It is possible, though perhaps not very likely, for an apparently non-poor household to be well insured, and yet be vulnerable to poverty.⁶ For example, households may avoid taking risky but profitable opportunities or practice income smoothing as a substitute for consumption smoothing. This diversification may come at high cost. Walker and Ryan (1990) find that in semi-arid areas of India, households may sacrifice up to 25 per cent of average incomes to reduce exposures to shocks. Others may be able to smooth their consumption through coping strategies that deplete their assets, such as selling their livestock (Rosenzweig and Wolpin, 1993), withdrawing their children from school when there are shortfall in income (Jacoby and Skoufias, 1997), or using assets as a buffer for consumption (Deaton, 1992). As a consequence of all these risk management and risk-coping strategies, households may appear to be well insured, when in fact their vulnerability to future poverty may be increasing as a result of foregone investments and/or asset depletion.

On a different (yet related) note, in a framework where vulnerability depends on both mean and variability of consumption, Ligon and Schechter (2002) define vulnerability as the sum of losses due to poverty and risk exposure. The authors use monthly data from the Bulgarian Household Budget Survey to estimate their vulnerability measure. They also decompose the contribution of various components to overall vulnerability, using both total and food consumption. In doing so, they find that 53% of total vulnerability is attributable to poverty, while the remaining 47% is due to risk. More specifically, 23% of losses due to risk are caused by aggregate shocks, 2% are explained by idiosyncratic risk, and 75% is the result of unexplained risk.

The biggest attraction of this approach rests in its ability to correctly capture the effects of risk on household welfare, unlike other measures of vulnerability derived from the Foster-Greer-Thorbecke (1984) poverty measures. Notably, however, the need to assume a particular form of the utility function places a heavy burden on the analysis. Yet another cost is the need for panel data, although the requirements for panel data are similar to those estimating vulnerability to risk exposure.

The third and final approach views vulnerability as the risk that a household will fall into poverty in the future (Chaudhuri et al., 2002; Christiaensen and Subbarao, 2001; and Pritchett et al., 2002). This strand of the literature includes among the vulnerable, households who are currently poor and have a high probability of remaining poor even if they do not experience any large adverse welfare shocks. On the other hand, it excludes those households among the non-poor who face a high probability of a large

⁶ Along similar lines, it is also possible for a wealthy household to be quite vulnerable to risk and yet

adverse shock but are currently well-off so that even if they were to experience such a shock, they would still remain non-poor.

This methodology deviates from Ligon and Schechter's (2002) analysis by not limiting the analysis to a specific formulation of the utility function. Greater flexibility, however, comes at the cost of being unable to explicitly control for the depth of expected poverty. There is nothing novel in this critique of a headcount measure of vulnerability; it applies equally to the headcount measure of poverty. To illustrate, consider two households both of whom are vulnerable (i.e. we know with certainty that both will be poor in period $t+1$). Suppose that we were to transfer sufficient consumption from one household to the other such that the recipient household will not be poor in period $t+1$. According to a headcount measure, we have reduced vulnerability by making a poor household even poorer, thus increasing the poverty gap.

To avoid this problem, Kamanou and Morduch (2002) introduce a slightly different approach. The authors are not concerned with expected poverty *per se*, but with expected *changes* in poverty. Hence, they define vulnerability in a population as the *difference* between the expected value of a poverty measure in the future and its current value, where the poverty measure is not restricted to the headcount measure. Notably, while Kamanou and Morduch (2002) do not restrict their discussion to a specific measure of poverty, their empirical application is for the headcount measure.

not vulnerable to poverty.

1.2.1 THE EMPIRICAL STRATEGY

The existing literature provides many definitions of vulnerability, and seemingly, no consensus on its definition or measurement. Choosing the most appropriate approach to measure vulnerability, therefore, becomes inherently a function of the settings at hand and the type of data available. In line with Hoddinott and Quisumbing (2003), in the case of Uganda, focusing on the notion of vulnerability as the probability of experiencing poverty in the future appears advantageous on three separate accounts. First, it produces a number analogous to Uganda's widely recognised measure of the incidence or severity of poverty. Comparability between the two types of analysis can be especially helpful in cases where poverty is low but a substantial proportion of households have consumption just above the poverty line. Indonesia in the mid 1990s provides a good example. In this scenario, governments (and development partners) might become complacent, under the assumption that poverty has been 'solved'. Nevertheless, if these households lying just above the poverty line are vulnerable to shocks, summary measures of vulnerability will be much higher, indicating that such complacency is misplaced. Second, it sheds light on the relationship between poverty and vulnerability. If the characteristics of the vulnerable were to differ significantly from those of the poor, targeting poverty (for example, by using a proxy means tests that focuses on the determinants of poverty) would miss a significant group of households that are vulnerable to declines in living standards. Third, this approach can also be implemented using a single round of cross-sectional data. This is particularly important on the bases that aside from the two wave panel analysed in this chapter, no subsequent rounds of panel data are available for Uganda. It follows that individual

cross-sections are the only available tools to replicate this analysis in order to assess the long(er)-term trends and implications of vulnerability.

As a word of caution, in a single cross-section, one can only estimate the variability of consumption expenditure *across* households. This is not to be confused with the variability of consumption expenditure *over time*. According to Chaudhuri et al. (2002) estimating the standard deviation of consumption using a single cross-section implies that cross-sectional variability proxies inter-temporal variation. The implications are far reaching. For instance, consider Tesliuc and Lindert's (2002) risk and vulnerability assessment of Guatemala. The qualitative fieldwork indicated that natural disasters are a particularly serious risk in Guatemala. Some individuals reported that they had never fully recovered from losses incurred in the aftermath of the 1976 earthquake, while others reported significant damage incurred in 1998 by Hurricane Mitch. However, there were neither serious earthquakes nor hurricanes in the survey year that the authors used to examine vulnerability. In this context, using cross-sectional variation from a "non disaster" year understates the level of consumption vulnerability. Conversely, had a household survey taken place in a particularly "bad" year, one might have erroneously overestimated the incidence of vulnerability.

On the premise that this chapter focuses on vulnerability to poverty defined in terms of current consumption expenditure, the vulnerability level of a household h at time t is defined as the probability that the household will find itself poor at time $t + 1$:

$$v_{ht} = \Pr(c_{h,t+1} \leq z^*) \quad [1.1]$$

where, $c_{h,t+1}$ is the household's per-adult equivalent⁷ consumption level at time $t+1$ and z^* is the absolute poverty line, which in Uganda's case is anchored to the cost of meeting basic needs, with a focus on caloric requirements (Appleton et al., 1999).

In this framework, the level of vulnerability at time t is defined in terms of the household's consumption prospects at time $t+1$. This implies that the probability that a household will find itself poor depends on its expected (i.e. mean) future consumption, and on the volatility of its consumption stream (i.e. variance). Hence, to determine the ways in which certain household characteristics are associated with vulnerability, we need to estimate not only how the expected consumption level of a household varies with these characteristics, but also how these characteristics affect the variance (and possibly higher moments) of consumption.

Following Chaudhuri et al. (2002), Christiaensen and Subbarao (2001), and Pritchett et al. (2002), constructing the vulnerability level of a household entails three steps:

STEP 1

Assume that consumption is determined by the following stochastic process:

$$\text{Lnc}_h = \beta \mathbf{X}_h + \mathbf{e}_h \quad [1.2]$$

⁷ While it is standard practice to use per-capita consumption figures to measure household welfare, there is a large literature supporting the estimation of equivalence scales. Previous poverty work on Uganda uses adult equivalent scales, with male adults between 18 and 30 years of age as the reference group. For the sake of consistency and comparability with previous research on poverty in Uganda, this chapter adopts this approach. For more details refer to Appleton (2001).

where, Lnc_h is log consumption expenditure (per adult equivalent) of household h ; X_h is a vector of strictly exogenous household and community characteristics, including household demographic composition, characteristics of the head, non-income indicators of the household's socio-economic status, and community infrastructure; β is a vector of parameters to be estimated and e_h is a disturbance term with mean zero. The variance of the disturbance term (σ^2_{eh}) is determined by:

$$\sigma^2_{eh} = \tau X_h \quad [1.3]$$

where τ is also a vector of parameters. Three-step feasible generalized least squares (Amemiya, 1977) are used to estimate values of β_{hat} and τ_{hat} . These parameters, together with X_h can be used to calculate expected log consumption and the variance of log consumption:

$$E[lnc_h | X_h] = X_h \beta_{hat} \quad [1.4]$$

and

$$\text{Var}[lnc_h | X_h] = \sigma^2_{ehhat} = X_h \tau_{hat} \quad [1.5]$$

STEP 2

Assume that consumption is log normally distributed,⁸ and identify the poverty threshold, z^* , which in Uganda's case corresponds to the absolute poverty line. With

⁸ This corresponds to what is typically found in the data. In addition, log normal distributions are completely determined by two parameters: their mean and variance. Thus, it suffices to estimate the

this assumption, we can estimate equation [1.1], the probability that a household with characteristics X_h will experience consumption shortfalls within a one year time period. This is equivalent to the definition of vulnerability:

$$v_{ht} = \Pr(\ln c_{h,t+1} < \ln z^* | X_h) = \Phi [(\ln z^* - X_h \beta_{hat}) / \sqrt{X_h \tau_{hat}}] \quad [1.6]$$

STEP 3

Assume some threshold probability value above which a household is considered vulnerable.⁹ The choice of a vulnerability threshold is ultimately quite arbitrary. A natural candidate, however, is the observed current poverty rate in the population. This is so on account of the fact that the observed poverty rate represents the mean vulnerability level in the population. Hence, anyone whose vulnerability level lies above this threshold faces a risk of poverty that is greater than the average risk in the population.

This method presents two important points of departure from most poverty assessments. First, it introduces considerations of risk and uncertainty in explaining the dynamics leading to and perpetuating poverty. Risk refers to uncertain events that can damage the wellbeing of people (e.g. the risk of a drought); risk exposure involves to the probability that a household will be affected by such risky events. For instance, a household living in a drought prone area whose primary source of income comes from non-farm activities will only be marginally exposed to the risk of a drought. The same goes for households who irrigate their crops. Farmers deriving

conditional mean and variance of a household's future consumption to obtain an estimate of its ex-ante distribution (Christiaensen and Subbarao, 2001).

⁹ Reducing vulnerability to a 0-1 may be problematic, in just the same way as reducing poverty.

their livelihood from rain fed agriculture, however, will be highly susceptible to such shocks. In addition to risk exposure, vulnerability reflects the lack of ex-post coping capacity with a shock. According to Christiaensen and Subbarao (2001), it concerns the ex-ante potential of a decline in wellbeing in the future, and is a function of the risk characterization of a household's immediate environment – the nature, frequency and severity of the shocks the household is exposed to, its exposure to these risks as well as its ability to cope with them when they materialise. This, in turn, is determined by the household's asset endowments and its ability to self-insure (formally or informally). For comparison purposes, poverty is usually treated in static, non-probabilistic terms (Ravallion, 1996). It generally refers to not having enough now, while vulnerability is about having a high probability now of suffering a shortfall in the future. While the poor are in practice often also vulnerable, both groups are typically not identical (Baulch and Hoddinott, 2000).

Second, in poverty assessments, the disturbance term is implicitly thought of as stemming from measurement error or some unobserved factor that is incidental to the main focus of the analysis. It follows that most poverty assessments, rather than specifying a separate equation such as [1.3] to allow the variance of e_h to be a function of household characteristics, take this variance to be the same for all households.

On this note, there are two problems associated with the assumption that the variance of the disturbance term (and of log consumption) is the same for all households. First, it is too restrictive in that it forces the estimates of the mean and variance of consumption to be monotonically related across households. This categorically rules

out the possibility that a household with a lower mean consumption may nevertheless face greater consumption volatility than a household with a higher average level of consumption. Both formal and anecdotal evidence points to high levels of income and consumption volatility for poor households.

Second, in purely statistical terms, unlike in other settings where failure to account for heteroskedasticity results in a loss of efficiency but need not bias the estimates of the main parameters of interest, here, the standard deviation of the disturbance term enters directly (see [1.6] above). A biased estimate of this parameter will therefore lead to a biased estimate of the probability that a household is poor. Recognizing this point, some poverty analyses do explicitly model the variance of the disturbance term (e.g. Elbers et al., 2001), but this step is seen as just a necessary heteroskedasticity correction with little economic relevance beyond that.

1.3 THE DATA

The data come from the two wave panel formed by the Integrated Household Survey (IHS) 1992/93 and the Uganda National Household Survey (UNHS-I) 1999/00, as discussed in the introduction to this thesis. The panel covers 1,309 households. Nonetheless, the panel sample was designed to cover 1,398 households as a sub-sample of the 9,924 and 10,687 households that were surveyed in 1992/93 and 1999/00, respectively. Failure to re-interview 89 out of the originally sampled households indicates an attrition level of 6.4%.

In the likely case that the pattern of attrition is non-random, inclusion of a panel component in a multi-purpose household survey will not necessarily yield a nationally representative sample even if the original survey was designed to be representative (Demery and Grootaert, 1993). As this danger increases with the time elapsed between the two survey periods, it could be of particular relevance to this Ugandan panel.

In a recent publication on growth and poverty reduction in Uganda, Deininger and Okidi (2003) run a probit regression where the probability of being included in the panel is a function of household characteristics. Their results suggest that the probability of attrition is systematically correlated with geographical and a number of other household characteristics, viz. household size, education, and assets. Notably, however, the authors conclude that, even though descriptive data derived from the

panel will not be representative of the population as a whole, use of the panel element to identify behavioural relationships is unlikely to impose unreasonable bias.¹⁰

Similarly, in a paper on poverty dynamics in Uganda, Okidi and McKay (2003) investigate the seriousness of the representativeness issue by comparing within each year the consumption expenditures for the panel households with those that were excluded from the panel. The authors report that the mean differences are not statistically different from zero at the standard levels of significance, and conclude that sample statistics based on expenditure data from the panel and non-panel observations do not significantly differ.

1.3.1 A DESCRIPTIVE ANALYSIS

Table 1.1 juxtaposes consumption expenditure per adult equivalent and overall poverty in 1992/93 and 1999/00 for the two wave panel described above. Generally, the 1990s were characterised by significant increases in consumption expenditure per adult equivalent and sharp reductions in poverty. This conclusion holds true for most of the country, with the exception of the northern region. While consumption expenditure per adult equivalent increased by 62%, 54%, and 45% in the central, eastern, and western regions, respectively, during the same period it merely recorded an increase by 6 percentage points in the northern region. This trend is clearly reflected in the northern region's poor performance in poverty reduction, which remains below the national average. While nationwide poverty declined from 50% to 30% between 1992/93 and 1999/00, during the same period it fell from 62% to 58%

¹⁰ For an extension of this discussion on other household surveys, see Alderman et al. (2001).

in the northern region. Such disparities are even more pronounced within the northern region, between rural and urban areas. On the one hand, northern urban Uganda experienced a 27% increase in consumption expenditure per adult equivalent together with a 22% reduction in poverty between 1992/93 and 1999/00; on the other hand, northern rural Uganda suffered a 1% decline in consumption expenditure per adult equivalent, resulting in a 1% increase in poverty.

In order to get a better understanding of the dynamics of poverty during the period under examination, table 1.2 illustrates poverty transitions at the national level, and by location, economic activity of the household, dependency ratio, and sex of the household head. According to the data, the majority of households who were poor in 1992/93 moved out of poverty by 1999/00 (61%), and the majority of those who were not poor in the first period remained so by the end of the decade (79%). This conclusion holds true even at the regional level, with the exception of the northern region. In northern Uganda, 35% of households who were poor in 1992/93 moved out of poverty by 1999/00, and barely half of those who were not poor in the first period retained their economic status by the end of the decade. This feature of northern Uganda is more pronounced in rural areas.

In addition, non-agricultural households, who are on average less likely to be poor than their agricultural counterparts (representing the majority of households), found it relatively easier to move out of poverty between 1992/93 and 1999/00. Similarly, households with a low dependency ratio, and female headed ones found it considerably easier than their respective counterparts to improve their economic status. More specifically, 72% (58%) of households with a low (high) dependency

ratio steered away from poverty during the past decade, and 69% (59%) of female (male) headed households who were poor in 1992/93 became non-poor by 1999/00.

On a related note, table 1.3 suggests that whereas in 1992/93 the welfare level of the richest 20% was approximately five times that of the poorest 20%, by 1999/00 such a disparity had risen to a scale factor of six both at the national and regional levels.

Table 1.3 also uses relative means of consumption expenditure per adult equivalent to show that, while urban welfare increased from a scale factor of 1.35 of the national average in 1992/93 to 1.66 in 1999/00, rural welfare dropped over time from 94% of the national average in 1992/93 to 89% in 1999/00.

Regionally, the central region, with the highest rate of urbanization, registered the highest increase in welfare from a scale factor of 1.10 of the national average in 1992/93 to 1.20 in 1999/00. In contrast, the northern region experienced the highest decline in welfare from 84% of the national average in 1992/93 to 60% in 1999/00. The corresponding figures for the eastern and western regions do not present the same degree of fluctuation in relative mean welfare. The eastern region registered a mild increase from 94% of the national average in 1992/93 to 98% in 1999/00, while the western region experienced a minimal fall from a scale factor of 1.03 in 1992/93 to 1.02 in 1999/00.

Notably, according to Dercon and Krishnan (2000), although it is rarely addressed in any study of poverty in developing countries, the hypothesis that much of the poverty fluctuations observed in the data may be linked to measurement error cannot be easily

dismissed a priori. Measurement error is particularly worrying for measuring mobility or transient poverty. If consumption or income is measured with independently distributed errors, then poverty status changes will be overestimated (Atkinson et al., 1988; Ashenfelter et al., 1986). To address this issue convincingly, one would need to collect alternative data to check the validity of the variables measured (e.g. Bound and Krueger, 1991). Table 1.2 shows that observed mobility accounts for 61% of the poor and 21% of the non-poor. To show that at least some of the movement in consumption is genuine, we constructed a mobility matrix by quintiles and calculated the percentage of households that remain in the same quintiles across the two periods using predicted rather than actual consumption. The model predicts that approximately 50% of households move to another quintile. On the basis that over 40% of the total population experienced some kind of mobility, it is possible to conclude that the model explains most observed mobility.

1.4 ESTIMATION AND RESULTS

Following Chaudhuri (2002), the basic idea underlying the empirical strategy developed in section 1.2.1 is that to determine the ways in which certain household characteristics are associated with vulnerability, we need to estimate not only how the expected consumption level of a household varies with these characteristics (which is the main focus of most poverty assessments), but also how these characteristics affect the variance (and possibly higher moments) of consumption.

Clearly, the extent to which this can be done depends on the type of data available. As it was mentioned at the outset, our data come from a two wave panel covering 1,309 households. Panel data permit the estimation of vulnerability within a more general framework, allowing for the inclusion of time-invariant household-level and dynamic effects. In addition, panel data enable to explore the evolution of vulnerability over time.

Table 1.4 contains the empirical definitions and summary statistics of the variables used in this analysis of household vulnerability to poverty. All chosen household characteristics are fixed, or non-manipulable. In other words, these variables are exogenous, at least in the short-run, and for clarity of exposition have been grouped in the following three categories:

i. Household demographic composition

Household size is an important determinant of vulnerability on the basis that the Uganda Participatory Poverty Assessment Projects (UPPAP, 2000, 2002) documents

large families stretching scarce household resources. UPPAP (2000, 2002) also points to the vulnerable status of women and elderly men. As such, the age of the household head, the proportion of female members of the household, and the gender of the household head have been singled out in the empirical specification of the model. Finally, the dependency ratio features in view of the fact that the higher the number of dependants, the fewer resources per person.

ii. Non-income indicators of the household's socio-economic status

Education unequivocally accounts for one of the main factors determining a household's well-being status (UPPAP, 2000, 2002). Notably, our specification differentiates between adult male and female mean years of education to account for stark gender divides in educational attainment. An additional non-income indicator of the household's socio-economic status is provided by the household's main economic activity. To this effect, a dummy variable was created to reflect whether a household derives its main source of income from agriculture.

iii. Community characteristics

A key lesson from the empirical literature is the significance of infrastructure variables on household growth opportunities (Deininger and Okidi, 2003). To assess the importance of such community characteristics, it is possible to include a number of variables capturing the distance a household needs to travel to access public roads, transport facilities, credit institutions, and local markets.

Moving on to the empirical estimation, step one involves the estimation of a household consumption model (i.e. Eq. [1.2]), and the variance of its disturbance term

(i.e. Eq. [1.3]). The choice of estimation technique is a direct function of data availability. An interesting option involves estimating vulnerability from the first wave of the panel and use it as a prediction of poverty in the second survey. This approach, however, is constrained by the lack of specific data on different types of shocks experienced by each household in 1992/93 and 1999/00. Alternatively, we opt for a pooled GLS estimation. The implicit advantage of this technique stems from the fact that our resulting estimates originate from a two wave panel of approximately 1,300 households with the advantage that changes in outcome levels include actual information about shocks experienced by households (Dercon, 2001).

The choice of a pooled GLS is further supported by the evidence generated in Annex I. The latter juxtaposes two simple OLS models of consumption for 1992/93 and 1999/00, respectively, in an attempt to establish the extent to which the determinants of household consumption varied between these two periods. The models explain approximately 25-30% of the variation in consumption, as measured by the R^2 s. Most importantly, however, the general correspondence in the estimated coefficients of these models confirms the hypothesis of existing similarities in the underlying structural features of the economy between 1992 and 1999, at least in so far as the determinants of household consumption are concerned.

Relying on Appleton's formulation of Uganda's regional poverty lines outlined in the previous chapter (i.e. table 2), Eq.s [1.2] and [1.3] are estimated separately for each of the eight administrative regions of Uganda (i.e. central rural, central urban, eastern rural, eastern urban, northern rural, northern urban, western rural, and western urban).

The main advantage of doing so is that it allows for some heterogeneity in the

structural parameters underlying the consumption process of households in different areas of the country.¹¹ The results are presented in Tables 1.5a and 1.5b, respectively.

This analysis points to a number of differences and similarities across all regional specifications of the model. Interpreting our estimated coefficients, however, remains tangential to this section's underlying objective of computing Uganda's first quantitative vulnerability profile. Moreover, an exhaustive discussion of the determinants of consumption poverty is provided in the next chapter.

In step 2, Eq. [1.6] yields the probability that, in both 1992/93 and 1999/00, a household with the characteristics specified in Eq. [1.2] will be poor within a one year time period. Figures 1.1 and 1.2 illustrate the distribution of estimated vulnerability for the population as a whole for 1992/93 and 1999/00. By comparison, the distribution of the latter period is visibly more left-skewed than the former one. This evidence indicates that, between 1992/93 and 1999/00, the proportion of Ugandans with zero probability of becoming poor in the next period increased from 5-6% to approximately 26% of the population.¹²

¹¹ In a discussion of the issue of national vs. regional poverty lines, Appleton (2003) finds the level of poverty in Uganda as a whole to be fairly robust to the choice of poverty line and sensitivity in the spatial pattern of poverty, even after using regional poverty lines adjusted for income differentials between regions. The author concludes that preference for national or regional poverty lines depends on how one conceives welfare. By adopting the regional formulations of the poverty line, this section remains consistent with our estimation of vulnerability, which by doing so allows greater flexibility in the estimation of the cross-partials of the functions capturing the effects of various household characteristics on the mean and variance of consumption expenditure (Chaudhuri, 2002).

¹² Juxtaposing the distribution of consumption expenditure per adult equivalent between 1992/93 and 1999/00 reveals stark similarities. This evidence suggests that figures 1.1 and 1.2 differ so much as a direct result of growth and poverty reduction.

In addition, figures 1.3 and 1.4 depict the estimated aggregate distribution of vulnerability for the population as a whole, and by poverty status in 1992/93 and 1999/00, respectively. In doing so, they plot the incidence of vulnerability at vulnerability thresholds ranging from 0 to 1 – measured along the horizontal axis. By construction, as the threshold increases, the incidence of vulnerability (i.e. the fraction of the population that has an estimated probability of being poor higher than the threshold) declines. At a threshold of zero everyone is vulnerable, while at a threshold of one no one is vulnerable. It follows that for any given threshold, the incidence of vulnerability is higher for the poor than for the population as a whole, which in turn is higher than the incidence of vulnerability amongst the non-poor. Moreover, figures 1.3 and 1.4 suggest that for a wide range of thresholds, poverty and vulnerability are significantly different from each other. To provide a clearer illustration of this diagrammatic representation, in 1999/00 at a threshold of 0.40 nearly 50% of the poor were also vulnerable. At the same threshold, merely 20% of the total population and approximately 10% of the non-poor were vulnerable in the sense that they faced the risk of falling into poverty within a one year period.

Finally, step three is a simple matter of computation, whereby a household is classified as vulnerable if the probability to be poor in the next period is greater than the incidence of poverty in the population observed in table 1.1.¹³ Table 1.6a shows

¹³According to Chaudhuri (2002), the presence of measurement error associated with most consumption (and income) measures drawn from household surveys can lead to significant overestimates of the variance of consumption. An advantage of the methodology outlined above is that it yields a consistent estimate of the true variance of consumption even when consumption is measured with error. This is because the measurement error in consumption shows up in the error term of Eq. [1.3]. Unless the measurement error systematically varies with household characteristics, the estimate of consumption variance, Eq. [1.5], will not be contaminated by the measurement error.

One might worry that in developing economies measurement error might in fact be correlated with some observable characteristic of the household. For instance, it is much more difficult to accurately

that much in the same way that the 1990s were characterised by sharp reductions in poverty, they also embraced a 56% decline in the population with an estimated probability of experiencing poverty within a one year period greater than the average risk of poverty (i.e. the observed incidence of poverty). Between 1992/93 and 1999/00, Uganda witnessed a significant fall in vulnerability to poverty from 57% to 25%.

Table 1.6a also reveals that: (i) vulnerability declined from 61% to 27%, and from 33% to 17%, between 1992/93 and 1999/00, in rural and urban areas, respectively; and (ii) at the regional level, while vulnerability was successfully reduced in the central, eastern, and western regions, it increased in the northern region. Moreover, within the northern region, while urban areas experienced a 12% reduction in vulnerability between 1992/93 and 1999/00, rural areas suffered a 9% increase.

Among the vulnerable, table 1.6b distinguishes between the relatively vulnerable (i.e. those who have an estimated vulnerability level greater than the observed incidence of poverty but less than 0.5) and the highly vulnerable (i.e. those with an estimated vulnerability level greater than 0.5). The period between 1992/93 and 1999/00 marked a sharp fall in the fraction of Ugandan households highly vulnerable to poverty. By 1999/00 the relatively vulnerable constituted approximately one third of the vulnerable and 9% of the overall population, while the highly vulnerable made up 16% of the overall population.

measure the consumptions of rural households because a large part of their consumption is derived from their own agricultural production and hence does not appear in any records of market expenditures. It is possible, therefore, that the measurement error in consumption would be correlated with an indicator for whether a household resides in rural or urban areas. This possibility can be adequately dealt with by carrying out the estimation separately for rural and urban households, or for

1.4.1 CROSS-VALIDATION EXERCISE

The aim of this section is to assess the reliability, and evaluate the predictive power of our vulnerability estimates. The first step involves exploring the relationship between our vulnerability index derived by modelling household consumption vis-à-vis the intuitive alternative of estimating Eq. [1.6] directly from a discrete dependent variable model by means of a probit (i.e. poverty function). Figure 1.5 plots our estimated index of vulnerability (i.e. $V_{\text{consumption}}$) against the one derived from the direct estimation of Eq. [1.6] by means of a poverty function (i.e. V_{probit}) in 1992. This simple exercise provides an informal check for consistency between both measures of vulnerability. Clearly, both sets of vulnerability estimates are positively related.

