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Perceived Wealth as a Poverty Measure for Constructing a Poverty Profile

A Case Study Of Four Villages In Rural Tanzania

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Comments on this Discussion Paper are invited.
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A Case Study Of Four Villages In Rural Tanzania

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Contents

Abstract

Poverty assessment and targetting usually relies on expensive, large scale survey data. We argue that, in some cases, exploiting information villagers have on their immediate neighbors in close-knit agricultural societies might provide an alternative. We use the results of a participatory wealth ranking gathered in four villages in Tanzania and explore correlations between perceived wealth and indicators related to household characteristics, human capital, housing and durables, and productive assets. Comparing our results to a similar analysis using houshold expenditure survey data, we find that participatory methods confirm the validity of most commonly used poverty indicators, but we also find some remarkable differences..

The fieldwork to gather the data on which this article is based was financed by Trias NGO (Belgium). I am grateful for granting me permission to use the data for this study. The Living Standard Measurement Survey data come from a nationally representative survey of 5,000 households in Tanzania. The survey was a joint effort undertaken by the Department of Economics of the University of Dar es Salaam, the Government of Tanzania, and the World Bank, and was funded by the World Bank, the Government of Japan, and the British Overseas Development Agency. I am indebted to the staff of Incomet, Tanzania, more in particular to our team leader, Charles Kyando. I also would like to thank Kathleen Beegle, Stefan Dercon, Jo Seldeslachts and participants at the IDPM seminar on Poverty Reduction for comments on earlier versions of this paper.

Résumé

L'évaluation et la prise comme cible de la pauvreté reposent d'habitude sur des données résultant d'une étude coûteuse et à grande échelle. Nous posons comme argument de départ que, dans certains cas, l'information utilisable que les villageois ont de leurs voisins immédiats dans les sociétés agricoles réduites peut nous en fournir une alternative. Nous employons ici les résultats d'une évaluation des richesses associatives faite dans quatre villages de Tanzanie et explorons les corrélations qu'on trouve entre la sensation de richesse et des indicateurs en rapport avec les caractéristiques du ménage, le capital humain, le logement et les biens durables, et les avoirs productifs. En comparant nos résultats avec une analyse similaire utilisant les données d'une étude sur la consommation des ménages, nous avons trouvé que les méthodes participatives viennent confirmer la validité des indicateurs de pauvreté les plus communément utilisés, mais nous avons trouvé également un certain nombre de différences notables.

Introduction

Over the last decades, Participatory Rural Appraisal (PRA) has become the preferred method in development practice worldwide. Most international development Non-Governmental Organizations (NGOs) have now institutionalised this approach, and local development NGOs have embraced the practice as a welcome alternative to the top-down approach of the past. Likewise, since the World Development Report 2000/2001 on Attacking Poverty, the World Bank has enriched its traditional quantitative analysis of poverty with qualitative participatory tools (Gacitúa-Marió and Wodon 2001). A marked example of this new approach is the Voices of the Poor project (Narayan et al. 2000). The reasons for its popularity in the field are straightforward: participatory methods can be used to identify relevant development issues and provide solutions that are adapted to the local environment. Furthermore, PRA methods have been proven very successful in convincing communities that their development is in their own hands, a necessary condition for every intervention to last (Chambers 1997). But maybe the most important reason for their popularity with NGOs is because they are cheap.

PRA has not resulted in a similar revolution in academic research on poverty and development. Research on poverty issues keeps relying on survey-based household expenditure or income data as a measure of wealth. Apparently, it is judged that the shortcomings of this method are less severe than the objective validity attached to quantitative data. But there are signs that the tide may be turning. While other research fields in economics have been using qualitative methods in the measurement of well-being for decades (Ferrer-I-Carbonell and Frijters 2004), subjective measurement is also trickling down in development studies (Adams et al. 1997, Pradhan and Ravallion 2000, Christiansen et al. 2001, McGee 2004, Krishna 2004, Krishna et al. 2004). The call for of a more prominent role for qualitative research in poverty analysis is also illustrated in a more general way in a dedicated series of articles in World Development, 30 and by the QUAL-QUANT workshops organised by Ravi Kanbur[1].

In this paper, we will use the outcome of a typical PRA exercise known as participatory wealth ranking as an alternative to the conventional poverty measures that are based on self-reported household expenditure or income. We will use this participatory wealth ranking in combination with a small questionnaire based survey of the ranked households. This will enable us to apply our alternative poverty measure to construct a local poverty profile. We will draw on original data gathered in four rural villages in the Southern Highlands of Tanzania. We will also compare our results to a poverty profile for Tanzania that is based on houshold expenditure data drawn from the Living Standard Measurement Survey (LSMS) of 1993.