More rigorously, using Ordinary Least Squares (OLS), Eq. [1.7] tests for statistical equality between the two estimates of vulnerability presented above. The null hypothesis of statistical equality implies that $\alpha = 0$ and $\beta = 1$. The results from table 1.7 clearly reject the null hypothesis of statistical equality between these two (positively and significantly related) estimates of vulnerability [$F_{(2, 1307)} = 529.54^{***}$].

$$V_{\text{probit}} = \alpha + \beta V_{\text{consumption}} + \varepsilon_v \quad [1.7]$$

Notwithstanding the consistency between both indices of vulnerability, their statistical inequality points to the choice of one index over the other. According to Appleton (2002), poverty functions are open to the criticism that it would be better to model

more disaggregated groups. These types of concerns about systematic measurement error provide

household consumption per se since this is the behavioural variable underlying the definition of poverty. Moreover, poverty functions disregard information about the distribution of household consumption. On the bases of the ease of specification of our consumption function, the remainder of this chapter will focus on the vulnerability index estimated by means of modelling household consumption.

In an additional attempt to validate the predictive power of our estimates of vulnerability, table 1.8 reports mean vulnerability levels for four groups of households classified by the poverty status in both 1992/93 and 1999/00. Notably, the mean vulnerability estimate for the group that is non-poor in both periods is considerably lower than the mean for the group that ends up poor in 1999/00, despite being non-poor in 1992/93. Similarly, the mean vulnerability for those who are poor in both 1992/93 and 1999/00 is substantially higher than the mean for those among the poor in 1992/93 who exit poverty between 1992/93 and 1999/00. Therefore, the results show that our vulnerability estimates succeed in identifying those among the non-poor who are less vulnerable and hence likely to remain non-poor, and those among the poor who are more vulnerable and hence likely to remain poor.

Lastly, and for the sole purpose of validating further the predictive power of our estimates, Eq. [1.6] can be used to formulate vulnerability with a three year time horizon. In this framework, Eq. [1.8] re-defines the level of vulnerability at time t in terms of the household's consumption prospects at time $t+3$. In other words, it describes the probability that a household will experience poverty at least once within a three year period.

further support for our choice to estimate Eq.s [1.2] and [1.3] separately for each administrative region.

$$v_{ht}=1 - [1 - \Pr(\ln c_{h,t+1} < \ln z^* | \mathbf{X}_h)]^3 = 1 - \prod_{t=1}^3 [1 - \Pr(\ln c_{h,t+1} < \ln z^* | \mathbf{X}_h)] \quad [1.8]$$

This algebraic manipulation allows us to use the 1999/00 component of the data to predict household poverty in 2002/03. The choice of 2002/03 as a reference year is due to the availability of a nationally representative household survey documenting poverty levels both at national and regional level.

Figure 1.6 juxtaposes 2002/03 predicted poverty rates (i.e. mean estimated vulnerability levels from 1999/00) and 2002/03 actual poverty rates by region derived from the Uganda National Household Survey (UNHS-III) 2002/03. Our predicted poverty rates replicate Uganda's actual poverty diagnostics in so far as recognising that the burden of poverty remains higher in rural areas. Our estimates are also in line with the actual regional poverty rates. Finally, they reproduce the ordinal properties of the true distribution of poverty across geographic regions.

Part explanation for the fact that our predicted values are consistently higher than actual poverty rates is due to the fact that our estimates cannot account for the potential impact of beneficial policy reforms. To Uganda's merit, between 2000 and 2003 government has gradually taken important measures to increase the quantity, and enhance the quality of service delivery. This was especially so in the health sector with the successful abolition of user fees.

1.4.2 SOURCES OF VULNERABILITY

Having generated our vulnerability estimates, and cross-checked their reliability, it is possible to look further into some of the sources of household vulnerability. Households with similar levels of vulnerability may be vulnerable for very different reasons. For some, vulnerability may stem primarily from low long-term consumption prospects. For others, consumption volatility may be the main source of vulnerability to poverty. From a policy perspective it will be important to distinguish between these two possibilities. For instance, vulnerability due to high volatility may call for ex-ante interventions that reduce the risks faced by households or insure them against such risks. On the other hand, to address vulnerability due to low endowments transfer programmes may yield more effective results (Chaudhuri et. al, 2002).

Clearly, the two possibilities presented above represent stylised extremes which can be potentially intertwined. For instance, it may be that with inadequate risk management instruments at their disposal, households forego risky but, on average, high return investments in favour of safer but lower earning opportunities. In this case, while household vulnerability may appear to be due to low endowments, the true source of vulnerability may lie in the household's inability to cope with risk and uncertainty.

Figures 1.7 and 1.8 plot the mean and standard deviation of consumption for households with selected levels of vulnerability in 1992/93 and 1999/00, respectively. These combinations of mean consumption and standard deviation of consumption for the same levels of vulnerability generate a set of iso-vulnerability curves. When mean

consumption is above the poverty line, increasing the variance increases the probability of poverty and the level of vulnerability. Starting from a given level of mean consumption, an increase in the variance of consumption has to be offset by an increase in mean consumption if the level of vulnerability is to remain unchanged. Hence, the upward slope of the iso-vulnerability curves to the right of the vertical line corresponding to the poverty line.

When mean consumption is below the poverty line, increasing the variance reduces the probability of poverty and the level of vulnerability. To illustrate, consider the extreme case where a household's consumption is fixed at some level below the poverty line with no volatility. Such a household is guaranteed to experience poverty in the next period. The introduction of some variability in consumption opens a small window of opportunity to escape from poverty, which (by definition) reduces household vulnerability. By implication, for a low enough initial level of mean consumption, an increase in variability has to be offset by a reduction in mean consumption to maintain the same level of vulnerability. It follows that when mean consumption is below the poverty line the iso-vulnerability curves are negatively sloped.

Consider the cluster of points associated with vulnerability level of 0.40 in 1999/00. This is slightly above the threshold level of vulnerability of 0.30 above which we categorized a household as vulnerable. All the households represented in this iso-vulnerability curve have estimated levels of vulnerability in the range 0.395-0.405. Yet the normalized mean consumption levels estimated for these households (i.e. the ratio of estimated mean consumption to the poverty line) range from 1.004 to 1.01.

Therefore, within this group, some households are vulnerable because they have low levels of mean consumption whereas others are vulnerable because their consumptions are more volatile.

Figures 1.7 and 1.8 also illustrate that the mean and standard deviation of consumption need not be monotonically related across households. For instance, amongst households with an estimated vulnerability level of 0.25 in both 1992/93 and 1999/00, the households with the highest estimated standard deviation of consumption have both a higher estimated standard deviation of consumption and a lower estimated mean level of consumption than several of the households with lower estimated levels of vulnerability.

This finding highlights the importance of keeping the estimation strategy adequately flexible for the mean and variance of consumption to be separately estimated. Moreover, it provides a clear point of departure between our analysis and most poverty assessments, where the possibility for a household with a lower mean level of consumption to face greater consumption volatility is generally not allowed.

1.4.3 POVERTY VIS-À-VIS VULNERABILITY

On the relationship between poverty and vulnerability, table 1.9 presents selected characteristics of the poorest and most vulnerable 25% of the population. Clearly, the characteristics of the vulnerable are consistent with the characteristics of the poor: large family size, high dependency ratios, location in communities with low provision of public services, and residence in poorer regions of the country.

While the foregoing discussion focuses on similarities between the poor and the vulnerable, a clear distinction between the notion of vulnerability and the concept of poverty exists. There may be some households whose ex-ante probability of poverty (i.e. vulnerability) may be high who are nevertheless observed to be non-poor; conversely, there may be some households who are observed to be poor, whose vulnerability level is, nevertheless, low enough for them to be classified as non-vulnerable. Of the 50% and 70% of the population observed to be non-poor in 1992/93 and 1999/00, respectively, 41% and 15% were vulnerable to poverty. Amongst the poor, 26% and 51% were non-vulnerable to poverty in 1992/93 and 1999/00, respectively.

Poor, non-vulnerable households are likely to have temporarily fallen into poverty as a result of an unexpected shock. Their non-vulnerable status implies that they are in a position to bounce back out of poverty. Non-poor, vulnerable households (on the other hand) are at risk of falling into poverty, possibly as a result of a series of events unaccounted for in the estimation of our consumption model. These residual unobserved factors anticipating household poverty, when they are not observed to be, are the likely result of an omitted variable problem in the estimation of consumption.

On a related note, table 1.10 ranks Uganda's administrative regions distinguishing between poverty and vulnerability. Notably, when regions are ordered in terms of the incidence of vulnerability rather than the observed incidence of poverty, their rankings do not always coincide. To illustrate, whilst retaining its position as the fifth poorest region in the country, between 1992/93 and 1999/00 central rural Uganda

emerges as the region least affected by vulnerability. In the spirit of distinguishing between regions in need of ex-ante poverty prevention interventions from others requiring ex-post poverty alleviation interventions, this finding provides sound justification for increasing the focus of poverty alleviation in the mix of policies directed at central rural areas.

Another important instrument to investigate the relationship between poverty and vulnerability, also included in table 1.10, is the ratio of the vulnerable to the poor population (i.e. *Vul/Poor*). This ratio provides a useful measure of how dispersed vulnerability is in the population. In general, for any given vulnerability threshold, a higher vulnerability to poverty ratio indicates a more dispersed (i.e. egalitarian) distribution of vulnerability, whereas a lower ratio suggests that vulnerability is concentrated among a few. To illustrate, table 1.10 points to widespread vulnerability in northern Uganda vis-à-vis a high degree of concentration of vulnerability among a few in the central region. Further, focusing on rural areas, while between 1992/93 and 1999/00 the *Vul/Poor* ratio increased from 1.25 to 1.38 in the northern region, it decreased in western, eastern, and most dramatically in central Uganda.

On this note, it seems important to touch upon one of Uganda's driving factors behind government's quest to improve the quality of life of the population: the Plan for Modernization of Agriculture (PMA). The PMA seeks to raise the incomes of the poor, primarily by increasing agricultural productivity and market share for subsistence farmers through interventions such as agricultural advisory services, rural finance, and agro-processing. The overall aim is to transform subsistence agriculture into commercial agriculture. Poor targeting, however, appears to have resulted in

benefiting primarily economically active and progressive farmers with existing assets and good links to both agricultural extension agents and the local government officials responsible for delivering the programme, as it is more likely to be the case in central rural Uganda.

The combination of poverty and vulnerability diagnostics provides a wealth of information regarding the structure and features of the Ugandan population. Figures 1.9 and 1.10 plot poverty vis-à-vis vulnerability during the period under examination, and provide a diagrammatic illustration of the marginalization of the northern region alluded to in the previous discussion. Notably, in spite of consistent south-west movement registered for Uganda's western, eastern, and central regions, northern areas continue to be depicted in the figures' upper right hand quadrants.

Persistence of high poverty and vulnerability levels, coupled with increasing *Vul/Poor* ratios in northern Uganda bring into question the government's commitment to end cattle-raiding and rebel insurgency, together with the PMA's design and its ability to move poor and isolated Ugandan farmers out of poverty.

1.5 DISCUSSION AND CONCLUSION

This chapter uses panel data to estimate household vulnerability by generating predicted probabilities of poverty for households with different sets of characteristics. In doing so, it defines vulnerability at the household level, within the framework of poverty eradication, as the possibility that a household, regardless of whether it is poor today, will be poor tomorrow (Chaudhuri et al., 2002).

Our results suggest that during the past decade, alongside sharp reductions in poverty, vulnerability to poverty in Uganda declined from 57% in 1992/93 to 25% in 1999/00. At regional level, vulnerability was successfully reduced in the central, eastern, and western regions, and it increased in the northern region.

Whilst encouraging on many accounts, these findings suggest that the benefits from Uganda's gradual and sustained economic growth were unequally distributed. As the central region experienced a dramatic reduction in the incidence of vulnerability, its northern counterpart suffered from severe stagnation. Focusing on rural areas, on the bases that over 90% of the chronic poor live in rural areas, and that the majority of them are employed in agricultural activities, the incidence of vulnerability in northern and central Uganda increased and decreased by 9 and 52 percentage points, respectively.

Section 1.4.2 highlights the importance of keeping the estimation strategy adequately flexible for the mean and variance of consumption to be separately estimated. In turn, this methodology marks our point of departure from most poverty assessments, which

tend to be constructed in such a way that forces the estimated variance of consumption to increase with higher estimated mean consumptions.

Section 1.4.3 shows that the characteristics of the vulnerable are consistent with the characteristics of the poor: large family size, high dependency ratios, location in communities with low provision of public services, and residence in poorer regions of the country.

The key message emerging from these findings is that while poverty and vulnerability are closely related, there remain important distinctions between the two and neither is a subset of the other. In other words, not all the poor are vulnerable, while a significant proportion of the non-poor are vulnerable. These observations may enable policy makers to distinguish between the effective implementation of poverty-prevention and poverty-reduction programmes. For the former group, interventions that reduce consumption volatility by reducing exposure to risk or by enhancing ex post coping capacity could be sufficient. However, for the latter, risk-reducing interventions alone may be inadequate, and must be accompanied by interventions to increase mean consumption (Chaudhuri and Christiaensen, 2002).

In conclusion, vulnerability is of growing concern for policy makers. The term is used to denote events that threaten or seriously damage one or more aspects of well-being (Tesliuc E. and Lindert K., 2002). In a shock-free environment, characteristics correlated with poverty provide the necessary information to implement a targeted intervention. In an environment characterised by frequent shocks, however, effective

intervention requires a deeper understanding of who is exposed to the risk of experiencing poverty within a clearly defined time period.

Our estimates of vulnerability proved successful in identifying those among the non-poor who are less vulnerable and hence likely to remain non-poor, and those among the poor who are more vulnerable and hence likely to remain poor. Further, the model's predictive power was confirmed by the finding that if in 1999/00 we chose to predict regional poverty levels for 2002/03, our results would have coincided with the actual ordering of poverty rates that was observed in 2002/03.

Table 1.1: Poverty trends and patterns

	1992/93			1999/00	
	N	Mean consumption expenditure per adult equivalent (Ugandan shillings)	Poverty (%)	Mean consumption expenditure per adult equivalent (Ugandan shillings)	Poverty (%)
Nation	1,309	6,959	50	10,277	30
Rural	1,115	6,539	52	9,096	32
Urban	194	9,377	39	17,065	18
Central	403	7,619	44	12,366	22
Eastern	302	6,507	54	10,021	28
Northern	201	5,849	62	6,176	58
Western	403	7,192	46	10,426	26
Central rural	329	7,094	50	10,874	24
Central urban	74	9,955	38	18,995	15
Eastern rural	263	6,209	57	8,528	29
Easter urban	39	8,515	33	20,087	18
Northern rural	164	5,543	63	5,500	64
Northern urban	37	7,203	54	9,174	32
Western rural	359	6,726	48	9,525	28
Western urban	44	10,996	32	17,778	9

Note: N is the number of observations in the relevant group.

Table 1.2: Poverty transition, 1992/93-1999/00

	Non poor 1992-93 / Non poor 1999-00	Non poor 1992-93 / Poor 1999-00	Total	Poor 1992-93 / Non-poor 1999-00	Poor 1992-93 / Poor 1999-00	Total
Nation	519 (78.64)	141 (21.36)	660 (100)	398 (61.33)	251 (38.67)	649 (100)
Rural	412 (76.16)	129 (23.84)	541 (100)	345 (60.10)	229 (39.90)	574 (100)
Urban	107 (89.92)	12 (10.08)	119 (100)	53 (70.67)	22 (29.33)	75 (100)
Central	194 (85.46)	33 (14.54)	227 (100)	120 (68.18)	56 (31.82)	176 (100)
Eastern	106 (76.26)	33 (23.74)	139 (100)	113 (69.33)	50 (30.67)	163 (100)
Northern	41 (53.25)	36 (46.75)	77 (100)	43 (34.68)	81 (65.32)	124 (100)
Western	178 (82.03)	39 (17.97)	217 (100)	122 (65.59)	64 (34.41)	186 (100)
Central rural	152 (83.98)	29 (16.02)	181 (100)	99 (66.89)	49 (33.11)	148 (100)
Central urban	42 (91.30)	4 (8.70)	46 (100)	21 (75)	7 (25)	28 (100)
Eastern rural	83 (73.45)	30 (26.55)	113 (100)	104 (69.33)	46 (30.67)	250 (100)
Easter urban	23 (88.46)	3 (11.54)	26 (100)	9 (69.23)	4 (30.77)	13 (100)
Northern rural	28 (46.67)	32 (53.33)	60 (100)	31 (29.81)	73 (70.19)	104 (100)
Northern urban	13 (76.47)	4 (23.53)	17 (100)	12 (60)	8 (40)	20 (100)
Western rural	149 (79.68)	38 (20.32)	187 (100)	111 (64.53)	61 (35.47)	172 (100)
Western urban	29 (96.67)	1 (3.33)	30 (100)	11 (78.57)	3 (21.43)	14 (100)
Agricultural household	338 (74.78)	114 (25.22)	452 (100)	310 (60.08)	206 (39.92)	516 (100)
Non-agricultural households	181 (87.02)	27 (12.98)	208 (100)	88 (66.17)	45 (33.83)	133 (100)
High dependency ratio	332 (77.93)	94 (22.07)	426 (100)	287 (58.10)	207 (41.90)	494 (100)
Low dependency ratio	187 (79.91)	47 (20.09)	234 (100)	111 (71.61)	44 (28.39)	155 (100)
Female headed household	122 (78.71)	33 (21.29)	155 (100)	106 (69.28)	47 (30.72)	153 (100)
Male headed household	397 (78.61)	108 (21.39)	505 (100)	292 (58.87)	204 (41.13)	496 (100)

Note: Figures are absolute numbers, and percentages are presented in parentheses.

Table 1.3: Quintile decomposition of consumption expenditure per adult equivalent

	Welfare quintiles					Total
	Poorest 20%	Lower middle	Middle	Upper middle	Richest	
1992/93						
Nation	2,604	4,365	5,940	7,961	13,369	6,959 (1)
Rural	2,609	4,354	5,932	7,897	12,707	6,539 (0.94)
Urban	2,546	4,438	5,996	8,367	15,174	9,377 (1.35)
Central	2,699	4,334	5,924	7,958	13,573	7,619 (1.10)
Eastern	2,591	4,327	5,998	7,956	12,697	6,507 (0.94)
Northern	2,516	4,406	5,852	8,008	12,271	5,849 (0.84)
Western	2,622	4,403	5,945	7,949	13,997	7,192 (1.03)
Central rural	2,712	4,307	5,938	7,894	12,831	7,094 (1.02)
Central urban	2,547	4,479	5,839	8,311	15,197	9,955 (1.43)
Eastern rural	2,624	4,331	5,957	7,913	12,734	6,209 (0.89)
Easter urban	2,233	4,241	6,260	8,328	12,601	8,515 (1.22)
Northern rural	2,500	4,425	5,822	7,876	11,709	5,543 (0.80)
Northern urban	2,637	4,335	5,997	8,557	13,708	7,203 (1.04)
Western rural	2,610	4,381	5,944	7,899	12,893	6,726 (0.97)
Western urban	2,856	4,601	5,959	8,349	18,293	10,996 (1.58)

Table 1.3 (continued): Quintile decomposition of consumption expenditure per adult equivalent

	Welfare quintiles					Total
	Poorest 20%	Lower middle	Middle	Upper middle	Richest	
1999/00						
Nation	3,476	5,533	7,596	10,256	21,680	10,277 (1)
Rural	3,473	5,536	7,583	10,252	18,640	9,096 (0.89)
Urban	3,514	5,500	7,723	10,270	29,711	17,065 (1.66)
Central	3,652	5,547	7,698	10,249	23,341	12,366 (1.20)
Eastern	3,767	5,597	7,593	10,263	21,764	10,021 (0.98)
Northern	3,213	5,492	7,506	9,746	17,705	6,176 (0.60)
Western	3,577	5,496	7,552	10,402	20,158	10,426 (1.02)
Central rural	3,643	5,537	7,671	10,223	20,403	10,874 (1.06)
Central urban	3,790	5,612	8,166	10,344	30,475	18,995 (1.85)
Eastern rural	3,774	5,638	7,600	10,294	16,211	8,528 (0.83)
Easter urban	3,644	5,120	7,514	10,054	34,721	20,087 (1.96)
Northern rural	3,199	5,465	7,406	9,664	16,489	5,500 (0.54)
Northern urban	3,370	5,678	7,824	9,899	18,574	9,174 (0.89)
Western rural	3,575	5,496	7,561	10,385	18,187	9,525 (0.93)
Western urban	3,614	5,498	7,421	10,495	27,856	17,778 (1.73)

Table 1.4: Variables definition and summary statistics

	1992/93		1999/00	
	Mean	S.D.	Mean	S.D.
<i>Dependent variable</i>				
Consumption expenditure per adult equivalent (Uganda shillings)	6,959.18	4,490.66	10,277.15	13,148.88
<i>Household demographic composition</i>				
Average household size	5.35	3.08	5.77	3.21
Dependency ratio	1.35	1.15	1.51	1.13
Proportion of female adult members of the household	0.29	0.19	0.29	0.21
Age of the household head	43.07	15.51	49.87	15.44
DV=1 if female household head	0.24	0.42	0.28	0.45
DV=1 if widow household head	0.11	0.31	0.20	0.40
<i>Non-income indicators of the household's socio-economic status</i>				
Female adult mean years of education	3.18	3.21	4.10	11.67
Male adult mean years of education	5.09	3.96	6.32	15.43
DV=1 if agricultural household	0.74	0.44	0.80	0.40
<i>Community characteristics</i>				
Average distance to tarred road (Km)	27.52	32.95	26.21	32.25
Average distance to bus or taxi stop (Km)	11.30	16.27	10.46	15.26
Average distance to bank (Km)	23.36	21.81	25.76	22.66
DV = 1 if produce market available in the village	0.06	0.23	0.06	0.23

Table 1.5a: GLS estimation of consumption [Dependent variable: Ln(Consumption expenditure per adult equivalent)]

	Central rural	Central urban	Eastern rural	Eastern urban	Northern rural	Northern urban	Western rural	Western urban
<i>Household demographic composition</i>								
Average household size	-0.061*** (-2.63)	-0.154*** (-3.77)	-0.120*** (-6.26)	-0.248** (-2.27)	-0.235*** (-4.69)	-0.258*** (-3.20)	-0.159*** (-4.42)	-0.109 (-1.48)
(Average household size) ²	0.003* (2.20)	0.007*** (3.91)	0.004*** (4.96)	0.015** (2.08)	0.012*** (3.95)	0.010** (2.55)	0.007*** (3.03)	0.002 (0.67)
Dependency ratio	0.008 (0.34)	0.125** (2.28)	-0.012 (-0.39)	-0.108 (-1.19)	-0.015 (-0.31)	0.066 (0.77)	0.050* (1.88)	0.049 (0.51)
DV=1 if no adult member of the household	-0.007 (-0.05)	0.395 (1.62)	-0.067 (-0.59)	0.695 (1.49)	-0.192 (-1.02)	-0.503 (-1.16)	0.229 (1.60)	-0.141 (-0.29)
DV=1 if female household head	0.019 (0.29)	-0.259* (-1.86)	-0.152* (-1.88)	0.394* (1.85)	-0.126 (-1.37)	-0.072 (-0.27)	-0.119* (-1.65)	0.028 (0.12)
Proportion of female adult members of the household	0.424** (2.26)	0.417 (1.20)	0.093 (0.46)	-0.879 (-1.45)	0.140 (0.44)	0.339 (0.54)	0.353* (1.81)	0.139 (0.23)
Age of the household head	0.005 (0.69)	0.005 (0.28)	-0.006 (-0.80)	0.072 (1.56)	0.017 (1.10)	0.054 (1.31)	-0.004 (-0.51)	-0.016 (-0.55)
(Age of the household head) ²	-0.00008 (-1.01)	-0.00004 (-0.24)	0.00002 (0.32)	-0.001 (-1.28)	-0.0002 (-1.40)	-0.0003 (-0.67)	0.00002 (0.19)	0.0002 (0.75)
<i>Non-income indicators of the household's socio-economic status</i>								
Female adult	0.004* (1.76)	0.003 (1.38)	0.005* (1.78)	0.075*** (2.56)	0.032** (2.27)	0.050* (1.91)	0.007* (1.76)	0.014 (0.64)
mean years of education								

Table 1.5a (continued): GLS estimation of consumption [Dependent variable: Ln(Consumption expenditure per adult equivalent)]								
DV=1 if missing obs. for female adult mean years of education	0.431*** (3.82)	0.121 (0.45)	-0.018 (-0.13)	0.032 (0.07)	0.259 (0.96)	-0.170 (-0.41)	0.086 (0.61)	-0.190 (-0.43)
Male adult mean years of education	0.002 (0.97)	0.003 (1.27)	0.004** (2.00)	0.028 (1.37)	0.003 (1.17)	0.022 (1.00)	0.002 (0.72)	0.113*** (5.14)
DV=1 if missing obs. for male adult mean years of education	-0.046 (-0.51)	0.213 (1.34)	0.128 (1.12)	0.216 (0.66)	0.043 (0.29)	-0.261 (-0.72)	-0.085 (-0.81)	0.860*** (2.73)
DV=1 if agricultural household ^{TT}	-0.144** (2.50)	-0.425*** (3.93)	-0.211*** (-3.53)	-0.255 (-1.40)	-0.107 (-1.07)	-0.531*** (-2.58)	-0.153*** (-2.65)	-0.102 (-0.73)
Community characteristics								
Average distance to tarred road	0.001 (0.85)	0.005 (1.28)	0.002 (1.05)	-0.028** (-2.35)	-0.003*** (-2.66)	0.005 (1.50)	-0.0004 (-0.54)	0.002 (0.79)
DV=1 if missing obs. for distance to tarred road	0.305 (1.30)	1.353*** (3.76)	0.061 (0.50)	0.070 (0.14)	-0.174* (-1.65)	0.352 (1.42)	0.170 (0.79)	0.524 (1.56)
Average distance to bus or taxi stop	-0.003* (-1.67)	0.011** (2.21)	-0.002 (-1.49)	-0.084 (-0.79)	-0.002 (-0.80)	-0.015 (-1.23)	-0.006** (-2.20)	-0.002 (-0.24)
DV=1 if missing obs. for distance to bus/taxi stop	-0.152 (-0.65)	-2.465*** (-3.86)	-0.175 (-0.60)		0.152 (1.02)	-0.233 (-0.68)	0.438 (1.06)	
Average distance to bank	-0.001 (-1.16)	-0.003 (-1.08)	-0.005*** (-2.85)	0.013 (1.33)	0.001 (0.36)	0.002 (0.29)	0.003*** (2.65)	0.003 (0.30)
DV=1 if missing obs. for distance to bank	0.393** (2.35)	1.227*** (2.85)	0.093 (0.73)	-0.163 (-0.43)	0.180 (1.26)		-0.300** (-2.42)	-0.535 (-1.19)

Table 1.5a (continued): GLS estimation of consumption [Dependent variable: Ln(Consumption expenditure per adult equivalent)]						
DV = 1 if produce market available in the village	0.020 (0.17)	-0.533* (-1.84)	-0.057 (-0.62)	-0.304 (-0.87)	-0.145 (-0.51)	0.047 (0.13)
DV=1 if missing obs. for produce market available in the village	-0.924** (-2.32)		-0.242 (-0.90)		-0.355 (-1.31)	-0.392 (-0.80)
DV = 1 if year 1992/93	-0.407*** (-11.47)	-0.503*** (-6.32)	-0.429*** (-10.24)	-0.331*** (-2.63)	-0.115** (-1.96)	-0.231 (-1.53)
Constant	9.272*** (41.33)	9.740*** (21.83)	9.938*** (43.47)	7.963*** (6.64)	9.275*** (23.74)	7.804*** (8.38)
R ²	0.2353	0.5526	0.2977	0.6081	0.2706	0.5350
Total number of groups	329	74	263	39	164	37
Total number of observations	658	148	526	78	328	74
						718
						88

ππ Omitted category: Non-agricultural household, Year 1999/00.