The paper is organised as follows. The second section provides a discussion on conventional poverty measurement, and the alternative methodol-

[1] The first, held at Cornell in March 2001, focused on conceptual issues in the use of mixed methods in poverty analysis. Approximately twenty participants gave short presentations on a range of themes followed by group discussion. The second conference was held in May 2003 in Accra, Ghana with a focus on elaborating a concrete research proposal integrating qualitative and quantitative approaches to poverty analysis. The present conference was held in May 2004 at the Centre for International Studies, University of Toronto. The proceedings of the first workshop are brought together in the book "Q-Squared: Combining Qualitative and Quantitative Methods in Poverty Appraisal" edited by Kanbur, R. Delhi, Permanent Black, 2003, 168 p.

ogy we will use, that is participatory wealth ranking. Section three describes the villages where we conducted the participatory wealth ranking. Section four discusses issues related to subjectivity and comparability. Section five presents the results of the application of our measure of perceived wealth to identify indicators of poverty, and compares them to what one would find using household expenditure data. We explore covariates grouped under the headings of household characteristics, human capital, housing and durables and productive assets. The last section concludes.

Measuring Poverty

To study the nature and characteristics of poverty, the poor first have to be delineated from the rest of the population. This is achieved by first agreeing on a standard of living concept that can be used to rank the units (households, individuals,…). Subsequently, a poverty line is defined. All units that fall below the poverty line are then labeled poor. Although this sounds simple enough, putting things in practice is marred with difficulties, and the applied researcher often has to make difficult value judgments. Both the definition of the standard of living and the choice of a suitable poverty line have generated volumes of research, often taking a philosophical turn on the issue (Sen 1987, Ravallion 1994, 1998).

As for the ranking of units, even if we agree on what it means to have a certain standard of living, operationalizing the concept is difficult because of its multidimensional nature (Boateng et al. 1991). The economic approach would be to concentrate on permanent income. But households are usually not very accurate (on purpose or not) at declaring their income, so total expenditure is used instead. Using prices, marketable goods can be aggregated into a single measure, but for publicly supplied services like education and health care, shadow prices will have to be used. This is a controversial exercise, so applied research will go for a one-dimensional monetary measure of the standard of living, focusing on private consumption. They will defend this practice by arguing that 'basic needs' indicators as health or education are highly correlated with private consumption anyway. Furthermore, we have to decide on what unit we are going to use in our ranking. Preferably, we would want to analyze the well-being of individuals, but most surveys focus on households. Thus, the researcher has to decide on how to correct for household demographics, for instance using adult equivalence scales or per capita income. Another issue is how to incorporate intra-household inequalities in the allocation. It is not that, because the researcher uses adult equivalent scales, real consumption is distributed according to needs within the actual household. Indeed, there is some evidence that there may be discrimination against female children in some parts of the world (Kynch and Sen 1983, Das Gupta 1987) although econometric studies rarely find evidence of this in household survey data (Deaton 1989).

In this article, we will replace the traditional poverty indicators by the outcome of a participatory wealth ranking. A participatory wealth ranking lets communities rank themselves according to their own perceptions of well-being. It exploits the fact that community members living in small, close-knit societies do probably far better in identifying the poor than any monetary based method can. First, community members draw a map of their immediate neighborhood[2]. Then, during a village meeting, the community members agree on criteria to be used when ranking the households into different categories[3] (Pretty et al. 1995). A number of community members (which we will call informants from here) are then asked to rank all the households according to the agreed criteria in three wealth categories (say the poor, the intermediate and the rich). After that, the category of the poor were subdivided into another two categories (say the really poor and the poor), and the same is done for the intermediate wealth category, leaving us with all households ranked in one of five wealth categories. As a first control for subjectivity, we always had several informants rank the household. Care was also taken to guarantee a gender balance in the pool of informants.

We feel that such a participatory approach could be a usefull aternative to assess poverty at the micro level. Many of the problems with the traditional measures of well-being are likely to be less problematic when using perceived wealth. The reason for this is that, using this method, the researcher does not have to make the difficult decisions mentioned above. Rather, this is implicitly done by the community members that live closely to the households they rank.

Take for instance the problems related to a household expenditure focus in traditional poverty research. A household that saves a lot of its money and maintains a tight consumption budget will be ranked low in a traditional wealth ranking exercise. If a fellow villager would rank that household, chances are that the villager will take the information on the household's savings behaviour into account, and rank the household as less poor. The use of prices to value household expenditure is also seen as a weak point in traditional poverty analysis. Prices brought about by equating aggregate demand and aggregate supply are at most indicative for the eventual price that comes about in a transaction. The eventual price agreed between two parties depends for a large part on their relative bargaining skills and power. Again, a participatory setting will exploit knowledge held by the community on the bargaining skills of the household. It is also difficult to capture the effects of product differentiation in an expenditure-based approach. If it is acknowledged that there is a high variation in the quality of products, they should also be disaggregated in the survey. Especially in this case, we can also ask ourselves questions on the accurateness of the elaborate household consumption diaries rural farmers have to keep to be able to reconstruct household expenditure using surveys[4].

[2] Strictly speaking, drawing a map of the village is not part of a typical wealth ranking exercise, but it can serve as a visual aid to the informants that have to rank the households. In addition, it is a good way to divide the village into smaller parts if the village is too big to be ranked as a whole. Indeed, the four villages we will use later had between 160 and 450 households. 450 households would be way too much for an informant to rank in a reasonable time without getting tired. In large villages, the information the informant possess on a household living in a completely other area of the village is likely to be less specific. The literature in participatory wealth ranking recommends using areas with about 100 households (Simanowitz 1999). But delineating areas that are too small is also not advisable, as the quality of the rankings will go up as the informant ranks more households and has a larger pool he/she can use as a reference when ranking an additional household.

[3] This is done to reduce the subjective nature of the ranking exercise. Another way would be to agree on some typical households for each wealth category, which are then used as a reference to rank the remaining households against.

[4] The realisation that such household consumption diaries are difficult to conduct in rural areas and require frequent revisits from enumerators resulted in the inceasing use of recall questionnaires that are much cheaper, maybe as accurate and much less prone to data quality problems.

As becomes clear from the description of the process of participatory wealth ranking, this method is not always preferable to the traditional measures of well-being. Since participatory rankings are based on the use of information villagers have on their immediate neighbours, we can only expect sensible rankings in a context where villagers know each other reasonably well. This is usually only the case in remote, isolated villages in traditional societies. Participatory wealth rankings are not suited to study poverty in the developed world, nor in cities where society tends to be less cohesive. But since poverty is mostly concentrated in rural areas, we believe participatory wealth rankings can be an important tool for applied research on local poverty.

Context and Data

The fieldwork used in this study was done in four villages in the rural areas of Mufindi District. The Mufindi District is situated Iringa Region in the Southern Highlands of Tanzania. The four villages under study are Ibatu, Ipilimo, Kilolo and Kisasa.

At the time of the fieldwork, the district of Mufindi had 133 registered villages. The district has an estimated population of about 320,000 with a population density of 45 inhabitants per square kilometer. The growth rate of the population in the district is 2.8 per cent. The dominant tribe in the district is the Hehe tribe. The staple food of the Wahehe is maize, which they mill and then use to cook porridge (ugali). The two most important minority tribes in the region are immigrants from Njombe (the Wabena) and Makete (the Wakinga). The district can be divided into three agro-ecological zones: the highlands (between 1700 and 2200 meter), the middle zone (generally referred to as the Mufindi plateau, between 1700 and 2000 meter) and the low plateau (between 1200 and 1500 meter). The four villages sampled are all situated in the Mufindi plateau. This plateau is characterised by gently rolling hills, with wide ridges and wide valleys. It has low inherent soil fertility, but reasonable physical characteristics. Average rainfall is between 900 and 1200mm per year. The average temperature is between 20 and 25 degrees. The district's capital is Mafinga, which lies along the main road connecting Dar es Salaam to Zambia and Malawi.

In the first village of Ibatu, village leaders reported 1152 villagers divided into 252 households. This leads to an average household size of 4.5. The village has five sub villages. The dominant tribe in Ibatu is Hehe. We decided to do a wealth ranking in two sub villages. In the first sub village, Matelefu, a group of six informants ranked 78 households. In the second sub village, called Kanisani, a group of eight informants ranked 53 households. This gives a total of 131 households that have been ordered in Ibatu.

Ipilimo was the biggest village in our sample with almost 2,400 inhabitants. It has six sub villages. According to the village government, the village consists of 454 households, leading to an average household size of 5.2. Ipilimo reported Bena to be the dominant tribe. Ipilimo village is situated in a hilly area. In Ipilimo, we ranked four sub villages. The first was referred to as Mwesa. There, eight informants ranked a total of 53 households. In the second sub village, called Udosongala, nine informants ordered 85 households. In the third sub village, Mjimwema, six informants ranked 150 households, while in the last sub village, Image, 50 households were ranked by six informants. In total 338 households have been ranked in this village.

Kilolo is the second biggest village of the four villages, with close to 2,000 villagers. They reported to have 414 registered households, resulting in an average household size of 4.8 persons. It had nine sub-villages and Bena was the dominant tribe. For our wealth ranking, we selected two sub villages: Amani and Mwongozo. In addition to these two sub villages, we also have data on a rest category. This category holds 75 households that are part of other sub villages. Only one informant has ranked this "sub-village". In Amani, three informants ranked 41 households. In Mwongozo, five informants ordered a total of 71 households. Hence, we have ranked 187 households in Kilolo.