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%.

Table 1.5b: GLS estimation of the variance of the disturbance term [Dependent variable: $\text{Ln}(\sigma^2_{\epsilon})$]

	Central rural	Central urban	Eastern rural	Eastern urban	Northern rural	Northern urban	Western rural	Western urban
<i>Household demographic composition</i>								
Average household size	0.165 (1.39)	-0.015 (-0.08)	-0.001 (-0.01)	0.303 (0.59)	0.099 (0.48)	0.457 (1.14)	0.045 (0.28)	0.410 (1.28)
(Average household size) ²	-0.005 (-0.78)	-0.003 (-0.34)	0.002 (0.47)	-0.014 (-0.40)	-0.006 (-0.43)	-0.022 (-1.23)	0.005 (0.46)	-0.027* (-1.76)
Dependency ratio	-0.076 (-0.65)	0.062 (0.24)	0.082 (0.66)	-0.113 (-0.25)	0.014 (0.07)	-0.036 (-0.09)	-0.096 (-0.80)	0.517 (1.29)
DV=1 if no adult member of the household	0.167 (0.28)	-1.107 (-1.01)	0.349 (0.74)	4.210* 1.81	-0.510 (-0.65)	-3.735* (-1.83)	0.381 (0.60)	2.074 (0.98)
DV=1 if female household head	-0.262 (-0.80)	0.073 (0.12)	-0.164 (-0.49)	0.557 (0.54)	0.985*** (2.65)	-0.448 (-0.31)	0.277 (0.89)	-0.223 (-0.24)
Proportion of female adult members of the household	0.969 (1.00)	-0.065 (-0.04)	0.392 (0.47)	0.672 (0.23)	0.875 (0.67)	3.133 (1.02)	0.457 (0.52)	4.463* (1.75)
Age of the household head	-0.033 (-0.84)	0.092 (1.21)	-0.039 (-1.23)	0.182 (0.82)	-0.054 (-0.87)	-0.296 (-1.40)	-0.018 (-0.52)	-0.039 (-0.31)
(Age of the household head) ²	0.0003 (0.73)	-0.001 (-1.27)	0.0003 (0.96)	-0.002 (-0.90)	0.001 (1.04)	0.003 (1.37)	0.0002 (0.63)	0.0002 (0.14)
<i>Non-income indicators of the household's socio-economic status</i>								
Female adult mean years of education	0.014 (1.23)	-0.005 (-0.48)	-0.002 (-0.22)	0.007 (0.06)	-0.033 (-0.59)	0.008 (0.06)	0.026 (1.44)	-0.183** (-2.02)

Table 1.5b (continued): GLS estimation of the variance of the disturbance term [Dependent variable: $\text{Ln}(\sigma^2_{\epsilon h})$]						
DV=1 if missing obs. for female adult mean years of education	1.192** (2.03)	1.073 (0.88)	0.826 (1.41)	-0.099 (-0.05)	1.224 (1.11)	1.829 (0.86)
Male adult mean years of education	0.014 (1.27)	-0.010 (-1.06)	0.009 (1.01)	0.061 (0.64)	-0.001 (-0.08)	-0.121 (-1.07)
DV=1 if missing obs. for male adult mean years of education	0.466 (1.00)	-0.490 (-0.66)	0.216 (0.45)	-0.345 (-0.22)	-0.912 (-1.49)	-0.252 (-0.14)
DV=1 if agricultural household ^{TT}	-0.122 (-0.42)	0.074 (0.15)	-0.202 (-0.82)	1.580* (1.81)	-0.063 (-0.15)	-0.401 (-0.40)
<i>Community characteristics</i>						
Average distance to tarded road	-0.0002 (-0.05)	0.009 (0.53)	0.010 (1.57)	0.003 (0.05)	0.001 (0.25)	0.013 (0.77)
DV=1 if missing obs. for distance to tarded road	-0.926 (-0.79)	0.002 (0.00)	0.275 (0.56)	-2.380 (-1.13)	0.281 (0.68)	-0.084 (-0.06)
Average distance to bus or taxi stop	0.002 (0.30)	0.023 (1.14)	-0.013** (-2.06)	-0.235 (-0.53)	0.005 (0.56)	-0.072 (-1.24)
DV=1 if missing obs. for distance to bus/taxi stop	1.326 (1.14)	2.206 (0.80)	-3.147*** (2.59)		-0.682 (-1.15)	-1.193 (-0.58)
Average distance to bank	0.002 (0.43)	0.008 (0.59)	-0.002 (-0.23)	-0.052 (-0.99)	-0.007 (-1.05)	0.027 (0.70)
DV=1 if missing obs. for distance to bank	-0.541 (-0.72)	-3.713** (-2.20)	0.276 (0.53)	0.162 (0.10)	0.058 (0.10)	0.736 (1.42)
						0.002 (0.06)
						0.433 (0.35)
						0.057 (1.46)
						-0.284 (-0.17)

Table 1.5b (continued): GLS estimation of the variance of the disturbance term [Dependent variable: $\text{Ln}(\sigma^2_{eh})$]							
DV = 1 if produce market available in the village	-0.330 (-0.62)	-0.309 (-0.26)	0.231 (0.62)	1.746 (1.17)	1.019 (0.91)	-3.014 (-1.42)	0.480 (1.28)
DV=1 if missing obs. for produce market available in the village	-0.184 (-0.10)		1.539 (1.38)		-0.640 (-0.60)		3.854* (1.93)
DV = 1 if year 1992/93 $\pi\pi$	0.078 (0.37)	0.159 (0.38)	0.250 (1.37)	0.492 (0.73)	0.382 (1.51)	-0.167 (-0.24)	0.146 (0.79)
Constant	-3.168*** (-2.85)	-4.883** (-2.55)	-1.974** (2.09)	-8.496 (-1.52)	-2.488 (-1.56)	2.244 (0.46)	-2.829*** (-2.82)
R ²	0.0240	0.1273	0.0571	0.2272	0.0677	0.1760	0.2198
Total number of groups	329	74	263	39	164	37	359
Total number of observations	658	148	526	78	328	74	718
$\pi\pi$ Omitted category: Non-agricultural household, Year 1999/00.							
Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%.							

Table 1.6: Vulnerability

Table 1.6a: Vulnerability Trends and Patterns (%)

	N	1992/93	1999/00
		Vulnerability	Vulnerability
Nation	1,309	57	25
Rural	1,115	61	27
Urban	194	33	17
Central	403	50	4
Eastern	302	61	27
Northern	201	76	80
Western	403	52	17
Central rural	329	55	3
Central urban	74	26	10
Eastern rural	263	65	29
Easter urban	39	31	15
Northern rural	164	79	88
Northern urban	37	62	46
Western rural	359	55	18
Western urban	44	23	7

Table 1.6b: Relative vs. High vulnerability (%)

	N	1992/93		1999/00	
		Relatively vulnerability	High vulnerability	Relatively vulnerability	High vulnerability
Nation	1,309	-	57	9	16
Rural	1,115	-	61	11	16
Urban	194	-	33	4	13
Central	403	-	50	3	1
Eastern	302	-	61	16	11
Northern	201	-	76	7	73
Western	403	-	52	13	4
Central rural	329	-	55	2	1
Central urban	74	-	26	4	6
Eastern rural	263	-	65	18	11
Easter urban	39	-	31	3	12
Northern rural	164	-	79	7	81
Northern urban	37	-	62	9	37
Western rural	359	-	55	14	4
Western urban	44	-	23	2	5

Note: N is the number of observations in the relevant group.

Table 1.7: Testing the equality of Vconsumption and Vprobit (1992)

	Vprobit
Vconsumption	0.544*** (37.83)
Constant	0.208*** (23.91)
$H_0: \alpha = 0 \text{ and } \beta = 1$ [$F_{(2, 1307)}$]	529.54***
R^2	0.5317
No. of observations	1309

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%. In addition, all reported standard errors are robust (White H., 1980; 1982).

Table 1.8: Mean vulnerability level in 1992/93 by observed poverty status in 1992/93 and 1999/00

		Poverty Status in 1999/00		
		Non-poor	Poor	All
Poverty Status in 1992/93	Non-poor	0.229	0.489	0.285
	Poor	0.444	0.687	0.538
	All	0.322	0.616	0.410

Table 1.9: Selected characteristics of poor and vulnerable households

	1992/93			1999/00		
	Full sample	Poorest 25%	Most vulnerable 25%	Full sample	Poorest 25%	Most vulnerable 25%
<i>Household characteristics</i>						
Average household size	5.35	6.19	7.13	5.77	6.69	7.21
Fraction with high dependency ratio	0.70	0.79	0.88	0.73	0.81	0.86
Fraction with female household head	0.24	0.22	0.25	0.28	0.25	0.27
<i>Community characteristics</i>						
Average distance to tarred road	27.52	33.68	36.79	26.21	34.82	37.84
Average distance to bus or taxi stop	11.30	13.84	16.43	10.46	12.55	12.46
Average distance to bank	23.36	28.35	28.49	25.76	31.73	32.09
Fraction with produce market	0.06	0.09	0.07	0.06	0.05	0.08
<i>Location</i>						
Central rural	0.25	0.21	0.12	0.25	0.17	0.03
Central urban	0.06	0.02	0.03	0.06	0.02	0.02
Eastern rural	0.20	0.25	0.27	0.20	0.19	0.23
Easter urban	0.03	0.02	0.03	0.03	0.02	0.02
Northern rural	0.13	0.19	0.29	0.13	0.29	0.44
Northern urban	0.03	0.03	0.05	0.03	0.02	0.05
Western rural	0.27	0.27	0.20	0.27	0.28	0.20
Western urban	0.03	0.01	0.01	0.03	0.01	0.01

Table 1.10: Ranking of poverty and vulnerability by administrative region

	Poverty rate (Poor)		Fraction vulnerable to poverty (Vul)		$\frac{Vul}{Poor}$
	Rank	Rate (%)	Rank	Fraction (%)	
1992/93					
Northern rural	1	63	1	79	1.25
Eastern rural	2	57	2	65	1.14
Northern urban	3	54	3	62	1.15
Western rural	4	48	4	55.2	1.15
Central rural	5	45	5	55.0	1.22
Central urban	6	38	7	26	0.68
Easter urban	7	33	6	31	0.94
Western urban	8	32	8	23	0.72
1999/00					
Northern rural	1	64	1	88	1.38
Northern urban	2	32	2	46	1.44
Eastern rural	3	29	3	29	1
Western rural	4	28	4	18	0.64
Central rural	5	24	8	3	0.13
Easter urban	6	18	5	15	0.83
Central urban	7	15	6	10	0.67
Western urban	8	9	7	7	0.78