Our last village, Kisasa, was the smallest village, with only four sub-villages. There are 840 persons living in 159 households, leading to an average household size of 5.3 persons. The dominant tribe is Hehe. In Kisasa, we choose all four sub-villages: Suchi, Kinega, Ng'ang'anwa and Matalawe. In the first sub-village, Suchi, five informants ranked 64 households. In the second sub village, three villagers ranked 56 households. In Ng'ang'anwa, three informants ranked a total of 60 households, while in the fourth sub-village, three informants ordered 41 households. This adds to a total of 221 households being ranked in Kisasa. Adding over all sub-villages and villages, we get a dataset of 877 households that have been ranked. Note that this is considerably more than reported by the village leaders.

To compare the results of our wealth ranking with more traditional indicators, we will also repeat the analysis using survey data. The data come from the Living Standard Measurement Survey conducted in 1993 in Tanzania. We constructed a wealth indicator on the basis of weekly household food consumption and monthly consumption that also includes some information on non-food items and services purchased by the household. This was then expressed as dialy household consumption. We devided this by the number of adult equivalents within the household, using the equivalence scales reported in Dercon and Krishnan (1998).

Subjectivity and Comparability

In general, large scale household surveys which collect traditional consumption measures are designed to measure wealth comparably across villages. Although these methods guarantee a high degree of comparability between housholds, it leaves little space for a more subjective interpretation of the concept of wealth. It has been acknowledged, however that poverty is highly subjective (Runciman 1966, van de Stadt et al. 1985, Easterlin 1995). A houshold that scores relatively high in a wealth ranking based on household consumption will be perceived as poor if it is the poorest household in its immediate neighbourhood, both by the houshold itself and by the community members. The question whether poverty should be viewed as absolute or relative is essentially an ethical question, but has far reaching implications for policy. For instance, if one views poverty as an absolute concept, it will be possible to completely eradicate poverty, while this is never possible within a framework where wealth is subjective.

Participatory wealth rankings imply a relative wealth concept, as people rank housholds relative to one another. As a result, they are not readily comparable like household expenditure data from surveys. If we want to compare participatory wealth rankings with traditional wealth rankings, we will have to think carfully about comparability. Indeed, since we are dealing with a subjective measure[5] of wealth, the outcome of a ranking by one individual may not be directly comparable to the outcome of a ranking by another individual. Moreover, if informants rank households relative to the average wealth level in their immediate neighbourhood, rankings from different (sub-) villages are also not readily comparable.

There are different ways we have tried to increase comparability. First of all, we tried to average out the subjectivity by letting several informants rank the same households and then calculate a mean score[6]. Secondly, we held a village meeting in which the villagers agreed on criteria to be used when ranking the households into different categories. This is likely to increase comparability within one village between households from different sub-villages. Finally, in the analysis we will not use the outcome of the wealth ranking directly, but a transformation of the ranking that allows for different subjective wealth levels between villages and sub-villages.

Another potential danger of our indicator is that private beliefs held by the informants may bias the outcome. It is indeed not unlikely that the community members that do the ranking will put certain households in the 'wrong' class for subjective reasons. An example would be the private belief that ranking a household in a lower wealth class might increase its chance of getting some kind of assistance. Although this bias is probably much less problematic in our data than in self-reported wealth (Kapteyn et al. 1987), we tried to control for this by taking averages of the rankings over the different informants. Additionally, we tried to control for this by asking the informants

[5] Note that what is meant here with subjective measure differs from the subjective measures used in for instance Pradhan and Ravallion (2000). These authors ask a minimum-income question to each household and thus use a self-reported measure of poverty. Kapteyn, Kooreman and Willemse (1988) find a substantial bias in self-reported measures. In our study, informants living in the village classify households according to their wealth. The subjectivity of our measure is thus limited to the subjective beliefs held by these informants, and not by each household.

[6] The fact that subjectivity of the informants is probably limited was confirmed during the actual wealth ranking within the (sub-)villages. The informants were astonishingly quick in putting the different households into different wealth classes and it rarely happened that one informant listed a household as rich while another informant listed that same household as poor. We saw this as a good indicator of how much information community members have on their peers.

to identify themselves, so that they could be flagged during data analysis. Unfortunately, informants were very reluctant to write their names on the papers with the ranking. Given the informants' resistance, we thought that forcing them to identify themselves would do more harm than good.