Figure 1.1: Distribution of estimated vulnerability, 1992/93

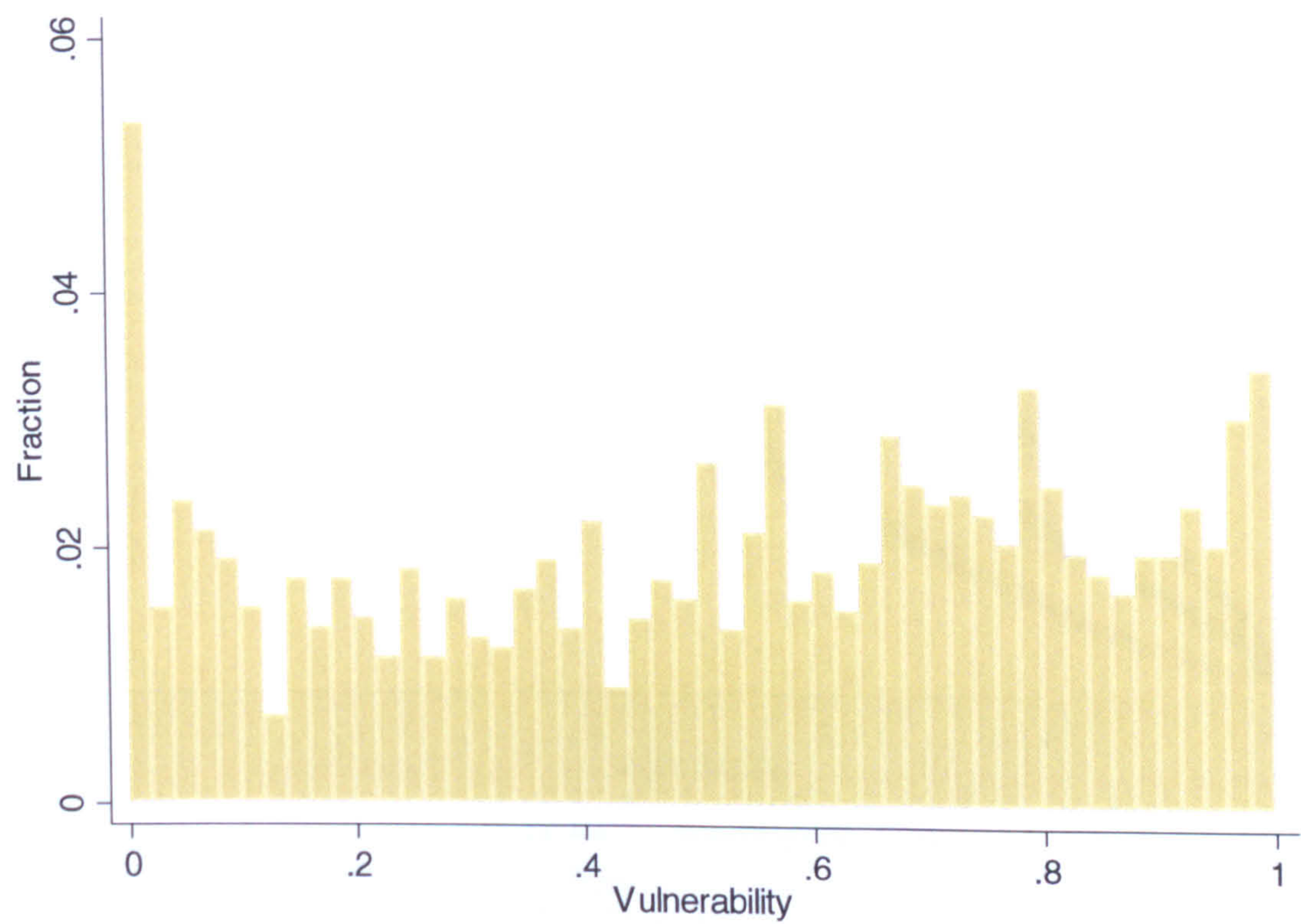


Figure 1.2: Distribution of estimated vulnerability, 1999/00

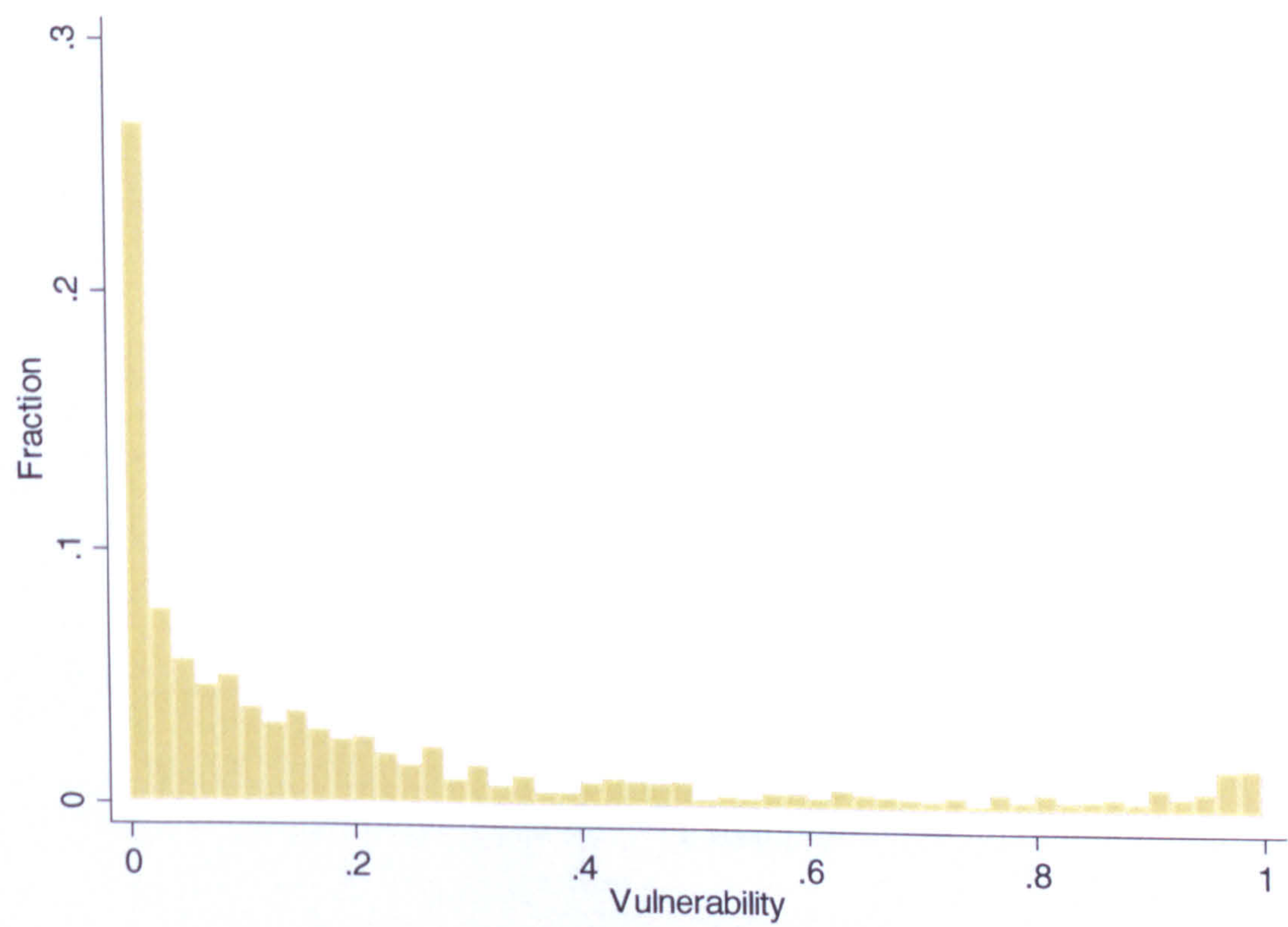


Figure 1.3: Cumulative distribution of estimated vulnerability, 1992/93

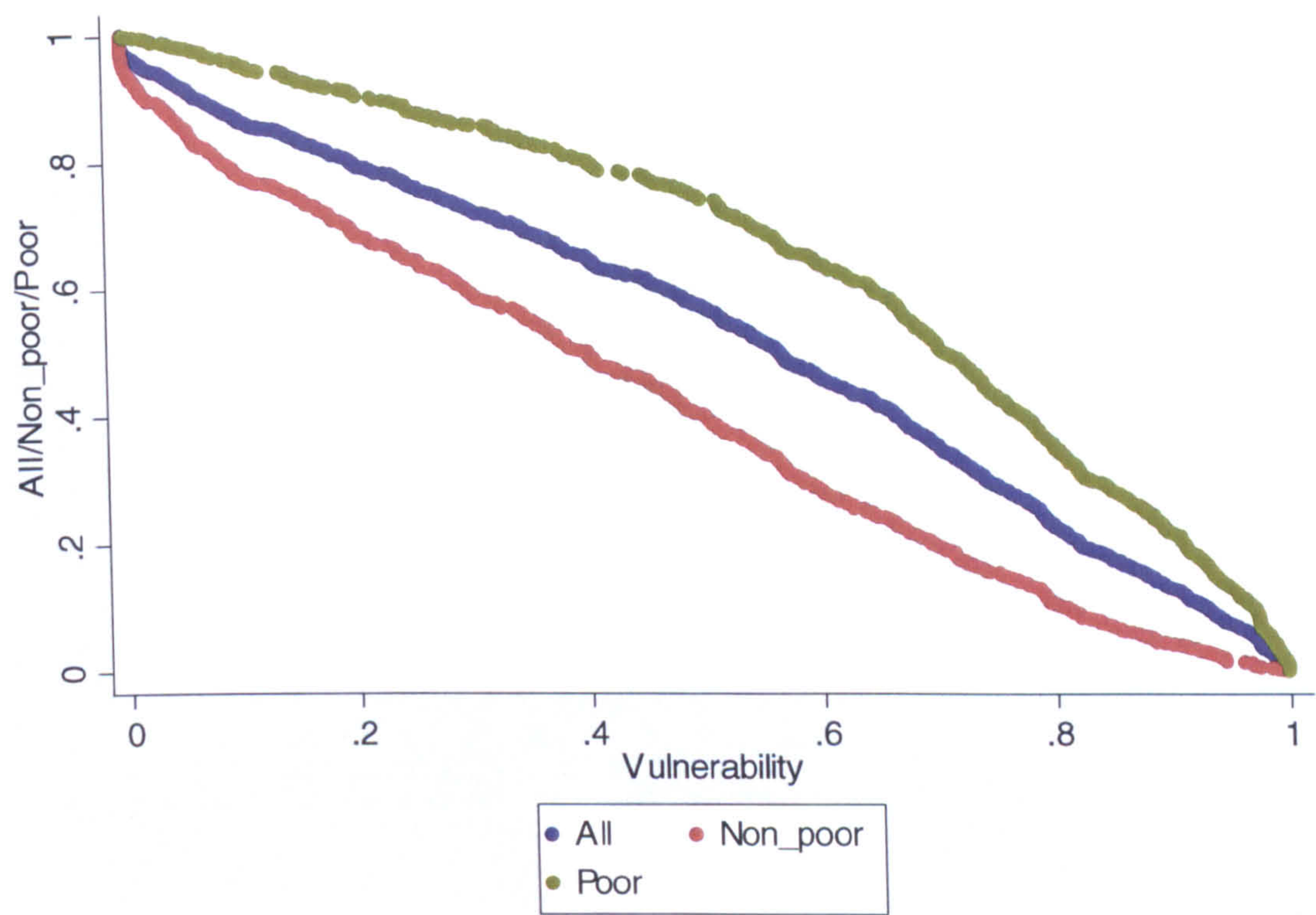


Figure 1.4: Cumulative distribution of estimated vulnerability, 1999/00

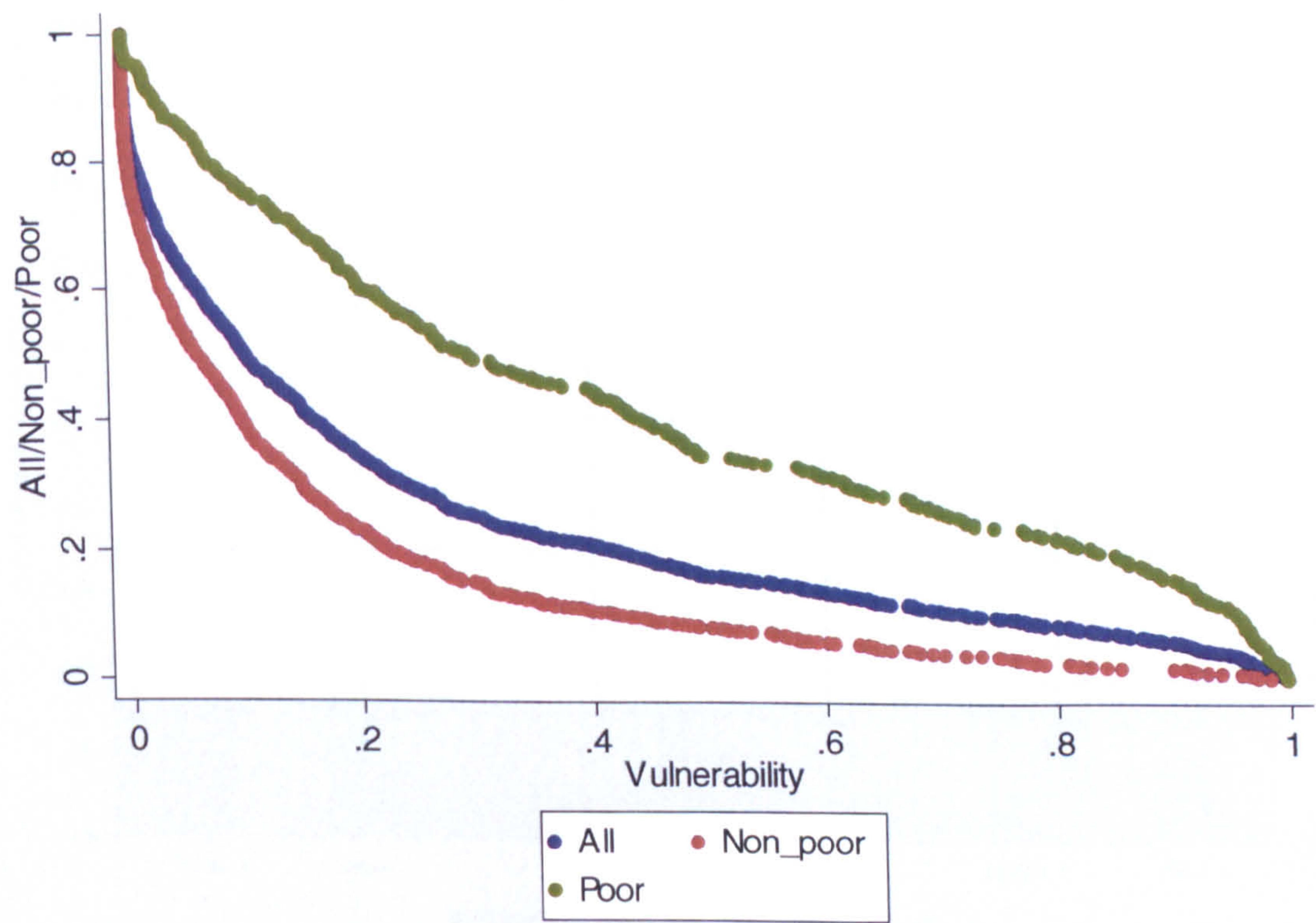


Figure 1.5: Distribution of estimated vulnerability, 1992/93

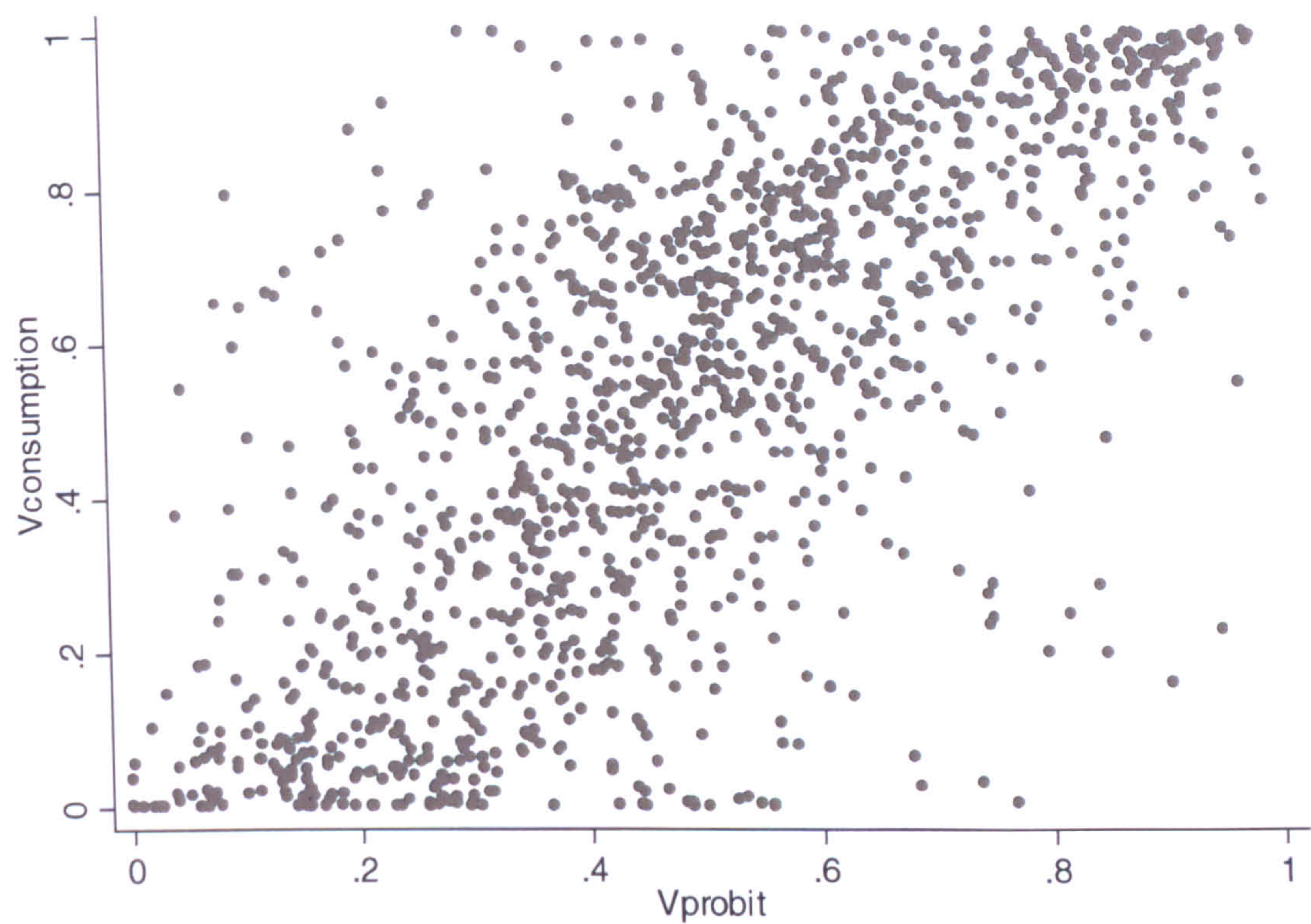


Figure 1.6: Predicted and actual 2002/03 poverty rates by region

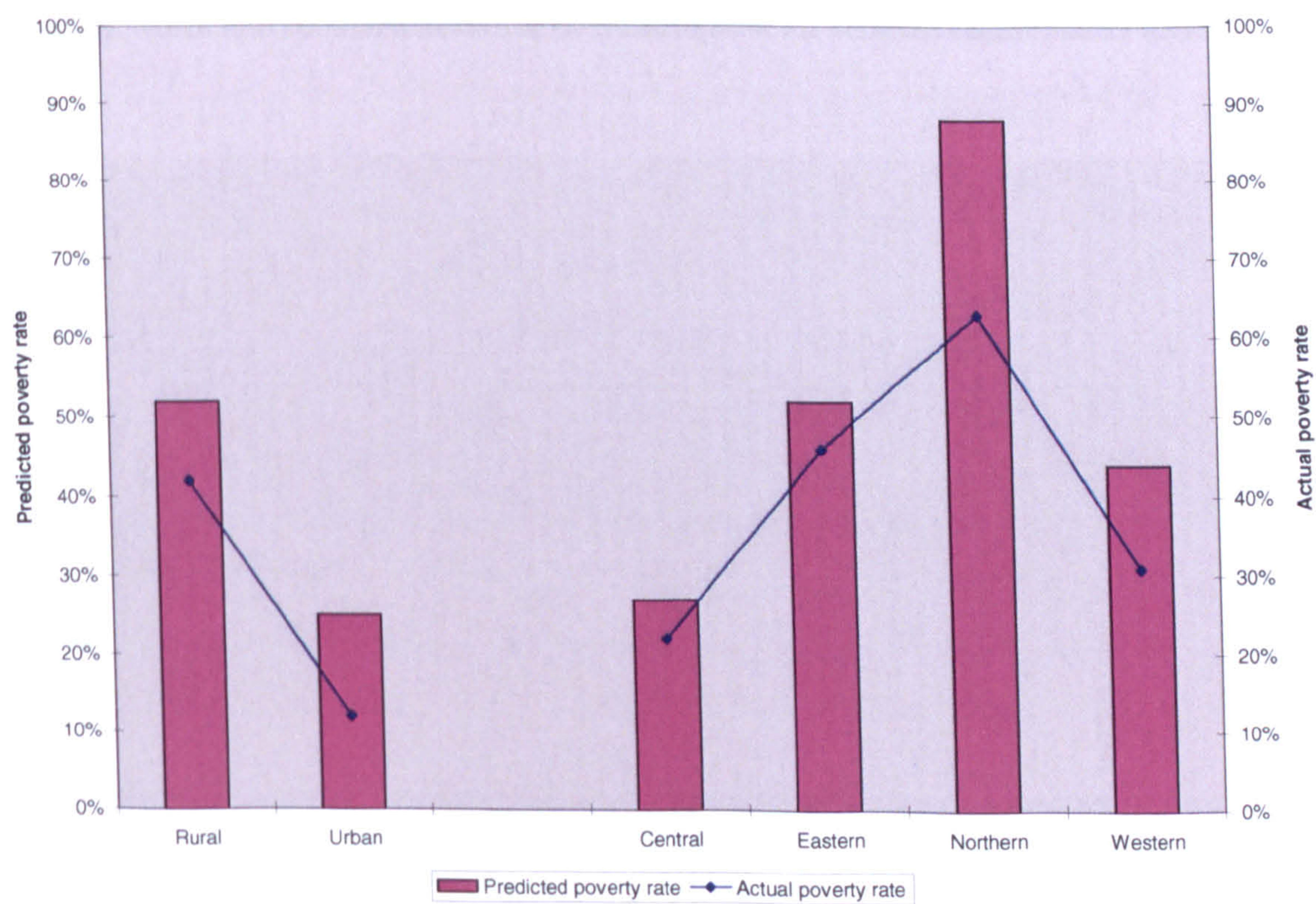


Figure 1.7: Mean and standard deviation of consumption for selected vulnerability levels (1992/93)

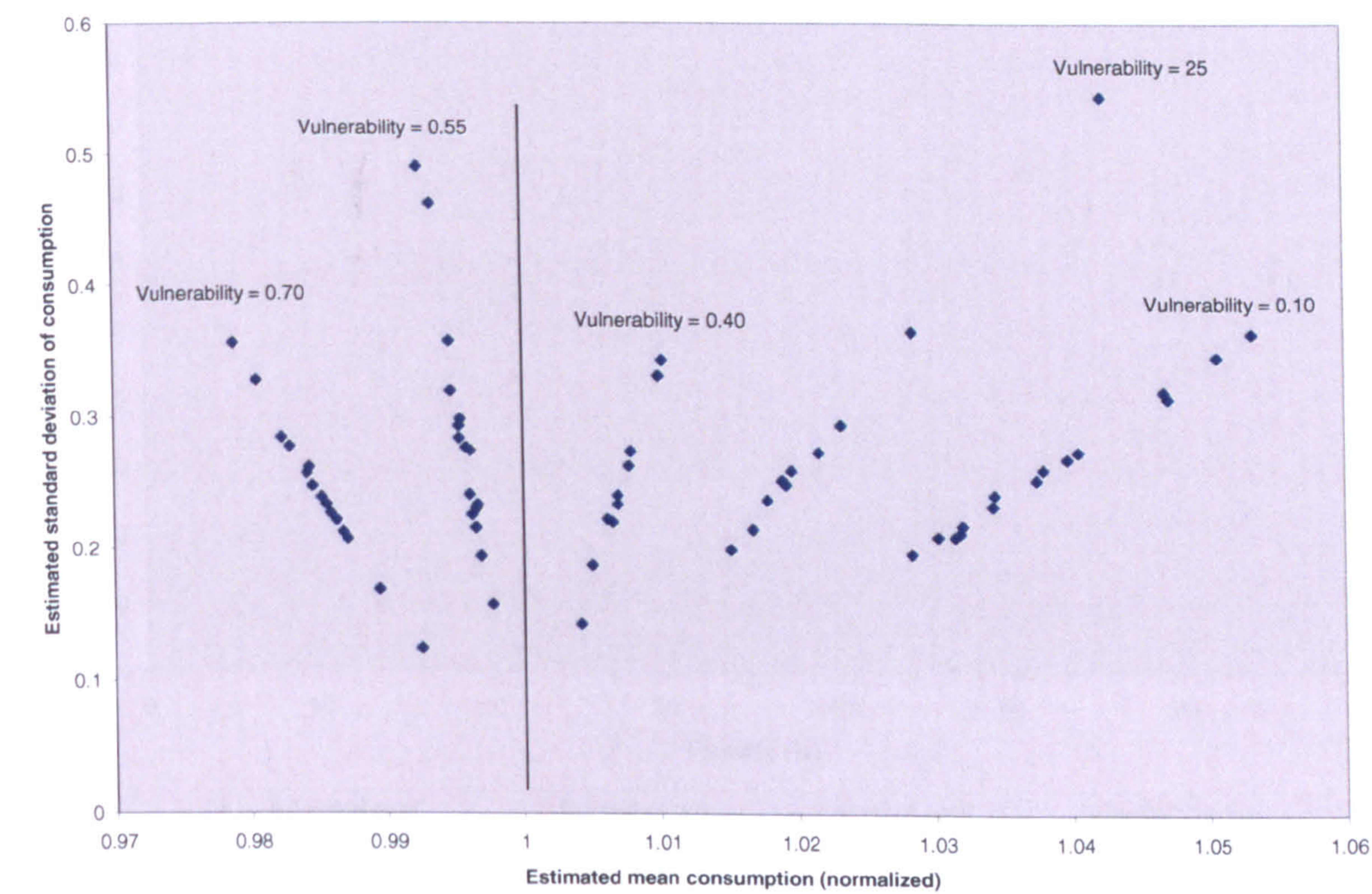


Figure 1.8: Mean and standard deviation of consumption for selected vulnerability levels (1999/00)

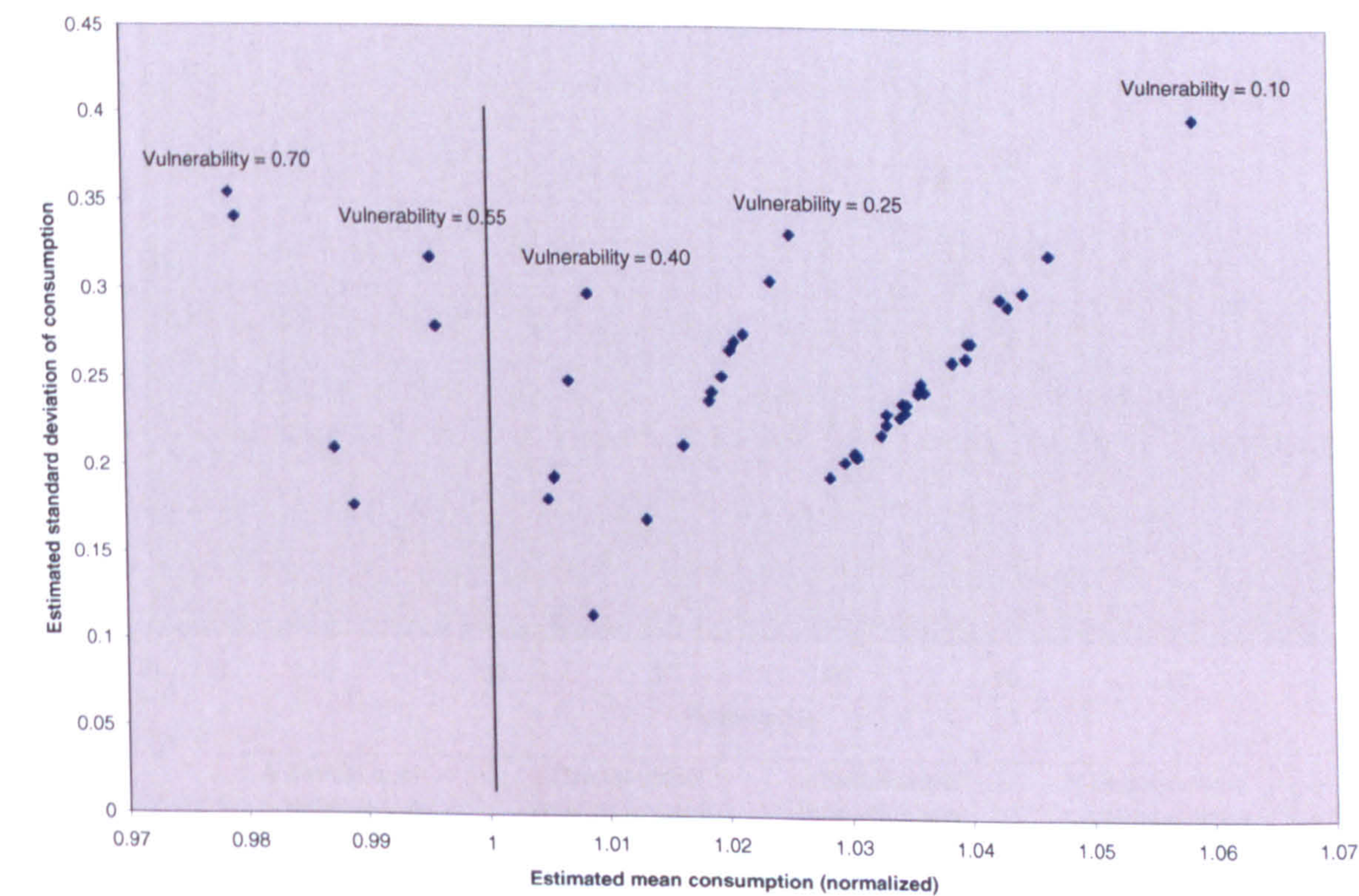


Figure 1.9: Poverty & Vulnerability, 1992/93

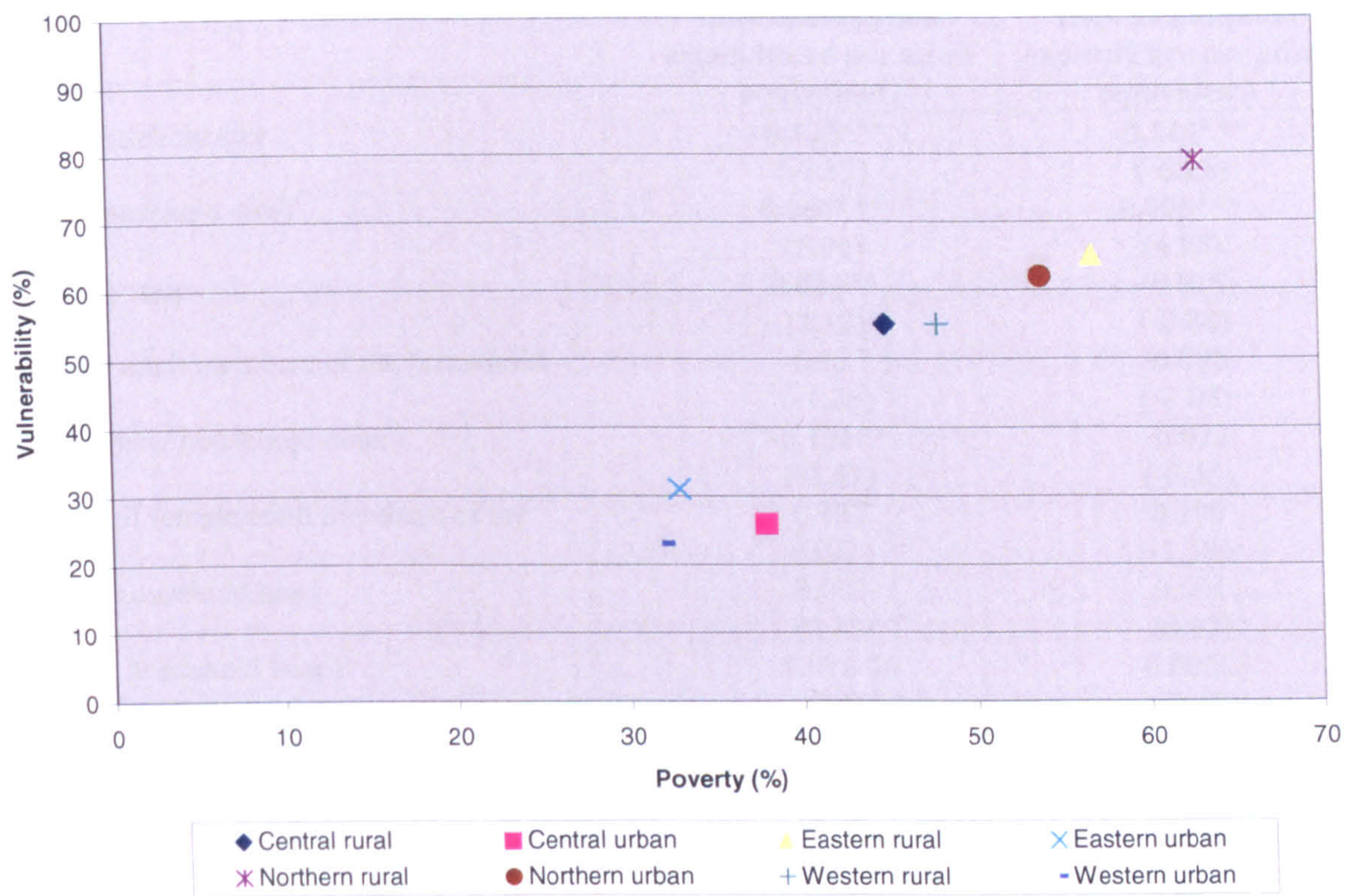
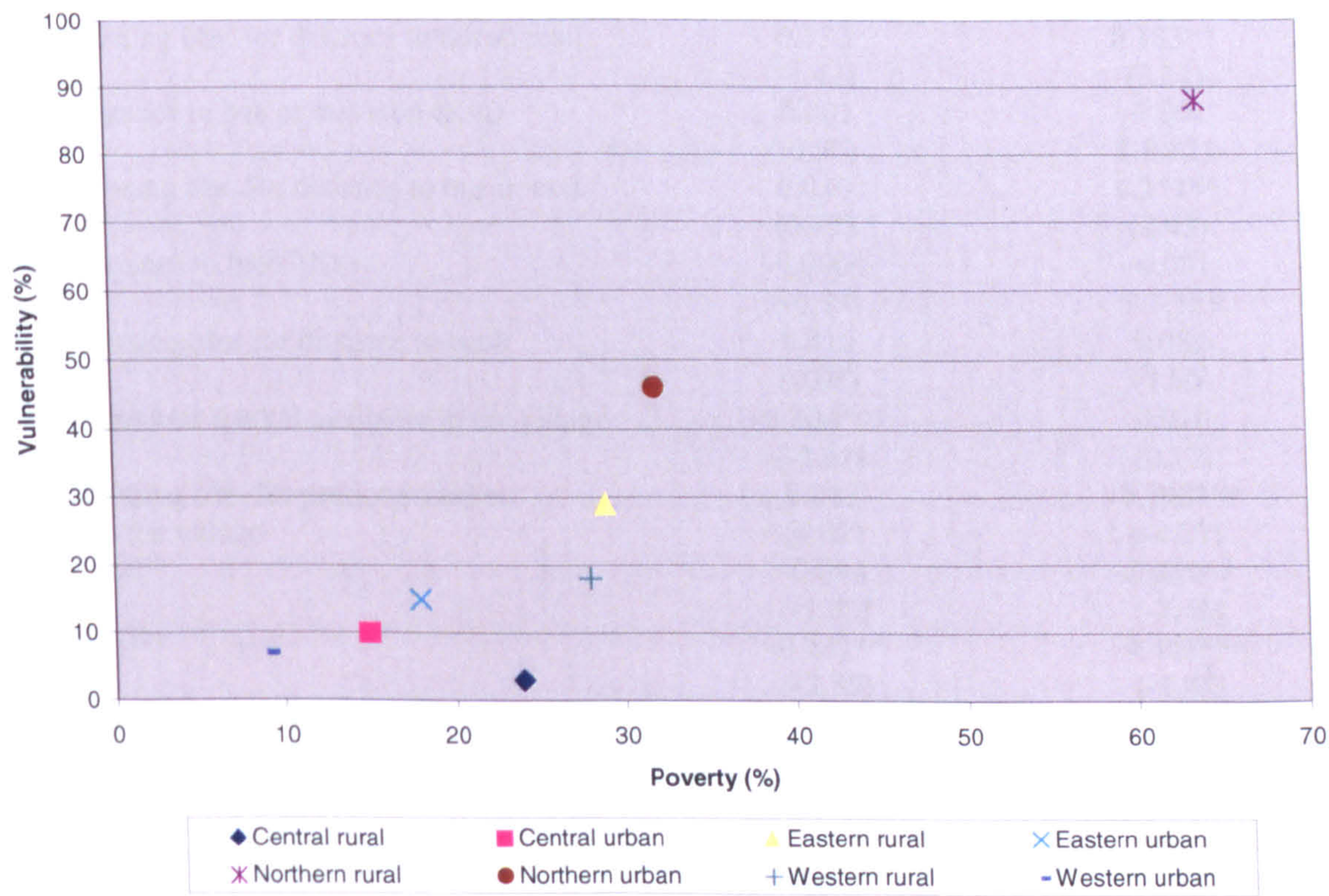


Figure 1.10: Poverty & Vulnerability, 1999/00



Annex I: OLS estimation of consumption

	1992/93	1999/00
	Ln(Consumption expenditure per adult equivalent)	Ln(Consumption expenditure per adult equivalent)
Average household size	-0.125*** (-7.17)	-0.114*** (-6.16)
(Average household size) ²	0.004*** (5.06)	0.005*** (4.98)
Dependency ratio	0.036** (2.12)	-0.015 (-0.88)
DV=1 if no adult members of the household	-0.127 (-1.26)	-0.006 (-0.08)
DV=1 if female household head	-0.131** (-2.57)	-0.022 (-0.45)
Proportion of female adult members of the household	0.137 (0.93)	0.199 (1.39)
Age of the household head	0.001 (0.13)	0.001 (0.17)
(Age of the household head) ²	-8.97e-06 (-0.16)	-0.00003 (-0.37)
Female adult mean years of education	0.034*** (5.62)	0.004** (2.34)
DV=1 if missing obs. for female adult mean years of education	0.155 (1.49)	0.152 (1.43)
Male adult mean years of education	0.030*** (6.53)	0.002** (2.12)
DV=1 if missing obs. for male adult mean years of education	0.209*** (2.85)	-0.039 (-0.63)
DV=1 if agricultural household ^{TT}	-0.071* (-1.83)	-0.257*** (-5.42)
Average distance to tarred road (Km)	-0.0003 (-0.42)	-0.0003 (-0.43)
DV=1 if missing obs. for distance to tarred road	-0.132 (-1.42)	0.183** (2.21)
Average distance to bus or taxi stop (Km)	-0.001 (-0.96)	-0.001 (-0.82)
DV=1 if missing obs. for distance to bus or taxi stop	0.036 (0.42)	0.271** (2.43)
Average distance to bank (Km)	-0.0004 (-0.39)	-0.001 (-1.55)
DV=1 if missing obs. for distance to bank	0.010 (0.08)	0.083 (0.80)
DV = 1 if produce market available in the village	-0.204*** (-2.61)	0.010 (0.12)
DV=1 if missing obs. for produce market available in the village	0.003 (0.02)	-0.798*** (-4.27)
Central rural ^{TT}	-0.094 (-1.02)	-0.210** (-2.45)
Eastern rural ^{TT}	-0.242** (-2.55)	-0.402*** (-4.88)
Easter urban ^{TT}	-0.174 (-1.53)	-0.155 (-0.84)
Northern rural ^{TT}	-0.284*** (-2.77)	-0.811*** (-8.17)
Northern urban ^{TT}	-0.236* (-1.66)	-0.573*** (-4.91)
Western rural ^{TT}	-0.119 (-1.24)	-0.276*** (-3.09)

Annex I (continued): OLS estimation of consumption

Western urban ^{TT}	0.112 (1.00)	0.061 (0.53)
Constant	9.085*** (53.26)	9.978*** (47.16)
R ²	0.2435	0.3177
No. of clusters	349	334
No. of observations	1309	1309

^{TT} Omitted category: Non-agricultural household, Central-urban.

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%. In addition, all reported standard errors are robust (White H., 1980; 1982), and adjusted to permit observations within clusters (primary sampling units) to be correlated (Deaton A., 1997).

CHAPTER II

INTEGRATING QUANTITATIVE AND QUALITATIVE DATA TO IMPROVE OUR UNDERSTANDING OF POVERTY IN UGANDA

2.1 INTRODUCTION

Poverty analysts in ‘qualitative’ and ‘quantitative’ traditions have been highly active in the policy debates of the past decades. While quantitative approaches have been dominant, the use of qualitative approaches has been increasing. This chapter aims to evaluate the claim that the understanding of poverty as a whole is enhanced by using both methods, and determine whether the result is possibly a bit more than the sum of the distinct contributions.

Integrating quantitative and qualitative sources of data can be used to widen the concept of vulnerability developed in the previous chapter. For purposes of this analysis, the quantitative data come from the Integrated Households Survey (IHS) 1992/93 and the Uganda National Household Survey (UNHS) 1999/00 two wave panel described in the previous chapter. This panel, spanning between 1992/93 and 1999/00, coincides with considerable changes in policy, in particular, liberalization of agricultural trade in the early 1990’s, a coffee price boom up to 1995/96, and the adoption of a programme of Universal Primary Education in 1997. The qualitative data come from the Uganda Participatory Poverty Assessment Processes (UPPAP, 2000, 2002). These represent an attempt to bring together the voices and perspectives of the poor into central and local governments’ policy formulation, planning and

implementation. As such, they highlight the complexity of poverty, while revealing its diversity by region, location, and socio-economic status.

Chapter I argued that, between 1992/93 and 1999/00, the national incidence of vulnerability to poverty declined from 57% to 25% of the population. Together with the finding that during the same period poverty dropped from over one half of the population to nearly one third, this evidence supports the claim that the period between 1992 and 2000 may mark the transition of Uganda from recovery to fresh growth (Appleton, 2001b).