If we want to use the results of the participatory wealth ranking exercise in a quantitative analysis, we have to transform the rankings into scores. We set out by constructing a table, listing all households in the first column. Then, we add a column to the table for each informant. In these columns, we assign a score to each household on the basis of the ranking of each informant. The score is equal to the value assigned to the class, divided by the total number of classes in the wealth ranking. The poorest class is assigned a value of one, while the richest is assigned a value of either three or five, depending on the total number of wealth classes. Hence, if an informant ranks a household in the poorest (richest) class, it gets a score of 1/5=0.2 (5/5=1). We then calculate the household's score as the sum of the scores assigned by each informant, and devide it by the number of informants who did the ranking[7].

[7] In our dataset, it often happens that a household is not ranked by all the informants that were assigned to rank it. Simple averages do not reflect the fact that households that are not ranked by all the informants are probably less representative than the ones that are ranked by all informants. To lessen this problem, we fell back on the score for three groups in the event the score for five groups was missing.

Taking a look at these scores, we find that the frequency distribution show a high degree of non-normality. Furthermore, if we compare the frequency distributions of the villages (or sub-villages), there is considerable variation in the shape of the empirical distribution. This is probably due to the subjective nature of our wealth ranking (or indeed, the subjective nature of wealth that is reflected in our data). Analysis of variance (ANOVA) carried out on the wealth ranking confirms that different villages and sub-villages have significantly different means and variances for the wealth ranking.

To make the scores comparable between villages and sub-villages, we will transform the wealth ranking scores in three different ways. The first entails subtracting village level averages from the individual household scores (vilFE). Household wealth is then measured relative to the village average. The implicit assumptions here is that individuals rankings are comparable within each village. The second transformation is similar to the first, but uses sub-village averages instead of village averages (subvilFE). The implicit assumption here is that the only factor that differs in the ranking of the different informants is mean wealth within the sub-village. The third method acknowledges the fact that subjective perceptions of wealth can be influenced by both the village and the sub-village one lives in. The nested structure of our data calls for a multilevel specification. More specifically, we estimate a two level random intercepts model, with one random intercept for the village level and one random intercept at the village level. We then estimate (Bayesian) posterior residuals (Goldstein 1995:24) and use these estimated residuals as our measure of perceived wealth (mult). So here we assume that informants rank relative to both a village and a sub-village random effects.

Analysis of the Participatory Wealth Ranking

In this section, we will use our measure of well-being to look for correlations with traditional poverty indicators that can be used in identifying the poor. We estimated three models, one for each transformation of the original wealth ranking explained above. We also check how these poverty indicators correlate to household expenditure obtained from a large scale survey in Tanzania. We arranged the prospective poverty indicators in different classes: general household characteristics, indicators related to human capital, housing and durables, and productive assets held by the household.

General Household Characteristics

The first commonly used household characteristic is sex of the household head. 33 per cent of the households in the sample were female headed. This high number is partly explicable by the high HIV/AIDS incidence in the region. Another phenomenon that helps explain the high number of female-headed households is polygamy, whether official or non-official. It is customary for men to build a small house for his girlfriends where she lives alone when the man is with his official wife[8]. The next two variables are the number of males and the number of females living in the household. On average, there are 2.14 males in the household, while there are on average 2.36 females, hence the average household size is 4.5. The next variable is a dummy taking the value of one if a household member migrated in search of a job. About 35 per cent of the households report household members that have migrated. We also include a dummy variable taking the value of one if the household head belongs to the Hehe tribe. 47 per cent of the household heads belong to this tribe. The other major tribe living in the area is the Bena tribe. They make up 48 per cent of the household heads in our sample. There is a small percentage of households that is headed by the Kinga tribe (3.5 %). The next variable we will use in our analysis of household characteristics is marital status. It takes the value of one if the household head is married or living together. The reference category is that the household head is either a widow/widower, is never married or is divorced. About 77 per cent of the household heads reported to be married/living together. Finally, we also included a dummy variable that takes the value of one if the household head was born in the village. In our sample, 75 per cent of the household heads were born in the village. The results of an OLS regression for each of our derived scores of perceived wealth using these independent variables are reported in table 1. We also added a regression that uses the traditional measure of wealth as dependent variable (HH exp).

[8] In Swahili, girlfriends are referred to as 'nyumba ndogo', which literally translates as 'small house'.

Table 1: Perceived wealth and household characteristics.

	vilFE	subvilFE	mult	HHexp
HHhead is male?	0.100	0.116	0.115	87.773
	(3.18)**	(3.76)**	(3.75)**	(2.03)**
Number of males in HH?	-0.007	-0.001	-0.001	-50.573
	(-0.75)	(-0.12)	(-0.16)	(-15.29)**
Number of females in HH?	0.038	0.034	0.034	-48.050
	(5.36)**	(4.75)**	(4.82)**	(-12.86)**
Any HH member migrated?	-0.050	-0.073	-0.073	-112.397
	(-1.66)+	(-2.57)*	(-2.56)*	(-7.78)**
HH head from Hehe tribe?	-0.007	-0.055	-0.053	
	(-0.22)	(-1.89)+	(-1.82)+	
HH head married?	0.057	0.030	0.031	-104.366
	(1.58)	(0.82)	(0.88)	(-2.49)**
HH head was born in village?	0.008	0.055	0.052	
	(0.24)	(1.73)+	(1.64)	
Constant	-0.138	-0.154	-0.153	674.558
	(-2.91)**	(-3.40)**	(-3.37)**	(29.91)**
Number of observations	178	178	178	5170
R^2	0.18	0.20	0.20	0.11

Robust t statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%

Male-headed households are perceived as having a higher standard of living as female-headed households. The variable is significant regardless of the dependent variable used. Note also the considerable quantitative effect male headedness has on the wealth ranking: switching from a female to a male head corresponds to a rise of half a standard deviation in the wealth ranking. Next, we included the number of household members as an explanatory variable. Doing so, we found a significant positive correlation with perceived wealth, confirming the results from Adams et al. (1997). This contrasts to the negative relationship between household size and per capita income that has been found in numerous studies (Visaria 1980, Sundrum 1990, Lipton and Ravallion 1994), but this empirical finding has often been challenged in the past (Lanjouw and Ravallion 1995)[9]. Case and Deaton (2002) argue that the negative correlation might be caused by the use of per capita income as a measure of wealth. They also propose a broader definition of poverty as an alternative.

[9] Using the LSMS survey data, we also find a significant negative effect of household size on household expenditure per adult equivalent.

Since we also have data on household composition separated by gender, we are able to go one step further than Adams et al. (1997). We substitute the number of household members by the number of males in the household and the number of females in the household. Having more males in the household appears to affect negatively how wealthy the household is viewed, although this effect is not significant using perceived wealth as a poverty indicator. More interesting is to note the ro-

bust positive correlation between the number of females in the household and perceived wealth, which is in contrast to the negative correlation found using houshold expenditure.

The negative relationship between the number of household members by gender and traditional wealth indicators has also been found in other studies (Lipton and Ravallion 1994). More people within the household tend to decrease household consumption per adult equivalent, irrespective of their sex. Our participatory wealth stratification seems to suggest different effects from males and females. It seems to acknowledge the beneficial effects of women on the household. Apart form the fact that in traditional societies women bear the biggest share of the burden in both reproductive and farming activities10, our wealth ranking also seems to reflect the fact that informants are well aware of the high correlation between the number of females and other indicators of well-being, like health and education. We also tried to include the age structure of the household, but found no convincing correlation of the number of people in different age groups and how wealthy the household is seen by its neighbors.

The next explanatory variable is a dummy that takes the value of one if a household member migrated to find work. The variable has a negative sign, suggesting that, on average, households where members migrate are deemed poorer. Indeed, in a traditional society where agriculture is the norm, selling one's labor is a measure of last resort. The validity as a poverty indicator is confirmed by the results using houshold expenditure. The fact that the household head is a member of the Hehe tribe seems to reduce perceived well-being relative to the other tribes, albeit only when we control for subvillage averages. The coefficients are significant at a 10 per cent level. Being married or living together has no significant effect, except for the model that uses survey data, where it is negatively related to expenditure. There is only weak evidence of a positive correlation between being born in the village and perceived wealth. We found no significant effect of the age of the household head on the dependent variable. Other household characteristics that showed no correlation with perceived wealth are the household's source of drinking water, the time it takes to fetch water and the time it takes to gather wood.

[10] In the villages where we carried out the fieldwork, it was reported that both men and women work on the family field. But further probing revealed striking imbalances in the division of this labor. For instance, the harvesting of maize was reported to be an exclusive women's job. Preparing the field is a shared task, unless if the household can afford to use oxen to plough the field: then it is exclusively the task of men. If men have their own field, women are solely responsible for the family field. Most women also have gardens where they grow vegetables. These gardens are alongside small rivers in valleys (so called vinyungu) and can produce crops the whole year round. However, men tend to view these gardens as inferior because they are too small. The unequal division of labor by gender was even more striking when we analysed the results of another popular participatory method known as gender daily calendars.