Borrowing from UPPAP (2000), it is possible to add texture to the seemingly narrow definition of household vulnerability presented in the previous chapter. In addition to noting that vulnerability varies with gender, age, ethnicity, occupation and social status, UPPAP participants identified vulnerability as one of the primary causes of poverty in Uganda. As it was already mentioned at the outset, local people defined vulnerability as (i) the likelihood that a person or group of people who were currently breaking even would deteriorate and eventually result in the person or the group becoming poorer; (ii) a condition in which an event or situation can easily predispose one to the likelihood of becoming poorer; and (iii) inability of some members of the community to meet their basic needs exposes them to poorer living standards (UPPAP, 2000).

While survey data can be further analysed to describe which households succeed in becoming less vulnerable, thereby increasing their chances of moving out of poverty, qualitative data is more suitable to explain how these households manage to improve

their welfare status. Table 2.1 illustrates the vulnerability path at the national level, and by location, economic activity of the household, dependency ratio, and sex of the household head. According to the data, the majority of households who were vulnerable in 1992/93 successfully managed to overcome their vulnerable status by 1999/00 (62%), and the majority of those who were not vulnerable in the first period remained so by the end of the decade (92%). This conclusion holds true even at the regional level, with the exception of the northern region. In northern Uganda, 90% of households who were vulnerable in 1992/93 remained vulnerable by 1999/00, while 48% of those who were not vulnerable in the first period became vulnerable by the end of the decade.

In addition, households with a low dependency ratio found it relatively easier to improve their social status than their respective counterparts. During the past decade, 70% (61%) of households with a low (high) dependency ratio who were vulnerable in 1992/93 became non-vulnerable by 1999/00.

Having quantified the incidence of household vulnerability, table 2.2 presents poverty vis-à-vis vulnerability trends between 1992/93 and 1999/00. The evidence supports the claim that during the 1990s Uganda experienced simultaneous reductions in poverty and household vulnerability. The proportion of poor and vulnerable Ugandans declined from 37% to 15%. In this economic environment, the proportion of poor, non vulnerable, Ugandans increased from 13% to 15%. While currently poor, these households (i.e. 169 and 199 in 1992 and 1999, respectively) are likely to move out of poverty in the next period.

This increase in the number of non-vulnerable Ugandans represents a marked improvement in households' ability to cope with risk and uncertainty. UPPAP (2002) communities identified hard work, access to gainful employment or multiple income sources, and increased access to land and property through purchase or inheritance, as the major factors explaining movement out of poverty. Hard work was largely associated with being healthy and able to engage in any work that may be available to earn an income. Multiple income sources were said to be important in improving risk management.

Land and livestock were viewed by some communities as the main engine for moving out of poverty through increased household income. Other priorities included having a small family, group formation, living for a longer period, which allows one to accumulate wealth, and acquiring skills and accessing education, particularly higher level education. Access to start-up capital and petty trade were also recognized as fundamental for upward mobility. Notably, petty trade was mentioned as particularly important in moving women out of poverty.

In Northern districts, movement out of poverty depended largely on the prevailing security situation. Upward mobility was experienced in periods of peace when people could access raw materials and petty traders were able to sell at a profit. Bad practices like corruption, theft, robbery and gun trafficking (especially by youth in the North) were also viewed by some communities as means of moving out of poverty in cases where opportunities for improving livelihoods were minimal. This possibly sheds light on why such practices have become increasingly common in the country (UPPAP, 2002).

This type of integration stands as the first example of potential gains from merging qualitative and quantitative approaches to improve poverty research and policy making. In view of the above, section 2.2 reviews the available literature, and section 2.3 provides an additional example of the advantages derived from the integration of Uganda's qualitative and quantitative sources of data. To this end, UPPAP's recognition of vulnerability as a threat to Ugandans' wellbeing, together with our survey based application to quantify its incidence present an opportunity for deepening our understanding of a common area of interest to both researchers and policy makers: Chronic poverty. Greater insight into this argument will be elucidated in Section 2.3.

In an attempt to establish their relative strengths and weaknesses, and identify what kinds of integration seem most profitable in the Ugandan case, section 2.4 makes use of participatory evidence to guide survey based analysis. In doing so, it focuses on assessing the feasibility of examining, explaining, confirming, refuting, and/or enriching information from one approach with that from the other.

Finally, while summarizing the main conclusions, Section 2.5 highlights areas for improving research design and poverty analysis, while merging the findings from the two approaches into one set of policy recommendations.

2.2 LITERATURE REVIEW

Qualitative and quantitative approaches to poverty analysis have a considerable contribution to make in furthering our understanding of poverty as a whole, and in helping to formulate poverty reduction strategies, policies and interventions. Each approach may capture and reflect reality in a way that might bridge the gap on many disagreements of poverty reduction strategies. Numerical information can be more easily aggregated, but it can miss out on nuance and texture. General coverage aids representativeness, but can lose context. Statistical inference can help in discussions of causality, but misses out on the power of inductive approaches (Kanbur, 2003).

The quantitative approach to poverty measurement and analysis is one that typically uses random sample surveys and structured interviews to collect data (mainly, quantifiable data) and analyses it using statistical techniques. By contrast, the qualitative approach is defined as one that typically uses purposive sampling and semi-structured or interactive interviews to collect data (mainly, data relating to people's judgements, attitudes, preferences, priorities, and/or perceptions about a subject) and analyses it through sociological or anthropological research techniques (Carvalho and White, 1997).

While recognisable to many, Hentschel and others question such a characterization of quantitative vis-à-vis qualitative approaches as being somewhat misleading. In Hentschel's (in Kanbur et al., 2001) own words, "often the terms 'quantitative' and 'qualitative' are used to describe both the methods of data collection as well as the

type of data collected. But what is generally referred to as ‘quantitative’ methods often produce ‘qualitative’ data and vice-versa”.

Booth and Hentschel (in Kanbur et al., 2001) offer a useful distinction between *types* of data on the one hand, and types of data collection *methods* on the other. On the latter, they propose the terminology of ‘contextual’ and ‘non-contextual’, meaning by the former methods that attempt to capture a social phenomenon within its social, economic and cultural context, while in the latter, the sampling, the interview schedule, the training of enumerators and other aspects of best practice survey technique are designed precisely to collect information that is untainted by the particularities of the context in which it is described (Booth et al., 1998). Booth and Hentschel prefer to reserve the term ‘quantitative’ and ‘qualitative’ for the types of data collected, although a more accurate terminology might be ‘numerical’ and ‘non-numerical’, and this would also avoid confusion with the more general usage of the terms ‘quantitative’ and ‘qualitative’.

Sticking to the qualitative and quantitative terminology, Carvalho and White (1997) provide the following listing of the strengths and weaknesses of each:

Quantitative

Strengths: (i) makes aggregation possible, (ii) provides results whose reliability is measurable, (iii) allows simulation of different policy options. Weaknesses: (i) sampling and non-sampling errors, (ii) misses what is not easily quantifiable, (iii) fails to capture intra-household issues.

Qualitative

Strengths: (i) richer definition of poverty, (ii) more insight into causal processes, (iii) more accuracy and depth of information on certain questions. Weaknesses: (i) lack of generalizability, (ii) difficulties in verifying information.

Carvalho and White (1997) and McGee (2000) use the above to characterise quantitative approaches as having *breadth*, and qualitative approaches as having *depth*. Although a questionable classification on account of the fact that qualitative assessments cover a wider range of aspects of the same issue (e.g. multidimensionality of poverty) while quantitative approaches pay closer attention to detail, the key is to marry breadth and depth of one with those of the other. To facilitate this process, Carvalho and White (1997) distinguish the following processes to combine the best of qualitative and quantitative approaches: (i) integrating the country's qualitative and quantitative sources of data; and (ii) examining, explaining, confirming, refuting, and/or enriching information from one approach with that from the other.¹⁴

While the contours of clarity are slowly emerging from these attempts at typology and classification of types of data, there is clearly some way to go, and there is still room for confusion (Kanbur et al., 2001).

¹⁴ McGee's (2000) recent evaluation of qualitative and quantitative assessments of poverty in Uganda illustrates these principles, focusing on how the Uganda National Household Survey (UNHS) and the Participatory Poverty Assessment (PPA) can be better combined. The author's key recommendations include: (i) Using PPA to further examine downturn in some welfare indicators between 1995/96 and 1996/97 as derived from the UNHS; (ii) Using PPA insights to refine the UNHS questionnaire; (iii) given the findings of the PPA, include questions on risk and vulnerability in the UNHS; (iv) matching sample design for PPA and UNHS – with some households in common; (v) increasing standardization of poverty trends assessments in PPA; and (vi) attempt to repeat PPA for a second round at some first-round sites.

2.3 INTEGRATING UGANDA'S QUALITATIVE AND QUANTITATIVE SOURCES OF DATA: CHRONIC POVERTY REVISITED

According to Howe and McKay (2004), chronic poverty is generally understood as poverty that persists over a long period of time, which in different instances may be several years, a generation or several generations; its key feature is an inability to escape in any reasonable time horizon. The key point about chronic poverty is its past and perceived future persistence. Chronic poverty contrasts with transitory poverty where individuals and households move into and out of poverty over time, depending on factors such as the state of the harvest, prices or opportunities for wage labour. By implication, different policy responses may be required for tackling these two types of poverty.

The difficulty for many people of escaping from poverty and its persistence is an issue that features strongly in many participatory poverty assessments. In Uganda, chronic poverty has been attributed to a multitude of reasons that form a web of inter-related factors. This web includes lack of ownership or access to assets (such as land and cattle) at individual, household and community levels, which translates into lack of opportunities for employment, production or income generation (CPRC, 2005). Additional factors perpetuating chronic poverty include social pressures, with some of the chronic poor often seen by others, including other poor households, as undeserving or responsible for their own plight.

Research on chronic poverty in Uganda has focused on the two wave panel from the IHS 1992/93 and the UNHS 1999/00 introduced in the previous chapter. In a recent

publication, the Chronic Policy Research Centre (2005) estimated that 20% of the country's households were poor in both 1992/93 and 1999/00. In light of these facts, it concluded that more than 7 million Ugandans, or 26% of the total population, were chronically poor.

While these conclusions are commendable in terms of both depth and scope of the analysis, they present a static depiction of chronic poverty. Recognizing that a household was poor in both 1992/93 and 1999/00 is not equivalent to saying that the same household was persistently, or chronically, poor in either 1992/93 and/or 1999/00. By implication, branding a household as chronically poor on the bases that it was poor in both 1992/93 and 1999/00, without focusing on both current and future implications of the household's socio-economic status, is not in line with the dynamic nature of household welfare.

In light of such shortcomings, this section builds on the relative strengths of qualitative and quantitative research methods to generate a novel definition of chronic poverty as a function of both current welfare and vulnerability. The inclusion of vulnerability, motivated by UPPAP (2000) and quantified by means of survey-based data analysis, marks our point of departure from the analysis outlined above. According to our definition, a household is chronically poor if simultaneously poor and vulnerable to poverty in the next period. This methodology provides an opportunity to assess chronic poverty in a more dynamic fashion. While static panel data comparisons, as articulated by the Chronic Poverty Research Centre (2005), result in a single estimate of chronic poverty across time periods, our methodology

provides distinct points of reference to monitor the dynamics of chronic poverty in Uganda.

Table 2.3, column (1), shows that between 1992/93 and 1999/00 the proportion of households simultaneously poor and with a likelihood of being poor in the next period greater than 0.5 declined from 37% to 10% of the total population. This evidence concords with the findings from table 2.2 that among poor households the proportion of those who were also vulnerable declined from 74% in 1992/93 to 49% in 1999/00.

Table 2.3 goes beyond cataloguing the proportion of households simultaneously poor and with a likelihood of being poor in the next period greater than 0.5. Columns (2) and (3) gradually focus our measure of chronic poverty to poor households virtually guaranteed to remain poor in the next period, by reporting on the proportion of households simultaneously poor and with a likelihood of being poor in the next period greater than (0.75) and (0.90), respectively.

Column (3) shows that between 1992/93 and 1999/00 chronic poverty in Uganda declined from 11% to 5%. In addition, it captures important geographical differences in the spatial distribution of chronic poverty in Uganda. Clearly, chronic poverty remains a rural phenomenon. Most importantly, however, the evidence underscores the marginalization of the Northern region, which took place during the period under examination. In 1992/93 chronic poverty was relatively equally distributed across all regions of the country. While the Northern and Eastern regions took the lion's share with a total of 85% of the chronically poor, the Central and Western regions accounted for 10% and 5%, respectively.

In sharp contrast, the evidence from 1999/00 places 93% of the chronically poor in Northern Uganda. Clearly, large parts of northern Uganda have been devastated by armed conflict and cattle-raiding, generating poverty and persistent (and often irreversible) depletion of productive assets. In this context, effective targeted interventions require a deeper understanding of the challenges of insecurity, living a life of dire need in protected camps, constant fear of abduction and death, loss of incentives to work, lack of productive assets and the feeling of being born in the wrong place.

2.4 MODELING POVERTY IN LIGHT OF THE UGANDA PARTICIPATORY POVERTY ASSESSMENT PROCESSES (UPPAP)

While there is little dispute that, over the past decade, Uganda has experienced remarkable economic growth, falling income poverty, and relative political stability, the contribution of different policy factors to these outcomes, as well as the regional distribution of poverty reduction, are disputed and can only insufficiently be explored using cross-sectional data alone (Deiniger and Okidi, 2003). Panel data allows a direct analysis of factors that contribute to changes in households' consumption expenditure as well as their poverty levels. This section makes use of participatory evidence to guide survey based analysis using panel data, by relating survey variables (proxies) to UPPAP evidence. Hence, it discusses original survey based results in light of UPPAP's evidence to identify their complementarities, and respective comparative advantages.

With reference to Uganda's longstanding tradition of poverty analysis as described in the introduction and the previous chapter, let household consumption be determined by the following stochastic process:

$$\text{Lnc}_h = \beta \mathbf{X}_h + e_h \quad [2.1]$$

where, Lnc_h is log consumption (per adult equivalent) of household h ; \mathbf{X}_h is a vector of strictly exogenous household and community characteristics, including household demographic composition, characteristics of the head, non-income indicators of the

household's socio-economic status, and community infrastructure; β is a vector of parameters to be estimated and e_h is a disturbance term with mean zero.

A common alternative to modelling the (generally continuous) underlying variable, measuring the standard of living through household consumption, is to model a discrete dependent variable. To clarify, consider $p_h = \beta X_h + e_h$, where p_h equals 1 if $c_h < c^*$, and p_h equals 0 if $c_h \geq c^*$. Appleton (2002) advanced yet another approach using as the dependent variable the household poverty gap: how far, if at all, household consumption falls below the poverty line.

As it was alluded to in the previous chapter, according to Appleton (2002), both alternatives (i.e. poverty functions) specified above are open to the criticism that it would be better to model household consumption per se since this is the behavioural variable underlying the definition of poverty. To different degrees, both approaches disregard information about the distribution of household consumption. Aside from possible measurement problems, the case for estimating poverty functions rather than consumption functions must ultimately rest on difficulties in specifying the latter.

Poverty functions may be preferable to modelling consumption if information about the level of consumption above the poverty line is not useful. This could be the case if the poor and the non-poor present different behavioural patterns. If hypothesised determinants of welfare, such as human capital and physical assets, have different returns for the poor and non-poor, then consumption functions may yield misguided policy recommendations for poverty alleviation. For example, consumption functions may show schooling to have large returns on average. However, if these results are

driven by the returns accruing to non-poor households, it would be misleading to advocate expansion of education as a part of a poverty reduction package. Thus the choice between consumption functions and poverty functions in part depends on whether people are poor just because they possess limited access to productive assets (including human capital) or whether they also receive lower returns on their assets.

On this note, using the first nationally representative household survey of Uganda (IHS 1992/93), Appleton (2002) shows that consumption functions can provide valid inference about the welfare of the poor; in other words, there is little to be gained from modelling poverty per se. As such, the consumption function passes an informal specification test for parameter constancy. More generally, this evidence is consistent with Schultz's hypothesis that in spite of lacking resources, poor households operate efficiently, as they receive the same rate of return on their assets as the non-poor.

2.4.1 ESTIMATION AND RESULTS

This discussion is based upon the estimation of the empirical counterpart to Eq. [2.2], where $C_{h,1999/00}$ is observed consumption expenditure per adult equivalent, and $X_{h,1992/93}$ represents a set of strictly exogenous household and community characteristics identified in the UPPAP (2002) among the major causes of poverty. These include large families, lack of education and skills, over-reliance on subsistence agriculture, insurgency and rebel activity, and bad cultural practices, together with

lack of transportation and access to social services, including credit facilities, access to markets, and market information.¹⁵

$$C_{h, 1999/00} = \beta X_{h, 1992/93} + e_h \quad [2.2]$$

Notably, while the use of lagged explanatory variables will not necessarily eliminate household fixed effects, it will result in more efficient estimates (Glewwe and Hall, 1998). Table 2.4 reports the main results from the estimation of Eq. [2.2]. In accordance with UPPAP's findings, the evidence points to four key areas of policy intervention to assist poor households rise out of poverty, and non-poor ones continue improving their welfare status. These are: (i) Family planning; (ii) education; (iii) gender; and (iv) rural development.

(i) Family Planning

Large families stretch meagre household resources, while hampering the household's ability to meet basic needs. Table 2.4 suggests that additional family members significantly reduce consumption expenditure per adult equivalent. On average, an additional member of the household reduces household consumption per adult equivalent by 5-6%.

That household size is an important variable in explaining the observed variations in welfare is confirmed by Ssewanyana et al. (2004), who argue that small households

¹⁵ Table 1.4 (chapter I) contains the empirical definitions and summary statistics of the variables used in this estimation of poverty. Section 1.4 (chapter I) further provides an exhaustive justification for our choice of explanatory variables.

are significantly better off than their larger counterparts. More specifically, they show that family size of five and above is responsible for moving a household to a welfare level that is below the national average.

Clearly, while survey based analysis provides a precise account of the impact of large families on consumption expenditure per adult equivalent, it lacks insight on the implications of reduced consumption on individual and household welfare. These questions can be readily addressed by means of participatory processes. UPPAP's analysis of the determinants of poverty, for instance, associates reduced consumption expenditure due to large family size with lower caloric intake, poor nutritional status, weakened physical ability, and poor health. Further, it argues that poor health causes poverty because sick individuals are unable to work, treatment does not come free of charge, and other family members (especially women) who care for the sick are unable to engage in economic activities.

The health status of individuals is of great importance not only because of the direct utility health can provide but because of productivity losses and large indirect costs, caused by ill-health, which places demands on already stretched health systems and family support networks (Strauss et al., 1998). This is particularly the case in Sub-Saharan Africa, and especially in Uganda, where high prevalence levels of HIV/AIDS over the last two decades has had a debilitating effect on many families and their ability to escape poverty.

To the effect that poor health is a serious cause for concern notwithstanding sharp reductions in poverty, Deininger and Okidi (2003) show that the past decade was

characterised by a significant increase in the number of days lost to illness by the average household, from 8 to 12 between 1992/93 and 1999/00. The data also indicates that during the period under review 23% of households experienced the death of a family member aged between 15 and 40.¹⁶

Additional analysis of the Uganda National Household Survey series shows that the health status of the household head plays a fundamental role in determining a household's poverty status (Lawson, 2003b). More specifically, households moving into poverty have a larger proportion of sick household heads, than non-sick. The reverse is true for households moving out of poverty.

On a slightly different note, UPPAP (2002) also identified large families as a primary cause of land shortages, as many families were found to have very small plots of land that were grossly inadequate to meet the household needs due to land fragmentation. In support of this claim, descriptive analysis from the Uganda National Household Survey (UNHS-I) 1999/00 reports a 10-20% reduction in acres of land (owned) per person for each additional household member. In addition, Deiniger and Okidi (2003) document a declining share of land in the asset endowment of the population between 1992/93 and 1999/00, a time in which Uganda's population growth rate peaked at 3.4% per annum. As a direct result, they suggest that policies relating to land issues, for example those that aim to increase access to land, transparency of land administration and transferability of land, will have important implications for households' wealth.

¹⁶ This result is not necessarily telling of a general worsening of the health status. It could be the case

The discussion above provides support for combining qualitative and quantitative approaches to clarify the relationship between large families and poverty in Uganda. While quantitative data computes the opportunity cost of additional household members on consumption expenditure, qualitative information clarifies the link between reduced consumption expenditure and poverty. In turn, quantitative data can be used further to test the statistical validity of the hypotheses advanced by participatory respondents.

(ii) Education

Education in developing countries is often identified as a key area where public spending can lead to poverty reduction (Appleton, 2001a). In Uganda, all UPPAP communities unequivocally accepted education to be one of the principal factors determining one's well-being status. Notably, however, education was perceived to be of limited worth when not directly related to the traditional livelihoods of the community, and when children were unable to continue studying beyond primary level due to high cost and/or lack of a nearby secondary school. Moreover, the UPPAP (2002) cited lack of education and skills, reducing income generating opportunities, as a cause of poverty in 58% and 42% of all sampled rural and urban communities, respectively.

To corroborate this evidence, the Uganda National Household Survey (UNHS) 1999/00 supports the claim that high costs remain the most important barrier to school

that Ugandans are becoming more sensitive to their health and may have revised their perception of good vis-à-vis ill-health.

enrolment,¹⁷ and shows that both adult female and male average years of education in poor households are significantly lower than in their wealthier counterparts. Such differences are especially pronounced in urban areas, where poor and non-poor households average a total of 8 and 19 adult years of education, respectively.

Table 2.4 highlights the importance of education as an effective means to improve the household's standard of living by increasing consumption expenditure per adult equivalent. Notably, the marginal impact of female education appears threefold that of male education. One additional year of female education raises household consumption expenditure per adult equivalent by 3.6 percentage points, compared to 1.1 for males.

On a related note, modelling total earnings at household level over time, Appleton (2001) estimates substantial increases in returns to education, in contrast to constant coefficients on the traditional factors of production. More specifically, if adults in the household average an extra year of primary education, this raises household earnings by 8% in 1999/00 compared to 5% in 1992. Averaging an extra year of secondary education raises household income by 13% in 1999/00 compared to 10% in 1992. The rise in the coefficients on university education is even larger. If all household members had attended university, income would be 183% higher, *ceteris paribus*, in 1999/00; in 1992, the corresponding figure is 54%.

¹⁷ Cost as a deterrent of education is a bigger concern for wealthier (and urban) households than for their poorer counterparts. Further, there appears to be a clear link between the cost of education and utilization patterns by different welfare groups in different regions.

Pointing to education as one of the main drivers of household well-being, these quantitative results fail to account for UPPAP's reservations on the value of education. Participatory evidence is indeed a primary source of concern over the quality of the delivery of education in Uganda. While on balance, and by international comparison, the returns to education in Uganda do not appear low,¹⁸ UPPAP respondents' concerns on the value of education are corroborated by nationwide alarming shortages of qualified teachers, textbooks, classrooms, classroom equipment (e.g. desks), and the absence of agriculture in the primary curriculum. On the latter, UPPAP's community members explained that the inclusion of agriculture would make the curriculum more practical and relevant, while equipping school leavers with the necessary modern farming skills.

The discussion above suggests that qualitative and quantitative approaches complement each other by addressing different aspects of the debate on the importance of education in Uganda's poverty reduction strategy. On the one hand, survey based evidence, highlighting high rates of return to education, stresses the importance of investments in education for poverty alleviation. UPPAP's observations, on the other hand, provide unprecedented insight on the factors compromising the success of delivering education.

¹⁸ For primary education, the private rate of return doubles from 15% in 1992 to 30% in 1999/00. The primary rate of return also rises substantially, almost doubling in the case of secondary school. There is little difference between the private and the social returns to secondary education, since the direct cost of such education to the government is small relative to the assumed opportunity cost. For primary education, relatively low opportunity cost can make the direct cost to the government more important. Nonetheless, the social return to primary education is estimated at 24% in 1999/00. The allowance for public direct cost is most important for university education, lowering the return in 1999/00 from a private rate of 24% down to a social rate of 13%. Overall, it appears that the social rate of return is highest for primary education, followed by university and then secondary education. It is noteworthy

(iii) Gender

The centrality in addressing gender issues in poverty reduction and development in Africa is being increasingly recognised, with growing evidence showing that the nature, causes and impacts of poverty are different for men and women (Lawson, 2003a). Gender inequality persists in access to and control of a range of productive, human, and social capital assets.

Our quantitative results show inconclusive evidence on the relationship between gender issues and poverty. Female-headed households appear worse-off than their male-headed counterparts. By contrast, widow-headed households in the northern region are visibly better off than their respective counterparts. Our results further present mixed evidence on the relationship between the proportion of female adult members of the household and consumption expenditure per adult equivalent. To this effect, table 2.4 discloses stark regional differences in women's contribution to household welfare. Whereas in the central region the proportion of female adult members of the household increases household wellbeing via increased consumption expenditure, the reverse is true for the northern region.

These results are likely to be the consequence of varying degrees of female participation in household activities in different regions of the country. Nonetheless, they appear to be in line with Appleton's (1996) conclusions that female-headed households as a whole do not appear to be poorer when assessed by consumption and income, nor do they appear to be consistently disadvantaged on social indicators.

that the fall in public spending per university student from 1992 to 1999/00 has greatly increased the

Notwithstanding the paper's overall findings, Appleton (1996) documents that some sub-groups, such as widowed female-headed households, have lower income, face inequalities in educational attainment, and are dependant upon high levels of remittances to maintain economic parity. Similarly, Lawson (2003c) argues that households headed by sick females, or female agricultural subsistence workers, face a higher probability of falling into poverty.

Such considerations rest at the heart of UPPAP's (2002) analysis. According to UPPAP (2002), female-headed households – especially widows with few assets and several children – are more vulnerable to falling into poverty. Widows are often not allowed to become the head of the household and are generally disregarded. In some cultures, women are not able to inherit property. Grabbing of the husband's property by in-laws, clan members or elder children often propels widows into poverty: “When my husband was alive 5 years ago, we had 25 goats, 2 big turkeys and 1 chicken. By then I had 4 children. My husband and I worked hard, very hard indeed, to acquire the 5 acres of land that enabled us to produce some good amounts of food. We were able to pay school fees, dress our children and so on. But soon after his death, Hhmmm..., my in-laws began to grab what we had. They took them one by one until I was left with only one acre of land! They refused to even pay school fees for my children. With those hardships, I had to leave my home. I am now struggling on my own with 5 children. My relatives are so poor that they cannot help me” (Widow, Chokwe, Moyo).

social return, from a scarcely profitable 3% to a healthy 13% (Appleton, 2001a).

UPPAP (2002) also emphasises the importance of female participation in household activities, by concluding that (i) men and women spend disproportionately large amounts of household expenditure on alcohol and school fees, respectively, and that (ii) women generally work substantially longer hours than men. In the colourful words of a UPPAP respondent: “Women are the brewers of local alcohol in communities, while men are their main customers. While women brew to support their families, men are often responsible for depleting household resources to drink”. These remarks suggest a possible explanation for our finding that widow-headed households in the northern region are better off than their respective counterparts. That is, widows, who are successful in establishing themselves as the head of the household without any interference from in-laws, clan members or elder children, are in a position to use household resources more effectively.

As our consumption data from the Uganda National Household Survey series is not disaggregated at the individual level, it is not possible to verify the former claim on individual expenditure preferences. Borrowing from Lawson’s (2003a) analysis of the Uganda Demographic and Health Survey (2000), however, we find evidence that alcohol expenditure as a proportion of total expenditure peaks in divorced male-headed households – with over 6% of total expenditure spent on alcohol. This compares with less than 2% for divorced female-headed households. For expenditure on school fees, female-headed households appear to spend proportionately more than male-headed households. This result is particularly accentuated with divorced and widowed female-headed households and is even the case after controlling for the increased numbers of young people in these types of household. Finally, in terms of the number of hours worked by individual members of the household across all types

of occupation, using the Uganda National Household Survey (UNHS-II) 2002 Lawson (2003a) finds that, on average, women work longer hours than their male counterparts.

This section provides a clear example of the gains associated with combining qualitative and quantitative approaches. Early analysis of Uganda's quantitative sources of data failed to fully account for the importance of gender issues in poverty reduction. By contrast, qualitative research placed gender considerations at the forefront of poverty analysis. Participatory evidence alone is not sufficient to validate and generalise national behavioural relationships as they are derived from clearly identified catchment areas with a specific geographic limitation. Nonetheless, UPPAP's (2002) contributions proved instrumental in guiding more rigorous scrutiny using statistical analysis. There is no doubt that gender inequalities in Uganda come as a result of women facing limited opportunities for social and economic development due to their role in society and their relationship with men. It is also true, however, that these restrictions are subject to stark regional variations and revolve around women's status, ownership and access to assets, participation in decision-making, and workload.

(iv) Rural development

Both quantitative and qualitative sources of data confirm that in Uganda, agriculture, particularly crop farming, is the major livelihood engaging activity. Table 2.4 estimates that consumption expenditure per adult equivalent in agricultural households is, on average, 12% lower than in non-agricultural ones. In support of this

finding, Ssewanyana et al. (2004) report that between 1992/93 and 2002/03, households whose head worked in non-crop farming, trade and transport, or communication registered consistently higher welfare levels than their counterparts in crop farming.

UPPAP's analysis complements our quantitative findings. Farmers responding to UPPAP explained that due to their heavy dependence on environmental resources, their livelihoods are highly vulnerable to sudden shocks and changes in physical conditions. As poor people command a minimal asset base, they lack alternative opportunities to make a living; hence, incomes remain variable and unstable. Any slight change in the condition of the physical resource base on account of a shock, stress or disaster worsens household well-being. For example, people reported that unpredictable weather patterns and climatic conditions, characterised by usually heavy and erratic/unreliable rains, lead to crop and infrastructure damage, causing food insecurity. Moreover, they expressed how lack of information on prices, coupled with lack of access to alternative markets, undermines their ability to negotiate better prices with traders.

This evidence provides a clear example of the advantages of integrating qualitative and quantitative approaches to poverty analysis. In this framework, survey data quantifies the impact of the household head's main occupation on household welfare, while qualitative data explains the reasons associating certain sectors of the economy with increased poverty.

On a slightly different note, UPPAP (2002) identifies isolation, and lack of credit and market facilities among the biggest barriers to community development. Across all sampled UPPAP communities, improvement in roads was the most frequently cited priority problem. Poor respondents valued credit, but widely believed that terms and delivery mechanisms of current programmes were strategically designed to serve their wealthier counterparts. They also valued highly produce markets, but argued that limited access – including high duties, and exploitation – did not allow the poor an opportunity to obtain reasonable profits from the sale of their produce. Problems with marketing were reported by farmers in places with good infrastructure as well as in remote sites. Moreover, farmers noted that marketing difficulties provided a disincentive to production and investment in agriculture.¹⁹

In line with UPPAP (2002), table 2.4 singles out distance to a bank as an important barrier to increased consumption in both northern and eastern Uganda. In these regions consumption expenditure per adult equivalent decreases, on average, by 0.4% for each additional kilometre required to walk to a bank. A possible explanation for this finding is that borrowing constraints force liquidity constrained households to forego high(er) return activities.

Northern and Eastern Uganda have been under the constant threat of rebel insurgency and cattle-raiding for over twenty years. Local people in areas most affected by the threat of cattle-raiding and rebel insurgency agreed that they make existing poverty

¹⁹ These qualitative observations are suggestive of a widening gap of income generating opportunities between the top and bottom ends of the population. Most interestingly, they have recently been complemented by a number of quantitative studies. Ssewanyana et al. (2004) and Pender et al. (2004) independently support the hypothesis that poor households have less access to market information, extension services, and credit facilities.

worse, and prohibit development (UPPAP, 2002). Rebel insurgency in these regions affects all aspects of people's lives – social, physical and emotional. Property is lost, injuries and death occur, and displacement and fear result. The consequences are isolation and limited business opportunities, community insecurity, low productivity, food insecurity and low incomes. In addition, the devastating consequences of these raids were clearly expressed by those ethnic groups who do not raid back. In their own words, “losing cattle means losing everything ... Cattle are banks of cattle-keepers so loss of cattle equates to loss of wealth as well as loss of livelihood. Without cattle, bride price cannot be paid, services cannot be paid for in kind, school costs and household needs cannot be met”.

Our quantitative results for these regions only minimally suggest that the unavailability of roads, transport facilities, credit services, and/or markets places severe pressure on households' ability to improve their welfare status. Further, our analysis merely recognises Easterners and Northerners' inability to safeguard and diversify household resources. This argument exposes one of the main limitations of our data, and survey based analysis in general, viz. inadequate coverage of insecure areas. It follows that participatory evidence, capturing individual experiences and community dynamics, provides a valuable source of information to contextualise analytical results often lacking nuance and texture.

2.5 DISCUSSION AND CONCLUSION

This chapter combines Uganda's rich sources of qualitative and quantitative data to deepen our understanding of poverty as a whole. The analysis widens the notion of vulnerability developed in the previous chapter by adding texture to our consumption based index of household vulnerability. In doing so, it highlights the advantages of integrating qualitative and quantitative approaches to poverty analysis by showing that the comparative advantage of participatory and survey based instruments lie in probing the "why", and "what" and "how much" questions, respectively.

On the bases that different research techniques provide complementary information, there is a potential benefit when setting the agenda for research within one approach in learning from the results of previous work using an alternative approach. As a clear example, in the Ugandan context, survey data results about poverty suggest that participatory research may be useful in understanding how poverty fell. This might require some refocusing of attention from the standard participatory concerns with people's existing or worsening problems, and onto their achievements and areas of progress. Understanding what some people have done to raise their material standard of living might be useful in learning what the government can do to assist these efforts and enable others who have not.

Section 2.3 builds on the relative contributions of qualitative and quantitative analysis to re-conceptualise chronic poverty in Uganda.²⁰ Our definition of chronic poverty

²⁰ This discussion is based upon the notion of vulnerability developed in chapter I. The relevance of introducing and measuring vulnerability in explaining the dynamics leading to, and perpetuating poverty was explained in detail in the previous chapter.

reflects the proportion of households simultaneously poor and with a likelihood of being poor in the next period greater than 0.90 [i.e. column (3)]. This group constitutes 11% and 5% of the population in 1992/92 and 1999/00, respectively. Notably, these households may represent a subset of the chronic poor. Perhaps the chronic abject-poor, in that 0.90 is an extremely high cut off point for the likelihood of a household experiencing poverty in the next time period.

This quantitative approach for identifying the chronic poor offers the opportunity to understand the extent and pattern of chronic poverty in Uganda. Clearly, however, many aspects of chronic poverty, and especially the understanding of the social processes that underline exclusion or deprivation, are only amenable to a qualitative analysis. In line with Howe and McKay (2004), this framework argues strongly for combining qualitative and quantitative approaches in thinking about chronic poverty and offers the scope to link with perspectives from other disciplines and traditions (e.g. social exclusion).

Section 2.4 models poverty in light of participatory evidence, by relating survey variables to qualitative evidence. In general terms, Uganda's qualitative and quantitative sources of data appear to be reliable in themselves, and where they relate to similar issues, are broadly consistent with each other. The two sources also complement each other, providing insights that the other cannot. This dual approach to poverty analysis enriches the discussion of poverty trends by drawing attention to aspects of poverty and well-being neglected by simple construction of poverty indicators (Carvalho and White, 1997).

In light of the foregoing discussion, there is substantial support for small movements from either side in the other direction. But there are grave concerns about large movements, ending up with an undifferentiated single instrument or approach. In this case, however, it is the responsibility of analysts to reach out and understand the other ends of the spectrum and to learn from them. This is particularly difficult because of disciplinary divides.

In conclusion, getting a little of the best of both worlds seems relatively easy. Getting more than this, it seems, may be quite a bit more difficult.

Table 2.1: Vulnerability (Vul) transition, 1992/93-1999/00

	Non Vul 1992-93 / Non Vul 1999-00		Non Vul 1992-93 / Vul 1999-00		Total Non Vul		Vul 1992-93 / Non Vul 1999-00		Vul 1992-93 / Vul 1999-00		Total Vul
Nation	517 (91.67)		47 (8.33)		564 (100)		463 (62.15)		282 (37.85)		745 (100)
Rural	395 (91.01)		39 (8.99)		434 (100)		424 (62.26)		257 (37.74)		681 (100)
Urban	122 (93.85)		8 (6.15)		130 (100)		39 (60.94)		25 (39.06)		64 (100)
Central	201 (99.01)		2 (0.99)		203 (100)		185 (92.50)		15 (7.50)		200 (100)
Eastern	102 (86.44)		16 (13.56)		118 (100)		118 (64.13)		66 (35.87)		184 (100)
Northern	25 (52.08)		23 (47.92)		48 (100)		15 (9.80)		138 (90.20)		153 (100)
Western	189 (96.92)		6 (3.08)		195 (100)		145 (69.71)		63 (30.29)		208 (100)
Central rural	147 (99.32)		1 (0.68)		148 (100)		172 (95.03)		9 (4.97)		181 (100)
Central urban	54 (98.18)		1 (1.82)		55 (100)		13 (68.42)		6 (31.58)		19 (100)
Eastern rural	77 (84.62)		14 (15.38)		91 (100)		110 (63.95)		62 (36.05)		172 (100)
Easter urban	25 (92.59)		2 (7.41)		27 (100)		8 (66.67)		4 (33.33)		12 (100)
Northern rural	14 (41.18)		20 (58.82)		34 (100)		6 (4.62)		124 (95.38)		130 (100)
Northern urban	11 (78.57)		3 (21.43)		14 (100)		9 (39.13)		14 (60.87)		23 (100)
Western rural	157 (97.52)		4 (2.48)		161 (100)		136 (68.69)		62 (31.31)		198 (100)
Western urban	32 (94.12)		2 (5.88)		34 (100)		9 (90)		1 (10)		10 (100)
Agricultural household	302 (89.88)		34 (10.12)		336 (100)		397 (62.82)		235 (37.18)		632 (100)
Non-agricultural households	215 (94.30)		13 (5.70)		228 (100)		66 (58.41)		47 (41.59)		113 (100)
High dependency ratio	260 (92.20)		22 (7.80)		282 (100)		388 (60.82)		250 (39.18)		638 (100)
Low dependency ratio	257 (91.13)		25 (8.87)		282 (100)		75 (70.09)		32 (29.91)		107 (100)
Female headed household	130 (94.89)		7 (5.11)		137 (100)		105 (61.40)		66 (38.60)		171 (100)
Male headed household	387 (90.63)		40 (9.37)		427 (100)		358 (62.37)		216 (37.63)		574 (100)

Note: Figures are absolute numbers, and percentages are presented in parentheses.

Table 2.2: Poverty and Vulnerability, 1992/93-1999/00

1992/93	Non vulnerable	Vulnerable	Total
Non poor	395 (30)	265 (20)	660 (50)
Poor	169 (13)	480 (37)	649 (50)
Total	564 (43)	745 (57)	1,309 (100)
1999/00	Non vulnerable	Vulnerable	Total
Non poor	781 (60)	136 (10)	917 (70)
Poor	199 (15)	193 (15)	392 (30)
Total	980 (75)	329 (25)	1,309 (100)
Note: Figures are absolute numbers, and percentages are presented in parentheses.			

Table 2.3: Chronic poverty trends and patterns, 1992/93-1999/00

1992/93	(1) Poor & Vul (Prob>.50)	(2) Poor & Vul (Prob>.75)	(3) Poor & Vul (Prob>.90)
<i>National</i>	481 (37)	280 (21)	141 (11)
Rural	435 (91)	248 (89)	115 (82)
Urban	46 (9)	32 (11)	26 (18)
Central	116 (24)	38 (14)	14 (10)
Eastern	124 (26)	89 (32)	56 (40)
Northern	111 (23)	92 (33)	63 (45)
Western	130 (27)	61 (21)	8 (5)
1999/00	(1) Poor & Vul (Prob>.50)	(2) Poor & Vul (Prob>.75)	(3) Poor & Vul (Prob>.90)
<i>National</i>	134 (10)	92 (7)	61 (5)
Rural	118 (88)	80 (87)	52 (85)
Urban	16 (12)	12 (13)	9 (15)
Central	3 (2)	1 (1)	1 (2)
Eastern	19 (14)	8 (9)	2 (3)
Northern	102 (76)	82 (89)	57 (93)
Western	10 (8)	1 (1)	1 (2)

Note: Figures are absolute numbers, and percentages are presented in parentheses.

Table 2.4: OLS estimation of consumption

	Uganda	Central region	Eastern region	Northern region	Western region
<i>Family planning</i>					
Average household size	-0.056*** (-4.13)	-0.038 (-1.16)	-0.051** (-2.58)	0.054 (1.08)	-0.132*** (-2.78)
(Average household size) ²	0.002*** (3.67)	0.002 (0.93)	0.002*** (3.30)	-0.005 (-1.57)	0.006** (2.03)
Dependency ratio	-0.028 (-1.39)	0.028 (1.14)	-0.033 (-0.78)	-0.114 (-1.67)	-0.083** (-2.06)
DV=1 if no adult members of the household	-0.218** (-2.18)	0.165 (1.18)	-0.367** (-2.54)	0.287 (1.44)	-0.810*** (-2.67)
Age of the household head	0.004 (0.75)	0.011 (0.010)	0.002 (0.27)	0.036 (1.66)	-0.002 (-0.20)
(Age of the household head) ²	-9.55e-06 (-0.17)	-0.0001 (-1.26)	0.00001 (0.17)	-0.0004 (-1.42)	0.0001 (0.84)
<i>Education</i>					
Female adult mean years of education	0.036*** (5.88)	0.037*** (3.16)	0.035** (2.48)	0.028** (2.14)	0.041*** (4.01)
DV=1 if missing obs. for female adult mean years of education	0.101 (0.92)	0.415** (2.33)	-0.073 (-0.35)	0.185 (0.72)	-0.421* (-1.97)
Male adult mean years of education	0.010** (1.99)	0.005 (0.69)	0.004 (0.34)	0.032** (2.14)	0.008 (0.81)
DV=1 if missing obs. for male adult mean years of education	0.151* (1.89)	-0.048 (-0.40)	0.185 (1.08)	0.275 (1.07)	0.486*** (3.01)

Table 2.4 (continued): OLS estimation of consumption

<i>Gender</i>						
DV=1 if female household head (F)	-0.100* (-1.77)	-0.099 (-0.94)	0.066 (0.51)	-0.141 (-0.92)	-0.198 (-1.60)	
DV=1 if widow household head (W)	0.136 (1.18)	0.164 (0.90)	-0.238 (-0.85)	0.251 (1.20)	0.352** (2.48)	
(F) * (W)	0.019 (0.15)	-0.056 (-0.25)	0.181 (0.62)	-0.154 (-0.69)	-0.082 (-0.45)	
Proportion of female adult members of the household	-0.037 (-0.24)	0.429* (1.80)	-0.143 (-0.49)	0.159 (0.42)	-0.706** (-2.05)	
<i>Rural development</i>						
DV=1 if agricultural household ^{rr}	-0.115*** (-2.87)	-0.228*** (-3.32)	-0.152** (-2.02)	-0.015 (-0.13)	-0.012 (-0.16)	
Average distance to tarred road (Km)	-0.00003 (-0.04)	0.001 (0.87)	0.001 (0.56)	-0.002 (-0.97)	0.0003 (0.31)	
DV=1 if missing obs. for distance to tarred road	0.068 (0.84)	-0.162 (-1.16)	0.248*** (3.02)	0.018 (0.15)	0.212** (2.44)	
Average distance to bus or taxi stop (Km)	-0.001 (-0.43)	-0.001 (-0.46)	0.0004 (0.26)	0.003 (0.93)	-0.001 (-0.43)	
DV=1 if missing obs. for distance to bus/taxi stop	-0.046 (-0.24)	-0.640*** (-6.70)	-0.182 (-1.11)	0.427** (2.47)	0.301*** (2.90)	
Average distance to bank (Km)	-0.001 (-0.99)	0.0001 (0.05)	-0.004* (-1.96)	-0.004* (-1.74)	0.001 (0.50)	

Table 2.4 (continued): OLS estimation of consumption					
DV=1 if missing obs. for distance to bank	-0.020 (-0.22)	0.373 (1.65)	-0.128 (-0.89)	-0.135 (-0.90)	-0.044 (-0.41)
DV = 1 if produce market available in the village	-0.030 (-0.42)	0.046 (0.26)	-0.189* (-1.86)	0.207 (0.98)	-0.085 (-0.63)
DV=1 if missing obs. for produce market available in the village	-0.188 (-0.88)	0.234 (1.38)	-0.102 (-0.55)	-0.463 (-1.66)	-0.693*** (-3.31)
Rural household ^{TT}	-0.278*** (-5.05)	-0.272*** (-3.05)	-0.196 (-1.59)	-0.323** (-2.51)	-0.408*** (-3.68)
Eastern region ^{TT}	-0.167*** (-3.92)				
Northern region ^{TT}	-0.551*** (-10.05)				
Western region ^{TT}	-0.047 (-1.01)				
Constant	9.446*** (59.27)	9.183*** (30.87)	9.353*** (32.38)	7.884*** (17.91)	9.978*** (31.07)
R ²	0.2611	0.2317	0.2096	0.3036	0.2285
Total number of clusters	349	128	103	62	108
Total number of observations	1309	403	302	201	403

^{TT} Omitted category: Non-agricultural household, Urban area, and Central region.

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%. In addition, all reported standard errors are robust (White H, 1980; 1982), and adjusted to permit observations within clusters (primary sampling units) to be correlated (Deaton A., 1997).

CHAPTER III

CHILD LABOUR: INSIGHTS FROM AN AGRICULTURAL HOUSEHOLD MODEL

3.1 INTRODUCTION

About one third of all the working children in the world are found in Africa, even though the continent contains only 10% of the world's population. Labour force participation rates for children 5-14 years of age average 40%, and in some countries exceed 50%. Several factors lay behind such high incidence of child labour: continent-wide poverty, cultural views, which often condone child labour, and badly functioning education systems, to name a few.

The aim of this chapter is twofold. First, to analyse the determinants of agricultural child labour, in order to test the hypothesis that if the household faces imperfections in the labour market, increased ownership of land intensifies the need for child labour. In Africa's traditional small-holder agriculture, labour-supply is the main constraint on expanding acreage (Kamuzora, 1984). In such an economic environment, if the household faces imperfections in the labour market, and, as a result, we observe some involuntary unemployment in the rural labour market, children become a particularly valuable asset.

On this note, the second aim of this chapter is to quantify the extent to which, at such young age, children contribute to the household's agricultural activities. A small survey in a Northern Indian city of Bhavnagar reveals that close of 60% of boys and girls contribute between 10 and 30% of household income (Swaminathan, 1998). Similarly, in rural Pakistan, 10-14 year old boys and girls have been found to contribute about one-third and 15% of household wage income, respectively (Bhalotra, 2007).

In a survey of 110 households in the urban informal sector of Patalia in Northern India, Sharma and Mittar (1990) find that children's contributions are more than 20% in two-thirds of households, with a fifth of households enjoying a contribution of more than 40%. They also find that the proportion of households with per capita income below the poverty line is greater once children's earnings are excluded from household income.

Patrinos and Psacharopoulos (1994) observe that children in Paraguay contribute as much as one third of household income at certain times of the year. In Asuncion, Paraguay, 6% of households depend entirely on child earnings, and 50% reported that child work contributed at least half of household income (Myers, 1989). Finally, Kassouf (1998) finds that the contribution of 5-14 year old children in Brazil is less than 10% for a third of households, but lies between 10 and 30% for almost 50% of their sample.

The structure of this chapter is as follows: Section 3.2 provides an extensive discussion of the existing literature. Section 3.3 sets out the theoretical framework at the heart of our

analysis, and section 3.4 outlines the empirical strategy. Notably, the formal analysis of child labour is closely related to the modeling of household behaviour (Basu, 1999).

Section 3.5 presents the data, while Section 3.6 discusses the main results. This work contributes to the existing body of literature by allowing (and testing) for the absence of a smoothly functioning market for adult labour in evaluating the determinants of agricultural child labour. Further, in quantifying the contribution of child labour to the household's agricultural earnings by means of a production function, this chapter challenges the common assumption of perfect substitutability among farm workers.

Finally, Section 3.7 summarizes the main conclusions and lays out the policy implications of this analysis.

3.2 LITERATURE REVIEW

A striking feature of developing economies is the typically large proportion of the work force that is not primarily engaged in wage labour. Self-employment is particularly pervasive in agriculture where the dominant unit of production is the family farm. In their efforts to analyse the complex interactions between the labour supply and demand decisions of farm households, most studies have relied on the empirical advantages offered by separability (e.g. Barnum and Squire, 1979; Rosenzweig, 1980).

Under this assumption, the production decisions of the agricultural household are separable from the household's consumption choices. The farm household seeks to maximise profits from its production activities, subject to production constraints. Then the resulting farm profits form part of its full income constraint, subject to which the household is assumed to maximise its utility from consumption. The prominent assumptions made are that rural labour markets are efficient and free of transaction costs, and that family and hired labour are perfect substitutes.

The separability of the model ensures that any variation in household assets will only affect labour supply through its effect on household profits. An increase in household assets will increase the marginal productivity of labour in household production leading to increased labour hiring, and reduced labour supply of the household members. In the presence of a smoothly functioning market for adult labour, increased ownership of land will unambiguously increase income, and (assuming that child leisure is a normal good)

reduce child labour. In the absence of a smoothly functioning market for adult labour, however, it is not possible to predict the effects on child labour. The net effect on labour supply is ambiguous and depends on the relative importance of the conflicting income and substitution effects.

In spite of the analytical advantages provided by separability in the context of empirical analysis, its shortcomings have been clearly documented in the empirical literature. In Bardhan and Udry's (1999) own words, in most developing countries where the hypothesis has been examined it is clear that the separation property does not hold. Everywhere in Africa, Latin America, and most of Asia where the hypothesis has been examined, it has decisively been rejected (Kevane, 1996; Udry, 1998; Barrett, 1996; Collier, 1983; Jacoby, 1993; Carter, 1984; Bardhan, 1973). There is an interesting pair of papers, however, by Benjamin (1992, 1995) and another by Pitt and Rosenzweig (1986), which indicate that the separation property is not far from true in a large Indonesian data set. In most developing-country contexts, the separation property seems more useful as a benchmark for comparison rather than as a basis for empirical work.

Additionally, the near absence of functioning markets, coupled with the existence of institutionally imposed constraints, constitutes one of the main sources of interdependence of production and consumption decisions. In the absence of separability, the production and consumption decisions of farm households must be treated as non-separable in the sense that labour supply choices cannot be considered independently of their labour needs on the family farm (Abdulai and Regmi, 2000).

Studies for a diverse set of countries suggest that the fraction of household income contributed by working children is, on average, large enough that the household may rely upon it. Two influential studies which support the view that children make significant and early contributions to household income are Cain (1977) for Bangladesh, and Nag, White and Peet (1978) for Java and Nepal. These studies are frequently cited to support the views that economic incentives determine both high fertility and child labour. Cain's innovative study of the village of Char Gopalpur in Bangladesh collected data on time use, including time budgets for children. This showed that children began serious work at a very young age (often within households, thereby releasing adult labour for use elsewhere), that boys became net producers by age 12, that they compensate for their own cumulative consumption by age 15 (using age-specific data on calorie consumption), and that they compensate for their own and sister's cumulative consumption by age 22. Similarly, for Java and Nepal, Nag et al. (1978) found that children began work in the household at 6-8 years. Comparing the household's income with its food expenditure, they suggest that children's labour made a significant contribution to household net income, and that this led to a strong demand for children.

Notably, however, the view that children make a significant and early net contribution to household income has been challenged. Eva Mueller (1976) simulated income-generation and consumption over the life-cycle of children in a number of countries, and concluded that in smallholder agriculture children consume more than they produce up until they become more productive adults, and therefore they have a negative economic value.

Similarly, Cassen (1978), who concentrates his analysis to the Indian household, is also doubtful that the economic value of children is positive.

Most of the work on child labour focuses on why families send their children to work. Comparatively few papers consider child productivity in the family or the wage market. This lack of research reflects the fact that very little child labour is in the formal labour market.²¹ In countries like Uganda, children from larger households are more likely to work, as a consequence of resources per person being smaller in larger households (e.g. Patrinos and Psacharopoulos, 1997), and that fertility may be encouraged by the prospects of child work (e.g. Rosenzweig and Evenson (1977), Cain (1977), Singh and Schuh (1986), Eswaran (1996), Bardhan and Udry (1999)). The empirical results are mixed, but there is a tendency to find a positive association of household size and child work. Clearly, it may be argued that household size is endogenous in a model of child labour. However, since changes in household size tend to take a long time to happen, it seems reasonable to treat this variable as if it were exogenous to the child work decision. Since size and composition are clearly correlated, the relation between household size and child work will also depend upon whether household composition is held constant. Jensen and Nielsen (1997) and Psacharopoulos (1997), for example, include assets and size but not composition of the household. Kassouf (1998), Jensen (1999), Canagarajah and Coulombe (1997), Grootaert (1998) and Patrinos and Psacharopoulos (1997) include income (assumed exogenous) and composition, but size does not appear independent. For the work of family members on the household farm, hours of work will tend to be

²¹ For a detailed overview of the state of the recent empirical literature on why and how children work as well as the consequences of that work, see Edmonds E. (2007).

increasing in land size until land is so abundant that the household rents it out (e.g. Sharif, 1994).

It has also been argued that households send children to work in order to augment their income but also to manage better the income risk they face. Child labour can be part of a strategy aimed at minimising adverse income fluctuations, and hence to reduce the potential impact of job loss by a family member, of a failed harvest, etc. Where the level of income is very low any interruption can be life-threatening, particularly in the absence of savings, liquid assets or ability to borrow (Mendelievich, 1979). Therefore, the risk argument provides a further explanation as to why child labour is more prevalent among poor households.

Evidence from rural India confirms that child labour plays a significant role in self-insurance strategy for poor households. It has been observed that when the variability of household income increases (measured by the difference in income from peak season to low season), children's school attendance declined. This was especially the case when a "shock" occurred which was external to the village. Small households suffer more from income shocks because they are less able from insuring themselves (Jacoby and Skoufias, 1998).