Human Capital

Next we will correlate indicators of the household's human capital with our indicators of well-being. We will consider some indicators of health, some indicators of schooling and some indicators of skills. The three indicators of health are dummy variables taking the value of one if, respectively the mother, household head, and any other household member suffers form any disability or major chronic health problem. In our sample, about 14 per cent reported a mother suffering form any disability or major chronic health problem, while about 16 per cent of the household heads reported suffering form any disability or major chronic health problem. Less than 2 per

cent of the households reported other household members suffering form any disability or major chronic health problem. Next, we considered the number of households members that are in school or that have attended schooling in the past by age group. The first variable is a variable taking the number of household members younger than six that are enrolled in school. The second variable is the number of household members between six and twelve years old that are attending school. The third is the same variable, but for the 12-18 age group. The last variable is the number of adults in the household that have received schooling in the past. We also had questions on special skills possessed by the household members, but most of them performed poorly in explaining perceived wealth. The only reported skills that proved to have a reasonably robust correlation with well-being were business skills. We also added gender of the household head and the number of family members by sex as control variables. The results are reported in table 2.

Table 2: Perceived wealth and human capital

	vilFE	subvilFE	mult	HHexp
HHhead is male?	0.126	0.105	0.106	-6.952
	(3.60)**	(2.86)**	(2.93)**	(-0.36)
Number of males in HH?	-0.007	-0.006	-0.006	-73.749
	(-0.66)	(-0.58)	(-0.58)	(-18.55)**
Number of females in HH?	0.037	0.023	0.024	-68.311
	(4.20)**	(2.47)*	(2.59)*	(-15.46)**
Mother chronic ill/disabled?	0.052	0.060	0.059	34.686
	(1.08)	(1.17)	(1.16)	(1.04)
HHhead chronic ill/disabled?	-0.056	-0.071	-0.071	25.679
	(-1.19)	(-1.57)	(-1.57)	(0.75)
Other HH members	-0.145	-0.209	-0.207	-29.420
chronic ill/disabled?	(-1.91)+	(-2.54)*	(-2.54)*	(-1.37)
Number of HHmem aged	0.005	0.025	0.023	78.719
0-6 in school?	(0.28)	(1.33)	(1.28)	(1.94)+
Number of HHmem aged	0.036	0.034	0.034	12.47
6-12 in school?	(2.06)*	(2.08)*	(2.10)*	(1.77)+
Number of HHmem aged	-0.045	-0.033	-0.034	4.484
12-18 in school?	(-1.92)+	(-1.69)+	(-1.71)+	(0.84)
Number of adults (>18)	0.035	0.047	0.046	72.802
that attended school	(1.97)+	(2.73)**	(2.70)**	(14.91)**
HH has member(s) with	0.167	0.139	0.140	301.937
business skills?	(3.06)**	(2.64)**	(2.68)**	(5.82)**
Constant	-0.179	-0.170	-0.170	616.19
	(-5.46)**	(-5.00)**	(-5.05)**	(28.29)**
Number of observations	160	160	160	5150
R^2	0.29	0.27	0.27	0.15

Robust t statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%

Mothers reporting a disability or chronic disease are not significantly correlated with perceived health, as are fathers with a disability. This seems to be the case irrespective for both qualitative and quantitative wealth indicators. For our models using perceived wealth, other household members with disabilities seem to reduce perceived well-being, but this is not confirmed when we use household expenditure as explanatory variable.

Next we turn to schooling. The number of household members attending school younger than six years was not significant, whatever qualitative dependent variable we use. Using household expenditure, children in this age category seem to increase household expenditure. The number of household members between six and 12 years attending school shows a positive impact on perceived wealth and on household expenditure. More surprisingly, the number of household members between 12 and 18 attending school seem to reduce the well-being attached to the household. This is not the case when we use traditional measures of wealth. Here, there seems to be a positive impact on expenditure, althought it is insignificant.

A possible explanation for this paradox is that this group consists mainly of children with a high repetition rate during their primary education. In other words, we suspect this category mainly consists of people aged 12-18 that are still finishing primary education, instead of adolescents attending secondary school. The informants know this, and this information is translated in a lower ranking for these households. When using household expenditure as a wealth measure, there seems to be a positive relationship, because repeaters increase household expenditures[11]. We verified this hypothesis using some incomplete data we have on the type of schooling for each age group. The data seem to confirm our suspicion: only two individuals reported attending secondary education, while 83 individuals of the 12-18 age group reported to be attending primary schooling. Further, adults that received schooling in the past have a positive effect. The only significant variable on skills shows a considerable increase of both perceived household well-being and household expenditure if an additional household member possesses business skills.

[11] When we use a measure of total annual household expenditure (which includes annual expenses like school fees), the coefficent on the 12-18 age group becomes even more positive, attaining a p-value of 16 per cent.