3.3 THE THEORETICAL FRAMEWORK

Consider a utility function, defined over consumption by each member of the household, and a budget constraint, which incorporates production on assets owned by a household with three members, two adults – male (denoted with subscript m) and female (denoted with subscript f), and a child (denoted with subscript c). Each member gets utility from consuming a good (C_m, C_f, C_c) and from leisure (l_m, l_f, l_c). Assuming a perfect labour market, the household maximizes the following utility function:

$$U = U(C_m, C_f, C_c, l_m, l_f, l_c) \quad [3.1]$$

Subject to

$$Q = f(L, K) \quad [3.2]$$

$$\begin{aligned} P(C_m + C_f + C_c) &= f(L, K) + w(L_m^x + L_f^x + L_c^x) - wL_h = \\ &= \Pi + w(L_m^x + L_f^x + L_c^x) \end{aligned} \quad [3.3]$$

$$L = L_m^0 + L_f^0 + L_c^0 + L_h \quad [3.4]$$

$$T_i = L_i^0 + L_i^x + l_i \quad (\text{where, } i = m, f, c) \quad [3.5]$$

Where, C = consumption, l = non-work (school and leisure) time, Q = production, L = labour time in household production, K = household assets (exogenous), L^o = household labour used on the farm, L^x = household labour supplied to the market, L_h = hired labour, P = the commodity price, w = the market wage rate, Π = profits from household production, $(PQ - wL_h)$, and T = time endowment.

Substituting [3.4]-[3.5] into [3.3] yields a single constraint of the form:

$$P(C_m + C_f + C_c) = \Pi + w(T_m + T_f + T_c) - w(l_m + l_f + l_c) \quad [3.6]$$

This result is often called the “separation property” of the agricultural household model, because the production decisions are separable from the household’s consumption choices. Notice that the converse is not true. The consumption choices of the household do depend on the profit realised from production through the budget constraint. To reiterate the logic, the existence of complete markets implies that a utility-maximising household will choose to maximise profits in its production enterprise. Profit maximisation (or, as it is commonly called in the literature, the separation property) is not an assumption: rather, it is derived from the twin assumptions of utility maximisation and complete markets.²²

²² Bardhan P. and Udry C., pg. 9-10, 1999

The household can choose the levels of consumption and total labour input into agricultural production that maximise utility. Consider labour input; the first order condition is:

$$\delta Q / \delta L_i = w/P = f_L$$

$$P \delta Q / \delta L_i = w \quad (\text{where, } i = m, f, c) \quad [3.7]$$

That is, the household will equate the marginal revenue product of labour to the market wage. This gives us the demand for labour inputs to the household farm:

$$L_i = L_i(w, P, K) \quad (\text{where, } i = m, f, c) \quad [3.8]$$

Or the corresponding labour supply functions:

$$R_i = R_i(w, P, K) \quad (\text{where, } i = m, f, c) \quad [3.9]$$

The solution to equation [3.8] can then be substituted into the right-hand side of the constraint (equation [3.6]) to obtain the value of full income when farm profits have been maximised through an appropriate choice of labour input. Maximising utility subject to this new version of the constraint yields the standard conditions for consumer demand theory.

The separability of the model ensures that any variation in household assets, K , will only affect labour supply through its effect on household profits and that its effects will be unambiguous. An increase in household assets will increase the marginal productivity of labour in household production leading to increased labour hiring. However, as the market wage rate is exogenous, the only change on the consumption side of the model will be the resulting increase in profits. Assuming that non-labour time is a normal good, this will unambiguously reduce the labour supply of the household members. Thus, in the presence of a smoothly functioning market for labour, increased ownership of land will unambiguously increase income, and (assuming that child leisure is a normal good) reduce child labour.

Following Bardhan and Udry (1999), let us now examine how these results change if the household faces imperfections in the labour market, and, as a result, we observe some involuntary unemployment in the rural labour market. The household cultivates its endowment of land, and might face a binding constraint on the amount of labour it can supply off its own farm. In this new framework, the household maximisation problem (now assuming just one person in the household) is:

$$\text{Max } U(C, l) \quad [3.10]$$

Subject to

$$PC = f(L^o + L_h, K) - wL_h + wL^x \quad [3.11]$$

$$T = L^o + L^x + 1 \quad [3.12]$$

$$L^x \leq M \quad [3.13]$$

Where, L_h is labour hired by the household to work on its farm, L^o is the household's own labour on its farm, L^x is the time spent by the household working for a wage, and M is the maximum amount of time the household can spend working for a wage as a result of some (here unmodelled) labour market rationing. If [3.13] is not binding, then [3.11] becomes:

$$PC + w_l = f(L, K) - wL + wT \quad [3.14]$$

Where, L is the amount of labour used on the farm. However, suppose [3.13] is binding, as it will be for small M , and when households decide to supply large amounts of labour to the market. In this case, $L^x = M$, $L_h = 0$. Setting the numeraire $P = 1$, the household's problem becomes:

$$\text{Max } U(C, l) \quad [3.15]$$

Subject to

$$C = f(T - M + 1, K) + wM \quad [3.16]$$

The first order conditions are [3.16] and $U_l/U_c = F_L$. The household's problem is illustrated in figure 3.1. The outer axes measure the household consumption (goods consumption on the vertical axis, the time endowment minus leisure on the horizontal axis). The inner axes demonstrate production on the household's farm, with output on the vertical axis and labour on the horizontal axis. M hours are spent working in the market, earning wM . The household's remaining labour time (L^o) is spent on the farm, producing q^* . So the household works $M + L^o$ hours and consumes $c^* = wM + f(L^o, K)$ units of the good. The household achieves a maximised utility of $U(c^*, l^*)$ and point A .

This sort of market structure could give rise to an oft-observed pattern in the rural areas of less developed countries, resulting in small farms being cultivated more intensively than their larger counterparts. Consider a household with more land than the household consuming at point A in figure 3.1, but facing the same wage and labour market constraint. If this household were to cultivate with the same intensity as household A , it would have to choose to produce and consume at point D in the figure. If leisure is a normal good, D will not be chosen. Instead, the household will choose to produce and consume at a point such as B , cultivating its large farm less intensively than the smaller farm of household A .

It follows that when a smoothly functioning market for labour is present, increased ownership of land will unambiguously increase income, and (assuming that child leisure

is a normal good) reduce child labour. However, if the household faces imperfections in the labour market, it is not possible to predict the effects on child labour.²³

²³ The basic conditions described in figure 3.1 are valid not only for total household production but also for any specific type of production. Indeed, it is possible to distinguish between two types of household production (Q_1 and Q_2) without altering the main conclusion.

3.4 THE EMPIRICAL STRATEGY

The theoretical model in the previous section concluded that if the household faces imperfections in the labour market, the effect of increased ownership of land on child labour remains ambiguous. The aim of this chapter involves testing the hypothesis that, in Uganda, if the household faces imperfections in the labour market, increased ownership of land intensifies the need for child labour. In the absence of any frictions in off-farm employment, the marginal productivity of work on the family farm should be equal to the effective wage received by family members working off the farm. Further, assuming that working off the farm entails no transaction costs, the effective wage reported should be equal to the market wage.

In line with Jacoby's (1993) analysis of structural time allocation models for self-employed agricultural households in the Peruvian Sierra, to test whether labour markets function efficiently, it is possible to examine the relationship between the effective wage for adult male workers in the non-farm labour market, W_m , and their marginal productivity of work on the family farm, \hat{W}_m . The going market wage for men in the community, W_m , is provided in the community questionnaire of the Integrated Household Survey (IHS) 1992. The corresponding marginal products, \hat{W}_m , can be predicted from the estimated parameters of an agricultural production function with functional form f , $Y = f(L, K, \beta) + \varepsilon$.

This chapter focuses on the Cobb-Douglas specification of the production function. The attractiveness of the Cobb-Douglas representation stems from its ease of estimation and interpretation of the elasticities of production and marginal products. On account of this property alone, the Cobb-Douglas production function holds a definite advantage over a wide spectrum of alternative specifications (e.g. translog) for it keeps our computation of the marginal productivity of work for adult men on the family farm manageable (see equations [3.22]-[3.24]).

The ease of estimation and interpretation of the Cobb-Douglas production function further implies that its estimated labour coefficients can be readily applied to quantify the economic value of children, the second aim of this chapter. This attribute proves especially desirable in the case of Uganda, where most child labour can be categorized as unpaid family work.

Notably, in spite of differing efficiencies, perfect substitutability among farm workers has been an implicit assumption throughout our discussion. Deolalikar and Vijverberg (1987), however, show that this assumption is not necessarily true. A simple manipulation in the standard specification of the production function enables us to test the common assumption of perfect substitutability among farm workers. Let adult male, adult female, child, and hired labour equal L_m^o , L_f^o , L_c^o , and L_h , respectively. Moreover, let adult female labour, L_f^o , child labour, L_c^o , and adult male labour, L_m^o , be perfect substitutes subject to a hired-worker equivalent correction term. Equation [3.17] captures

the new efficiency relationship among family adult males, females, children, and hired workers:

$$L^* = L_h + \tau L_f^o + \psi L_c^o + \delta L_m^o \quad [3.17]$$

The objective is to test whether τ , ψ , and δ equal 1. Notably, $L = L_m^o + L_f^o + L_c^o + L_h$; it follows that

$$L^* = L + (\tau - 1)L_f^o + (\psi - 1)L_c^o + (\delta - 1)L_m^o \quad [3.18]$$

$$L^* = L [1 + (\tau - 1)L_f^o/L + (\psi - 1)L_c^o/L + (\delta - 1)L_m^o/L] \quad [3.19]$$

Equation [3.19] can be re-expressed as

$$\ln L^* = \ln L + \ln [1 + (\tau - 1)L_f^o/L + (\psi - 1)L_c^o/L + (\delta - 1)L_m^o/L] \quad [3.20]$$

Let, $(\tau - 1)L_f^o/L + (\psi - 1)L_c^o/L + (\delta - 1)L_m^o/L = X$. If X is small, $\ln(1 + X) \approx X$. Hence,

$$\ln L^* \approx \ln L + (\tau - 1)L_f^o/L + (\psi - 1)L_c^o/L + (\delta - 1)L_m^o/L \quad [3.21]$$

Equation [3.21] can be plugged back into [3.2], in the estimation of the production function. The tests of $\tau = 1$, $\psi = 1$, and $\delta = 1$ equal the tests that $(\tau - 1) = 0$, $(\psi - 1) = 0$,

and $(\delta - 1) = 0$. Intuitively, this tests whether, given the optimal amount of labour, L^* , the mix of family adult males, females, children, and hired workers affects total observed labour use.

In view of the above, Eq.s [3.22] and [3.24] represent the Cobb-Douglas production function and the corresponding marginal products of labour for adult male workers, respectively.

$$Y = L^\alpha e^{a\Lambda} K^\beta \quad [3.22]$$

$$\begin{aligned} \Lambda = & 1 + (\tau - 1) L_f / (L_m + L_f + L_c + L_h) + (\psi - 1) L_c / (L_m + L_f + L_c + L_h) + \\ & + (\delta - 1) L_m / (L_m + L_f + L_c + L_h) \end{aligned} \quad [3.23]$$

$$\left(\frac{\partial Y}{\partial L_m} = \right) \hat{W}_m = \alpha \left\{ 1 - [(\tau - 1) \frac{L_f}{L} + (\psi - 1) \frac{L_c}{L} + (\delta - 1) \frac{L - L_m}{L}] \right\} (\hat{Y}/L) \quad [3.24]$$

\hat{Y} is the predicted value of output derived from the estimated coefficients α , $(\tau - 1)$, $(\psi - 1)$ and $(\delta - 1)$; L_m , L_f , L_c and L_h (i.e. $L = L_m + L_f + L_c + L_h$) are total hours of labour by family males, females, children, and hired workers, respectively; and K is a vector of household's fixed inputs such as capital and land; β 's are the parameters of the production function; and e is the production disturbance. Additive disturbances are assumed for the sake of exposition.

In turn, equation [3.25] tests for the equality of marginal productivity and wage rate among the sub-sample of male workers who reported working mostly for wages during the survey period. Following Jacoby (1993), using Ordinary Least Squares (OLS), the null hypothesis of the absence of any frictions in off-farm employment implies that $\alpha = 0$ and $\beta = 1$.

$$\ln \hat{W}_m^* = \alpha + \beta \ln W_m + \varepsilon_m \quad [3.25]$$

\hat{W}_m^* is the estimated marginal productivity of adult family male workers, W_m is the median market wage for male labour at the community level, and ε_m is a random term probably including measurement error.

Clearly, if a variable is incorrectly omitted from the regression model, the residual of the estimated model incorporates the effect of this omitted variable. In so far as the omitted variable varies with the regressor included in the model, heteroscedastic residuals may result (Mukherjee et al., 1998). In this particular application, even using White (1980, 1982) heteroscedasticity consistent standard errors may not be sufficient. Heteroscedasticity does not destroy the unbiasedness and consistency properties of the OLS estimators, but it renders them inefficient. Under normal circumstances, this lack of efficiency makes the usual hypothesis-testing procedure of dubious value. In this case, however, the researcher's interest goes beyond the interpretation of the individual coefficient estimate. The absence of any frictions in off-farm employment is embodied in the null hypothesis ($\alpha, \beta = 0, 1$).

3.5 THE DATA

The data are drawn from the Integrated Household Survey (IHS) 1992 described in great detail in the introduction to this thesis. The IHS 1992/93 includes a Labour Force Survey Questionnaire, collecting data on various labour force indicators, which provides a unique opportunity to improve our understanding of child labour in Uganda. Notably, as it was mentioned at the outset, the Labour Force Survey Questionnaire was not included in the design of the UNHS-I 1999/00.

Table 3.1 shows activity rates for Ugandan children, men and women. Own-farm employment is the most prominent form of child labour with 26% of children aged between 7 and 14 working on the household farm. Boys (29%) are more likely to engage in agricultural production than girls (22%), and children in school (22%) are less likely to do so than children not in school (35%). On a related note, 21% of both men and women are associated with employment off the family farm, and 27% engage primarily in wage employment. Encouragingly, in spite of high labour participation rates, school attendance rates have remained high, especially for young boys (74%) and girls (68%).

Table 3.1 also reveals that child (self-) employment is primarily a rural phenomenon. Children living in rural areas (28%) are significantly more likely to be employed on the family farm than their counterparts living in urban areas (7%). Notably, further disaggregation of the data shows that, within rural areas, child (self-) employment

appears to be more heavily concentrated in Eastern and Northern Uganda, the poorest regions of the country.

Leaving aside males aged over 14, who account for one third of the Ugandan population, women and children's off-farm and wage employment are either very low or negligible. In a sample of 10,459 surveyed children, 124 reported working for a wage in the week preceding the interview, and merely 140 reported being involved in wage employment in the year prior to the survey. Of the latter group of workers, only 30 have wages reported in the agricultural sector; the median child wage is 32 shillings per hour. By contrast, approximately 40% of an adult's expected earnings come from the agricultural sector; the median adult wage is 77 shillings per hour.

3.6 LABOUR MARKET EFFICIENCY AND CHILD LABOUR

Cain et al. (1980), and Grootaert and Kanbur (1995) have argued that the economic value of children and its implications for the reproductive behaviour cannot properly be assessed without reference to the structure of the labour market. The latter determines the level of wages, which in turn determines the contribution of child labour to household income. In competitive markets, children can substitute for adults in the market place. Where wages are at a floor level, whether due to legislation, collective action or because they have reached an adult subsistence minimum, the employer will prefer adult to child workers. The remainder of this section is structured as follows: Section 3.6.1 estimates the Cobb-Douglas production function, and tests for equality between the marginal productivity of work on the family farm and the effective market wage, in order to establish the existence of a smoothly functioning market for adult labour. Section 3.6.2 investigates the determinants of child labour. Finally, section 3.6.3 quantifies children's contribution to the household's agricultural activities.

3.6.1 THE COBB-DOUGLAS PRODUCTION FUNCTION

Table 3.2 contains the empirical definitions and summary statistics of the variables used in the estimation of our production function. The dependent variable is annual household agricultural earnings. Earnings from crop agriculture were aggregated using the median price for individual crops at regional level. As such, variations in household earnings

reflect differences in physical production rather than spatial or temporal differences in prices.²⁴

Three factors of production enter the empirical specification: Labour, land and capital. Labour is measured in terms of the number of hours of work annually performed on the farm; land is measured as available cultivable land; and capital as the value of capital goods, including agricultural equipment and buildings. Labour and land cannot be equal to zero in agricultural production. In the case of capital, however, zero values are possible and the logarithmic transformation was carried out by adding 1 to it.²⁵ On a related note, assuming constant return in percentage, it seems more appropriate to control for age and education in levels rather than logs.

On the premise that agricultural productivity varies across regions over time, a series of regional dummy variables were added to the empirical specification of the production function.²⁶ These spatial variables have been generated by dividing the country into eight parts – rural and urban areas of the four administrative regions (Central, Northern, Eastern and Western).²⁷

²⁴ Aggregate agricultural earnings do not reflect revenue net of pecuniary costs.

²⁵ The same analysis was performed adding 2 to capital in the logarithmic transformation in the presence of zero values. When this additive constant is set at 2 the resulting conclusions remain unchanged. Thus, the results will be robust to the choice of the constant.

²⁶ The pattern of these differences is expected, given the variation in climate and soil qualities. For instance, central areas of the country are more productive than northern regions (Appleton and Balihuta, 1996).

²⁷ The inclusion urban households in a study of agricultural productivity provides us with a ‘truly national picture’. Locations defined as urban often cover substantial areas of agricultural land and urban households may farm these, or other, areas. For a discussion of urban farming in Uganda, see Maxwell (1995).

Notably, in our estimation of the Cobb-Douglas production function, for the production disturbance to be orthogonal to the variable inputs, it must be unknown to the farmer in advance of input decisions (Zellner, Kmenta and Dreze, 1966). Simultaneity bias in the production function estimates could result if the disturbance is anticipated, or if it contains unobservable inputs such as managerial ability. In the presence of simultaneity, the method of 2-Stage Least Squares (2-SLS)²⁸ will give estimators that are both consistent and efficient. The bias due to the adjustment of variable inputs in anticipation of shocks can be rectified if instruments are available that are determined prior to the shock. The validity of these instruments is ultimately an empirical question, which can only be resolved by testing the over-identifying restrictions supplied by the theoretical model.

Table 3.3 presents the results from the first stage regressions. Total labour, family child, adult female, and adult male labour (instrumented by ‘Family’, ‘Adult females’, ‘Boys’, ‘Girls’, and ‘Female wage’) are fairly well explained by the first stage regressions, with mostly significant variables and relatively high R^2 s. Moreover, female market wage and household demographics satisfy a standard F-test of joint significance, while a test of over-identifying restrictions by Davidson and MacKinnon ascertains their validity as instruments [$\chi^2_{(1)} = 0.125$].

²⁸ 2-SLS allows us to find a ‘proxy’ for the stochastic explanatory variable L^* such that, although ‘resembling’ L^* (in the sense that it is highly correlated with L^*), it is uncorrelated with the production disturbance.

Table 3.4 reports the parameters of interest from the 2-SLS estimation of the Cobb-Douglas production function. In support of the argument that the labour variables need to be instrumented to avoid simultaneity, the Durbin-Wu-Hausman test rejects the null hypothesis of no simultaneity in the labour supply functions [$F_{(4, 5393)} = 44.46^{***}$].

As it was argued at the outset, from the estimated parameters of the Cobb-Douglas production function, it is possible to predict the marginal productivity of work on the family farm for adult male workers (i.e. equation [3.24]). Jacoby's (1993) methodology can, in turn, be applied to test whether labour markets function efficiently by examining the relationship between the marginal productivity of work for adult male workers on the family farm and their effective wage in the non-farm labour market.

The results from table 3.5 clearly reject the null hypothesis of the absence of any frictions in off-farm employment [$F_{(2, 604)} = 64,132.59^{***}$]. This finding is in line with the earlier results reported by Jacoby (1993), Skoufias (1994), and Abdulai and Regmi (2000). Following Jacoby (1993), besides the irrelevance of the utility maximisation hypothesis, there are various potential explanations for this rejection. It is possible that there are frictions or community costs associated with wage work. Alternatively, there may be employment constraints in the labour market due to a comparative advantage for household members to work in their own farm. This, in turn, will prevent households from equating the marginal returns across different activities.

In terms of the Cobb-Douglas production function, most of our results conform with Appleton and Balihuta's (1996) work on the impact of education on agricultural productivity in Uganda. That is, central areas of the country are more productive than northern regions, and higher levels of both primary and secondary education, in addition to being an end in themselves, play an important role in agricultural production. This evidence supports the widely accepted role of human capital toward improving farmers' efficiency, and it is consistent with a World Bank study in Kenya, showing that the incomes of self-employed small landowners increase with the level of education.

In contrast with Appleton and Balihuta (1996), who claim decreasing returns to scale in agriculture, a standard F-test [$F_{(1, 819)} = 0.87$] on the factors of production does not reject the null hypothesis of constant returns to scale. Clearly, the inclusion of individual worker efficiency in the production function provides a more accurate account of production practices in Ugandan agriculture.

3.6.2 THE DETERMINANTS OF CHILD LABOUR

Having established the absence of a smoothly functioning market for adult labour, we move on to investigate the determinants of child labour. In particular, we are interested in assessing the labour supply responses of children in Ugandan farm households to changes in household ownership of land. This relationship is captured in equation [3.26]:

$$\ln L^*_c = \alpha + \kappa \ln K + \omega \ln W + \beta \ln X + u_c \quad [3.26]$$

where, L^*_c is total hours of agricultural (family) child labour. As such, it was constructed by aggregating total hours of labour performed by family children on the farm. K is a vector of inputs available to the household in agricultural production. These are represented by total cultivable land, and the monetary value of capital goods. As it was mentioned at the outset, in Uganda's traditional small-holder agriculture, labour-supply accounts for one of the major constraints on expanding acreage. This is especially the case if a household faces imperfections in the labour market. In view of this argument, and on the bases of our results from the previous section, we expect increased access to cultivable land to intensify the need for child labour.

X is a vector of household-specific observable characteristics. These include household demographics, specified as household size, the proportion of children to adult members of the household, the average age of adult members of the household, and the average education level. The latter is included to capture preferences for education and the efficiency of household production of human capital (Behrman et al., 1999). Intuitively, educated parents may be more averse to child work.

W is the median market wage for male labour at the community level. This variable proxies the gains from children's next best foregone employment alternative, and it controls for the opportunity cost of child (self-) employment. Regional dummies have also been included to capture geographical variation in cultural attitudes towards child

(self-) employment. Finally, α , κ , ω , and β are the parameters to be estimated, and u_c is an error term summarising the effect on unobservable factors.

There are several ways to econometrically model the supply of child labour. Existing work has tended to concentrate on the participation decision. In line with Bhalotra and Heady's (2003) comparison of the determinants of child labour in Pakistan and Ghana, however, our dependent variable on hours of agricultural (family) child labour exhibits substantial variation, with many children working less than 10 hours a week. From a policy perspective, participation at 10 hours a week is rather different from participation at 40 hours per week. In order to utilize the information on work hours, and on the basis that many Ugandan households do not report employing children in farm activities, we use a tobit estimation. The main results are reported in table 3.6.

These results clearly support the null hypothesis of a positive relationship between household ownership of land and agricultural child labour. Bhalotra and Heady (2003), in their work on the determinants of child labour in Pakistan and Ghana, also find a similar relationship: (i) Acres of land operated by the household have a positive effect on girls' work, though they are insignificant for boys, in Pakistan; (ii) The number of farms operated by the household has a positive effect on hours of work for boys and girls in Ghana. Further, land and livestock ownership and having a family enterprise have all been shown to increase child labour participation (e.g. Bhalotra and Heady, 2001; Canagarajah and Coulombe, 1997; Cockburn, 2000; De Tray, 1983; Levison and Moe, 1998; Mergos, 1992; Mueller, 1984; and Rosenzweig and Evenson, 1977).

Table 3.6 also shows that child labour increases (at a decreasing rate) with the number of total household members and the proportion of children to adults (i.e. child ratio). By contrast, it decreases with the average age of adults (at an increasing rate), and the average level of adult primary education.

In line with Patrinos and Psacharopoulos (1997), child labour is more likely to be employed in large households, and in households characterised by a high dependency ratio, as a consequence of resources per person being smaller. Fertility may also be encouraged by the prospects of child work (e.g. Rosenzweig and Evenson, 1977; Cain, 1977; Singh and Schuh, 1986; Eswaran, 1996; Bardhan and Udry, 1999).

The fact that agricultural child labour decreases with the average age of adults, and the average level of adult primary education can also be easily explained. Firstly, in accordance with Abdulai and Regmi's (2000) conclusions, the older (and more experienced) the household's adult members, the lower the likelihood of agricultural child labour. Secondly, in line with the existing literature, having more educated parents decreases the likelihood of agricultural child labour (e.g. Psacharopoulos and Arriagada, 1989; Grootaert, 1998; Wahba, 2001).

3.6.3 THE ECONOMIC VALUE OF CHILDREN

The analysis in sections 3.6.1 and 3.6.2 suggests that in the absence of a smoothly functioning market for adult labour, increased ownership of land intensifies the need for child labour. By implication, in Uganda, children play an important role in the household's agricultural activities. This final section aims to quantify such involvement.

On the bases of our estimated coefficients from the Cobb-Douglas production function presented in table 3.4, we cannot reject the hypothesis that all types of labour employed on the family farm are equally efficient. As a direct result, in quantifying children's contribution to household earnings from agricultural activities, column A in table 3.7 imposes the null hypothesis' restriction that all types of labour are equally effective.²⁹ Within this framework, child (self-) employment accounts for approximately 9% of the household's annual agricultural earnings.³⁰ This evidence supports the argument that children contribute significantly to the household's agricultural activities, and is consistent with a number of studies reported in the introduction to this chapter.

At this juncture, it may be argued that the type of wage paid to hired workers (e.g. efficiency wage, piece-rate, crop-sharing) will affect their productivity, and should be

²⁹ Directly from our derivation of equation [3.21], section 3.4, $\{(\tau - 1) = 0, (\psi - 1) = 0, \text{ and } (\delta - 1) = 0\}$ implies $\{\tau = 1, \psi = 1, \text{ and } \delta = 1\}$.

³⁰ Relaxing the restriction of equality, and computing children's contribution from the actual coefficient estimated in table 3.6, children's contribution rises to approximately a quarter of household annual agricultural earnings.

built into our model of agricultural production. While this may be true, examining hired labour responses to differing market incentives is beyond the scope of this chapter.

Our results fail to support Canagarajah and Nielsen's (2001) argument that there may exist several activities for which children are more suited than hired workers. According to Canagarajah and Nielsen (2001), children are irreplaceable because of their nimble fingers. Following this argument, only children can pluck the delicate jasmine flowers without breaking branches; only children with small fingers have the ability to make fine, hand knotted carpets; and, similarly, only physically small individuals are able to climb mine tunnels. Notably, however, the activities that Canagarajah and Nielsen (2001) refer to are unlikely to be those that Ugandan children typically work on.

The discussion above suggests that high incidence of child labour in Uganda does not come as a result of children's comparative advantage in agricultural production. Child (self-) employment may reflect a parental maximizing response to differential labour-market returns with respect to the mix of labour inputs in agricultural production. This argument is consistent with the notion that high levels of child involvement in agricultural activities stem primarily from continent-wide poverty, and cultural views which often condone child labour. Many poor rural societies view child labour as part of a socialization process, which gradually introduces children into work activities and teaches them survival skills. It follows that many parents conclude that taking children out of school and putting them to work is the most sensible solution for survival, and the education method, which offers the best prospects for the future. As one African

commentator put it: “Education broadens your mind but it does not teach you how to survive” (Grootaert C. and Kanbur R., 1995).

3.7 DISCUSSION AND CONCLUSION

Comparative work is the first step in gaining an insight into the universality of the issue of child work. The empirical literature discussed in the previous section shares several differences and similarities corresponding to the diversity of regions and age groups studied, and the variety of specifications used. Our results suggest that, accounting for approximately 9% of the household's annual agricultural earnings, children play an important role in the farming activities of Ugandan agricultural households. On this note, Cain (1977) conceptualises a child's productive life cycle within the parental household as having four distinct phases. After an initial period when the child is completely dependent, the child becomes increasingly economically active but produces less than he or she consumes. Then comes a period during which the child produces more than he or she consumes but less than an adult produces. Finally, the child's productivity becomes equivalent to an adult's.

The rate at which the child's total productivity increases depends on a number of highly interrelated factors, viz. the age at which the child begins working, the amount of time the child spends working, the relative efficiency of children in performing economic activities, and the productiveness of the tasks to which children devote their time.

That children play an important role in Uganda's agricultural households is further corroborated by the finding that, as most child labour is performed within the household and smoothly functioning labour markets are rare, land ownership increases the

household's demand for child labour in agricultural activities. By rejecting the hypothesis of efficient labour markets, the analysis above also indirectly supports the concern of non-separability between the production decisions and the consumption choices of the Ugandan agricultural household.

The discussion above leads to some important policy considerations. On the one hand, government funded initiatives of land reform programmes may have an undesirable effect on agricultural child labour (at the cost of reducing schooling and/or leisure time). On the other, higher adult education, together with improved markets for adult labour can displace children from labour activities; thus, allowing them to enjoy more schooling and/or leisure.

Table 3.1: Activity rates in Uganda (for week preceding interview)

	N		Household Employment		Wage Employment	School Attendance
			Farm	Off-farm		
Children (7-14)	10459	P H	0.26 (0.44) 22 (16)	0.00 (0.07) 31 (19)	0.01 (0.10) 57 (16)	0.71 (0.45)
Men (>14)	11578	P H	0.63 (0.48) 33 (17)	0.13 (0.34) 42 (24)	0.22 (0.42) 47 (20)	0.15 (0.36)
Women (>14)	12598	P H	0.68 (0.47) 31 (13)	0.08 (0.28) 32 (21)	0.05 (0.22) 42 (18)	0.07 (0.26)
Boys	5286	P H	0.29 (0.45) 23 (17)	0.00 (0.06) 36 (20)	0.01 (0.09) 57 (18)	0.74 (0.44)
Girls	5173	P H	0.22 (0.42) 21 (14)	0.01 (0.08) 28 (17)	0.01 (0.10) 57 (14)	0.68 (0.47)
Rural Children	7043	P H	0.28 (0.45) 22 (16)	0.00 (0.06) 31 (18)	0.01 (0.07) 56 (18)	0.70 (0.46)
Urban Children	3416	P H	0.07 (0.26) 19 (12)	0.01 (0.11) 29 (20)	0.04 (0.19) 58 (14)	0.82 (0.39)
Children in school	7641	P H	0.22 (0.42) 16 (12)	0.00 (0.05) 30 (24)	0.00 (0.03) 46 (17)	1
Children not in school	2818	P H	0.35 (0.48) 32 (16)	0.01 (0.11) 31 (15)	0.03 (0.17) 58 (16)	0

Note: N is the number in the relevant group. P refers to participation rate and H to hours per week of those participating. Figures are means, and standard deviations are presented in parentheses.

Table 3.2: Definition of variables

<i>Variables</i>	<i>Description</i>	<i>Mean</i>	<i>S.D.</i>
Income	Annual household agricultural earnings (Ugandan shillings)	318,231.70	405,046.70
Labour	Total hours of agricultural household labour	3,744.94	2,559.51
Female labour	Proportion of hours of female adult labour to total hours of agricultural household labour (females defined between the ages of 15 and 60 – inclusive)	0.52	0.29
Male labour	Proportion of hours of male adult labour to total hours of agricultural household labour (males defined between the ages of 15 and 60 – inclusive)	0.39	0.29
Child labour	Proportion of hours of child labour to total hours of agricultural household labour (children defined below the age of 14 – inclusive)	0.07	0.15
Family children hours of labour	Total hours of agricultural work by family children	339.96	882.31
Land	Total cultivable land (Acres)	3.26	10.69
Capital	Monetary value of capital goods (Ugandan shillings)	149,805	1,142.261
Family	Total number of household members	5.22	3.00
Adult females	Proportion of total number of household females aged between 15 and 60 (inclusive) to total number of household members	0.26	0.18
Boys	Proportion of total number of household boys aged between 8 and 14 (inclusive) to total number of household members	0.10	0.14
Girls	Proportion of total number of household girls aged between 8 and 14 (inclusive) to total number of household members	0.09	0.13
Child ratio	Proportion of the number of members of the household younger than 15 years of age to the number of members of the household older than 15 years of age	1.14	1.06
Age	Average age of adult members of the household	33.35	13.23
Primary education	Average level of adult primary education	2.80	2.27
Secondary education	Average level of adult secondary education	0.22	0.69
Male wage	Median market wage for male labour at the community level	607.32	397.69
Female wage	Median market wage for female labour at the community level	538.48	327.18
Central rural	Dummy variable controlling for central rural location	0.21	0.41
Central urban	Dummy variable controlling for central urban location	0.03	0.18
Western rural	Dummy variable controlling for western rural location	0.24	0.43
Western urban	Dummy variable controlling for western urban location	0.03	0.17
Eastern rural	Dummy variable controlling for eastern rural location	0.23	0.42

Eastern urban	Dummy variable controlling for eastern urban location	0.03	0.17
Northern rural	Dummy variable controlling for northern rural location	0.19	0.39
Northern urban	Dummy variable controlling for northern urban location	0.03	0.18
<i>Constructed marginal product</i>			
Mp_m	Marginal product – Adult men	0.02	0.02
Source: Integrated Household Survey (IHS), Uganda (1992).			

Table 3.3: 2-SLS – First stage regressions of the Cobb-Douglas production function

	Ln(Labour)	Child labour	Female labour	Male Labour
Ln(Land)	0.143*** (12.17)	0.002 (0.97)	– 0.048*** (– 9.87)	0.028*** (5.72)
Ln(Capital)	0.035*** (7.93)	0.003*** (3.98)	– 0.017*** (– 9.39)	0.008*** (4.09)
Primary education	– 0.027*** (– 6.55)	– 0.018*** (– 22.69)	0.002 (1.39)	0.013*** (7.41)
Secondary education	– 0.083*** (– 6.29)	– 0.001 (– 0.25)	– 0.024*** (– 4.32)	– 0.004 (– 0.72)
Age	– 0.008*** (– 12.25)	– 0.004*** (– 33.61)	0.005*** (15.93)	– 0.0004 (– 1.55)
Central rural^{TT}	0.213*** (4.46)	0.015 (1.62)	– 0.026 (– 1.31)	0.018 (0.88)
Central urban^{TT}	– 0.232*** (– 3.73)	0.039*** (3.27)	0.040 (1.55)	– 0.095*** (– 3.69)
Western rural^{TT}	0.414*** (8.76)	– 0.018** (– 2.02)	0.028 (1.40)	0.009 (0.47)
Western urban^{TT}	0.130** (2.00)	– 0.028** (– 2.30)	0.093*** (3.43)	– 0.083*** (– 3.08)
Eastern rural^{TT}	0.164*** (3.46)	0.024*** (2.64)	– 0.028 (– 1.39)	0.025 (1.28)
Eastern urban^{TT}	– 0.298*** (– 4.58)	0.025** (2.04)	0.014 (0.50)	– 0.061** (– 2.25)
Northern rural^{TT}	0.269*** (5.61)	– 0.006 (– 0.68)	– 0.014 (– 0.69)	0.049** (2.48)
Constant	7.142*** (55.02)	0.175*** (7.10)	0.146*** (2.69)	0.626*** (11.62)
<i>Instruments</i>				
Ln(Family)	0.526*** (32.01)	– 0.026*** (– 8.37)	0.110*** (16.02)	– 0.076*** (– 11.21)
Adult Females	0.340*** (7.20)	– 0.079*** (– 8.88)	0.787*** (39.90)	– 0.707*** (– 36.13)
Boys	– 0.215*** (– 3.35)	0.375*** (30.92)	0.010 (0.38)	– 0.398*** (– 14.98)
Girls	– 0.447*** (– 6.44)	0.345*** (26.26)	0.109*** (3.77)	– 0.488*** (– 16.96)
Ln(Female wage)	– 0.042** (– 2.38)	0.007* (1.93)	0.008 (1.09)	0.003 (0.35)
F-test	222.72***	380.13***	346.92***	350.78***
[F_(5, 5396)]				
R²	0.3763	0.4166	0.2838	0.2804
Total no. of clusters	820	820	820	820
Total no. of observations	5414	5414	5414	5414

^{TT} Omitted category: Northern urban.

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%. In addition, all reported standard errors are robust (White H., 1980; 1982), and adjusted to permit observations within clusters (primary sampling units) to be correlated (Deaton A., 1997).

Table 3.4: 2-SLS estimation of the Cobb-Douglas production function

	Ln(Income)
Ln(Labour)[†]	0.788*** (11.47)
Child labour[†]	2.598 (1.08)
Female labour[†]	1.702 (0.73)
Male Labour[†]	1.758 (0.76)
Ln(Land)	0.244*** (4.32)
Ln(Capital)	0.065*** (3.49)
Primary education	0.077*** (7.22)
Secondary education	0.134** (1.99)
Age	0.011*** (5.91)
Central rural^{††}	0.399*** (4.12)
Central urban^{††}	0.493*** (3.52)
Western rural^{††}	0.227** (2.18)
Western urban^{††}	0.610*** (3.89)
Eastern rural^{††}	0.064 (0.60)
Eastern urban^{††}	0.152 (1.02)
Northern rural^{††}	− 0.161 (− 1.46)
Constant	2.589 (1.13)
Durbin-Wu-Hausman test [F_(4, 5393)]	44.46***
Davidson and MacKinnon test [χ²₍₁₎]	0.125
F-test [F_(1, 819)]	0.75
R²	0.1489
Total no. of clusters	820
Total no. of observations	5414

[†] Instrumented by: Ln(Family), Adult females, Boys, Girls, Ln(Female wage).

^{††} Omitted category: Northern urban.

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%. In addition, all reported standard errors are robust (White H., 1980; 1982), and adjusted to permit observations within clusters (primary sampling units) to be correlated (Deaton A., 1997).

Table 3.5: Testing the equality of marginal productivity on observed wages

	Ln(Mp_m)
Ln(Male wage)	0.090*
	(1.86)
Constant	– 4.104***
	(– 13.38)
H₀: α = 0 and β = 1	64,132.59***
[F_(2, 604)]	
R²	0.0037
No. of clusters	605
No. of observations	1181

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%. In addition, all reported standard errors are robust (White H., 1980; 1982), and adjusted to permit observations within clusters (primary sampling units) to be correlated (Deaton A., 1997).

Table 3.6: The determinants of child labour

	Ln(Family children hours of labour)
Ln(Land)	1.012*** (2.73)
Ln(Land) ²	0.036 (0.27)
Ln(Capital)	0.059 (0.19)
Ln(Capital) ²	0.017 (1.12)
Ln(Family)	9.937*** (7.05)
Ln(Family) ²	− 1.607*** (− 4.14)
Child ratio	3.331*** (9.56)
Child ratio ²	− 0.473*** (− 7.19)
Age	− 0.527*** (− 10.33)
Age ²	0.003*** (4.77)
Primary education	− 1.483*** (− 20.65)
Secondary education	− 0.202 (− 0.80)
Ln(Male wage)	− 0.153 (− 0.47)
Central rural ^{††}	0.698 (0.86)
Central urban ^{††}	0.893 (0.76)
Western rural ^{††}	− 3.956*** (− 4.86)
Western urban ^{††}	− 6.731*** (− 4.14)
Eastern rural ^{††}	1.099 (1.39)
Eastern urban ^{††}	0.431 (0.44)
Northern rural ^{††}	− 0.927 (− 1.16)
Constant	− 3.874 (− 1.32)
Total no. of clusters	820
No. of total observations	5414
% of censored observations	0.7664

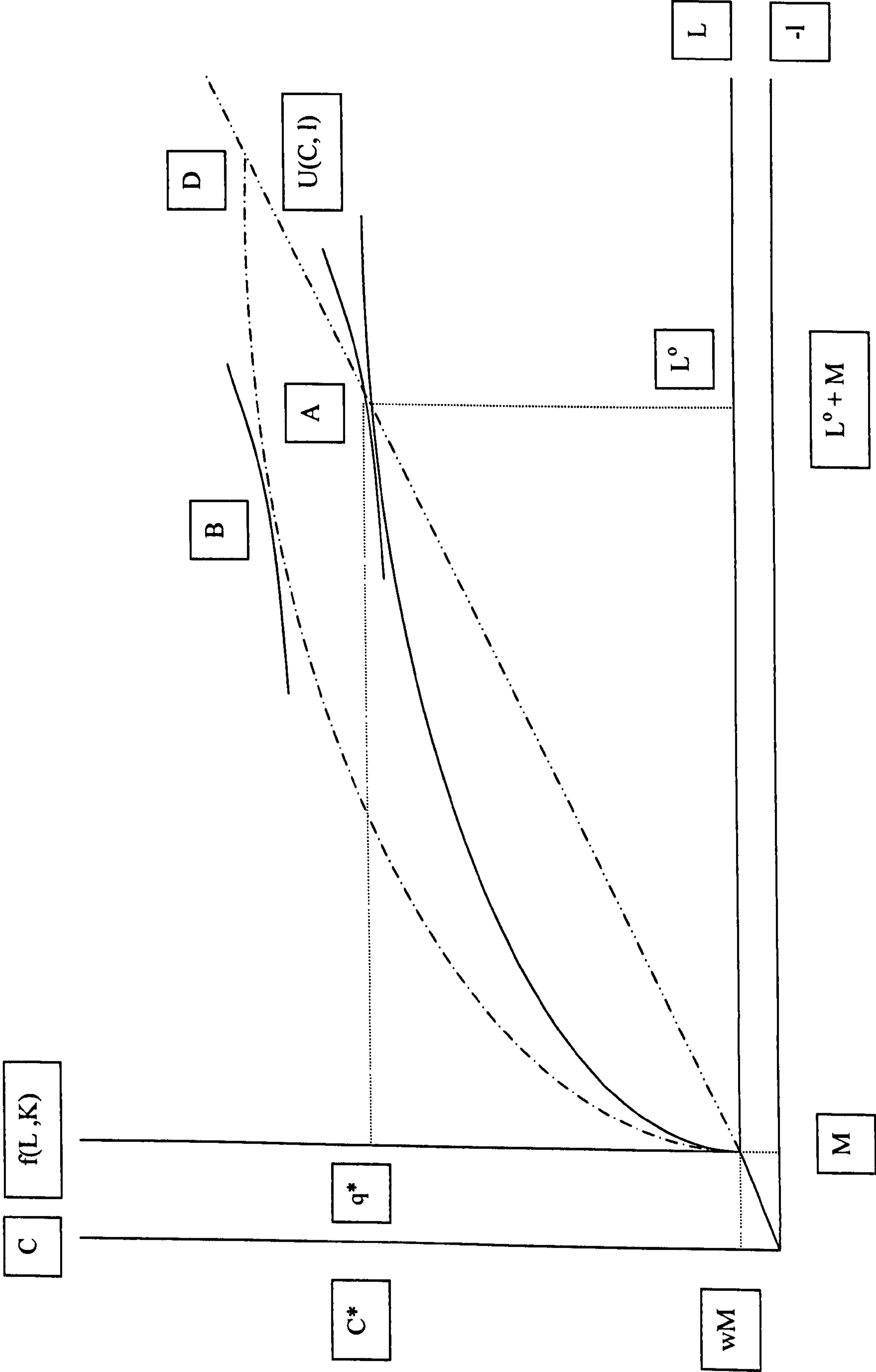
^{††} Omitted category: Northern urban.

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%. In addition, all reported standard errors are robust (White H., 1980; 1982), and adjusted to permit observations within clusters (primary sampling units) to be correlated (Deaton A., 1997).

Table 3.7: Individual contributions to household's agricultural activities

	Coefficient (A)	Hours of labour (B)	(A) x (B)	(A) x (B)/(T)
Uganda				
Child labour	(ψ =) 1	339.96	339.96	9.08%
Female labour	(τ =) 1	1,888.69	1,888.69	50.43%
Male labour	(δ =) 1	1,416.52	1,416.52	37.83%
[Hired labour	1	99.78	99.78	2.66%]
Total			3744.95 [= (T)]	100%

Figure 3.1: Labour-increasing (decreasing) physical asset accumulation



CHAPTER IV

CONCLUSION

Uganda's excellent record in reducing the national incidence of monetary poverty over the 1990s has been widely documented in the literature. Notably, however, this net aggregate reduction was accompanied by substantial mobility into as well as out of poverty (Okidi and McKay, 2003). A majority of those that were poor in 1992 had escaped by 1999, but a substantial minority were left behind and many others fell into poverty over this period. Therefore, against the background of Uganda's impressive macroeconomic performance over this decade, there was a significant variation in individual experiences of poverty movements, and it is important to understand the factors that contributed to this (Lawson, McKay and Okidi, 2003).

Understanding the picture of poverty and the strength of the described data sources is important in illuminating and commenting on the relevance of Uganda's government policies for poverty reduction. Such efforts provide a context for the formulation and implementation of policy. In addition, the way poverty is understood affects the way it is tackled (UPPAP, 2000). While outlining the main findings of the thesis, the aim of this chapter is to highlight each chapter's contribution to the literature, discuss their main policy implications in light of Uganda's development dynamics, and finally set an agenda for future research.

4.1 HOUSEHOLD VULNERABILITY

Chapter I argues that the current poverty level of a household may not necessarily be a good guide to the household's expected poverty in the future. Hence, it applies Chaudhuri et al. (2002), Christiaensen and Subbarao (2001), and Pritchett et al.'s (2002) pioneering work on household vulnerability to poverty, to develop Uganda's first quantitative vulnerability profile.

As it was mentioned at the outset, the basic idea underlying this methodology is that to determine household vulnerability, we need to estimate not only how the expected consumption varies with household characteristics (which is the main focus of most poverty assessments), but also how these characteristics affect the variance of consumption. This notion represents our point departure from most poverty assessments, where the disturbance term is implicitly assumed to come from measurement error or some unobserved factor that is incidental to the main focus of the analysis. It follows that most poverty assessments, rather than specifying a separate equation allowing the variance of consumption expenditure to be a function of household characteristics, take this variance to be the same for all households.

The analysis of vulnerability in Uganda shows that between 1992/93 and 1999/00, alongside sharp reductions in poverty, vulnerability to poverty declined from 57% to 25% of the total population. The characteristics of the vulnerable (i.e. large family size, high dependency ratios, location in communities with low provision of public services, and

residence in poorer regions of the country) were found to be remarkably consistent with the characteristics of the poor. This description of vulnerability points to the importance for policy makers to distinguish between the effective implementation of poverty-prevention and poverty-reduction programmes. In a shock-free environment, characteristics correlated with poverty provide the necessary information to implement targeted interventions. In a shock-prone environment, however, effective interventions require a deeper understanding of who is exposed to the risk of experiencing poverty within a clearly defined period of time. Further, it concludes that for poverty-prevention programmes, risk-reducing interventions aimed at mitigating consumption volatility and enhancing ex post coping capacity could be sufficient. For poverty-reduction strategies, risk-reducing interventions alone may be inadequate, and must be accompanied by interventions to increase mean consumption.

4.2 QUALITATIVE VIS-À-VIS QUANTITATIVE APPROACHES TO POVERTY ANALYSIS

In terms of poverty reduction, chapter II recognizes numerous synergies from the careful combination of Uganda's qualitative and quantitative sources of data. Such synergies contribute successfully to widen the notion of household vulnerability developed in chapter I. In addition, they help clarify the relationship between poverty, vulnerability, and household well-being.

This work draws attention to a number of analytical complementarities enabling the researcher to understand the processes underlying poverty, and its social dimensions, in greater detail. For instance, in discussing family planning as a key determinant of poverty, it is argued that while quantitative data holds an advantage in computing the opportunity cost of additional household members on consumption expenditure, qualitative information is in a unique position to clarify the link between reduced consumption expenditure and poverty. Similarly, in elucidating the importance of the role of education for poverty reduction, qualitative and quantitative approaches address different aspects of the debate on the importance of education in Uganda. On the one hand, survey based evidence, highlighting high rates of return to education, stresses the importance of investments in education for poverty alleviation. UPPAP's observations, on the other hand, provide unprecedented insight on the factors compromising the success of government's delivery of education.

On a related note, Chapter II demonstrates how the marriage between qualitative and quantitative traditions of poverty analysis in Uganda proves instrumental in re-conceptualising the notion of chronic poverty as a function of both current welfare and vulnerability. This combined methodology is a marked improvement on existing definitions of chronic poverty as it provides a more sophisticated framework to assess the dynamics of chronic poverty in Uganda.

The underlying conclusion emerging from our analysis is that this dual approach to poverty analysis enriches the discussion of poverty trends by drawing attention to a more

complete set of aspects of both poverty and well-being. Notwithstanding numerous synergies to be gained from the careful combination of mixed research methods, however, all methodologies have their limitations, and the goals of quantitative and qualitative researchers sometimes legitimately differ (Gibson and Duncan, 2005). Researchers must clearly identify the types of questions that these different types of methodologies can and cannot answer, and the sorts of contributions they can and cannot make.

In line with Appleton and Booth (2001), the foregoing discussion does not suggest that either method is generally superior, since such a claim would be almost as unproductive as claiming that one discipline was superior to another. Nonetheless, while it is important to be sensitive and respectful of alternative approaches, it is clear that some are more suited for certain tasks than others. Survey based approaches are more suited to monitoring outcomes in terms of readily quantifiable indicators such as household income and consumption. Participatory methods share with other qualitative or other case-study approaches the ability to investigate issues in an exploratory and holistic manner. This classification has been useful for uncovering factors that were not anticipated, and in general for interrogating evidence in an open ended way.

4.3 CHILD LABOUR

The extent to which the benefits of poverty and vulnerability reduction strategies are transmitted through to landless and poor households depends crucially on how farm

households adjust their members' labour supply and their demand for family and hired labour. Africa has the highest child participation rate in the world, and East Africa has the highest incidence of child labour within the African continent. In spite of these facts and the availability of timely, accurate, and reliable data, little has been done in the way of unpacking the determinants of child labour in Uganda. Chapter III discloses new and important insight on the factors affecting child labour in Uganda's traditional small-holder agriculture, where labour-supply is the main constraint on expanding acreage. This work's main contribution to the literature is the recognition of the absence of a smoothly functioning market for adult labour in evaluating the determinants of agricultural child labour. Further, it adds to a limited but expanding literature quantifying the contribution of children to the household's agricultural activities on the African continent.

Our results reject the null hypothesis of a smoothly functioning market for adult labour, and support the claim that land ownership increases child labour participation in agricultural activities. The evidence also suggests that accounting for approximately 9% of the household's annual agricultural earnings, children play an important role in the farming activities of Ugandan farm households.

One policy-related implication of these findings is that government activities in support of land reform programmes may have undesirable effects on agricultural child labour. To the extent that reduced schooling prevents the accumulation of human capital, long term poverty alleviation may be severely compromised.

4.4 AGENDA FOR FUTURE RESEARCH

Monitoring poverty and other aspects of social well-being is essential to ensure the effective implementation of government policies aimed at improving the quality of life of the poor, and the population as a whole. Survey analysis has probably been the single most effective tool for deepening our understanding of poverty in Uganda. In recent years, the introduction of qualitative sources of data contributed considerably in furthering our understanding of poverty, and in helping to formulate poverty reduction strategies, policies and interventions.

Accepting the current trend towards combining qualitative and quantitative approaches, it remains unclear whether there is a justified need to force such integrations at the design stage, or whether each technique should be allowed to do its best, leaving integrations for a later stage. While acknowledging the fact that poverty monitoring is not all about the technical aspects of data collection, it is important to note how setting an agenda to improve certain features related to data collection may enhance the robustness of Uganda's poverty indicators.

On a related note, the official poverty line as derived by Appleton et al. (1999) is based on the 1993 food basket. With changing consumption patterns, the validity of the 1993 food basket at the turn of the millennium becomes questionable. This is especially so in light of the fact that the consumption module of the Uganda National Household Survey

continues to be modified over time to include “new” areas of consumption such as mobile phones.³¹

The national representativeness of the household surveys remains a challenge. Due to insecurity, some surveys could not cover the entire country. This has affected the national representativeness of the surveys, especially in those survey rounds where entire districts were not covered. Notably, for comparability over time, it is standard practice in Uganda to exclude the districts of Bundibugyo, Kasese, Gulu, and Kitgum from poverty analysis. These districts represent approximately 6% of the national population. The omission of some of the poorest districts leads to higher consumption means, and a lower national incidence of poverty than may be reflected otherwise had these districts been incorporated.

With the exception of the latest Uganda National Household Survey 2005/06 (UNHS III), the 1993/94 has been the only truly nationally representative survey, making it difficult to change the reference period based on more recent surveys. Clearly, the recent completion of the UNHS III provides a unique opportunity to update Uganda’s poverty line with a more relevant basket of consumption, and calculate Uganda’s true national incidence of poverty, without compromising national representativeness.

³¹ With such difference in design, the definition of the consumption aggregate may not be identical over the years. For a detailed discussion on the impact of such changes on the consumption aggregate, refer to Appleton et al. (1999).

Further, the emphasis on poverty analysis focuses on changes in income poverty over time. This has implications on the methods used to construct the consumption aggregate for comparability over time. It is standard practice in Uganda to account for inter-temporal price variation by using an all-item consumer price index (CPI) index. Failure to analyse separately food- and non-food CPI may understate the welfare aggregate. This is especially the case for poor households, who spend a higher proportion of their income on food. While coverage of price collection exercises for constructing the CPI index continues to improve over time, it is still limited to urban areas. On the basis that the majority of the Ugandan population is rurally based, there is a need to integrate rural areas into these CPIs.

Lastly, it is important to notice that by structural design the household surveys do not contain any information on individual's income and expenditure. As a direct result, the analysis of child labour implicitly assumes that a household acts as a single entity with a single set of preferences. While this assumption has been a powerful tool for understanding household behaviour, a growing body of evidence suggests that this view is an expedience that comes at considerable, and possibly avoidable cost.³² Numerous economists have recognised that households are sites of conflict as well as co-operation. In this setting, standard household models may offer misleading conclusions about the effects of policies on individual household members. It is only natural at this point to advocate for building into Uganda's household data generating processes a way to capture carefully selected information at the individual level.

³² Alderman H. et al., pg. 1, 1995

To conclude, in an environment where people have been shown to be vulnerable to severe poverty and extremely variable incomes, and where children appear to be important determinants of agricultural households' production strategies, this thesis becomes important at three distinct levels. First, it adds to a limited but expanding literature on vulnerability, poverty, and child welfare. Second, by analyzing the merits of quantitative vis-à-vis qualitative approaches to poverty analysis, it offers new insight to improve Uganda's sources of poverty analysis. Last, but not least, it provides rigorous evidence and guidance on a number of key issues at the heart of Uganda's policy discourse.

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