Housing and Durables

Next, we turn to indicators on physical capital. Indicators of physical capital are an important component of poverty profiles because they are especially useful for targeting. Usually, they are much easier to observe than, say, the health status of the household head or the number of household members. Indicators that are best suited for targeting are those related to fixed assets, like the state of the house. They are objectively measurable at very low cost, and cannot easily be hidden. We will look at the material that is used for the walls of the house, and the type of roof that is used. The variable for the type of wall is a dummy taking the value of one if the household lives in a house with stone/brick/cement walls. About 50 per cent of our sample reported to have such walls. The other half of our sample lived in a house

with mud/dung or wooden walls. The variable for the type of roof is a dummy variable taking the value of one if the household was living in a house with a thatched roof. About 69 per cent of our sample reported a thatched roof, while the rest reported a wooden or galvanised iron roof. Furthermore, we added the number of bikes, the number of maize mills and the number of radios owned by the household to explain wealth. About 27 per cent of the households reported owning a bike, about 2 per cent reported owing a maize mill and about 26 per cent reported owning a radio. The results of OLS regressions explaining the outcome of the participatory wealth ranking using these variables are presented in table 3, as is an OLS regression using traditional household expenditure as the dependent variable. As in the previous regressions, we include the sex of the household head, the number of males and the number of females as controls.

Table 3: Perceived wealth and housing and durables:

	vilFE	subvilFE	mult	HHexp
HHhead is male?	0.092	0.079	0.079	1.709
	(3.22)**	(2.58)*	(2.62)**	(0.10)
Number of males in HH?	-0.004	-0.004	-0.004	-46.755
	(-0.42)	(-0.42)	(-0.42)	(-14.93)**
Number of females in HH?	0.027	0.020	0.021	-48.017
	(3.26)**	(2.47)*	(2.54)*	(-13.50)**
House has stone/brick/	0.059	0.043	0.045	301.977
concrete walls?	(2.30)*	(1.63)	(1.70)+	(21.01)**
House has thatched roof?	-0.094	-0.092	-0.092	-179.586
	(-3.03)**	(-3.30)**	(-3.32)**	(-19.03)**
Total number of bikes	0.083	0.093	0.092	29.931
owned by HH?	(3.10)**	(4.08)**	(4.05)**	(2.65)**
Total number of maize mills	0.207	0.157	0.160	
owned by HH?	(2.26)*	(1.44)	(1.50)	
Total number of radios	-0.005	-0.012	-0.012	-2.267
owned by HH?	(-0.19)	(-0.53)	(-0.51)	(-1.50)
Constant	-0.091	-0.070	-0.071	576.398
	(-2.03)*	(-1.68)+	(-1.71)+	(28.06)**
Number of observations	213	213	213	5170
R^2	0.34	0.30	0.31	0.27

Robust t statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%

The first dummy, reflecting the type of wall of the household has the expected sign and is significant for our wealth indicator controlled for village level averages and our wealth ranking based on the residuals of the random intercepts model. Moreover, the validity of the type of wall as a poverty indicator is confirmed using household expenditure data. The roof dummy also has the expected sign: households living in houses with a thatched roof are viewed poorer than those having an iron or wooden roof. They also tend to have lower expenditure per adult equivalent. Having a thatched roof thus seems to be an excellent poverty indicator in our sample. The number of bikes is positively related to perceived wealth and also to household expenditure.

The number of maize mills held by the household is positively correlated to well-being, but only in the village level fixed effects model. Notice that the effect of an additional mill is substantial (inducing an increase in perceived wealth equal to about one standard deviation). The coefficient on the number of radios owned by the household is nowhere significantly different from zero. We experimented with a variety of other items like the number of beds, tables, chairs, etc. but they all proved insignificant.

Productive assets

Finally, we will look at the productive assets reportedly held by the households in our sample. We will in turn look at livestock and land ownership. The first productive asset is the number of cows possessed by the household. About 24 per cent of our sample reported owning one or more cows. The second productive asset is the number of chickens held by the household. 85 per cent of the households in the sample own chicken. The average number of chicken held by the households is about eight. The next variable represents the number of guinea pigs held by the household. The motivation to include this in the regression is that guinea pigs are seen as inferior livestock. They are very cheap and breed extremely fast, but the meat is perceived as less tasty as chicken. We thus suspect households reporting guinea pigs ownership belong to the group of households ranked as least well off. Only about 10 per cent of the households reported having guinea pigs. Finally, we include the acreage of land owned by the household. Most households in the sample own land (less than 5% reported not owning land). We again included a dummy for male headed households, the number of males and the number of females as controls.

Table 4: Perceived wealth and productive assets.

	vilFE	subvilFE	mult	hhexp
HHhead is male?	0.167	0.161	0.161	-9.931
	(3.78)**	(3.49)**	(3.51)**	(-0.70)
Number of males in HH?	-0.016	-0.017	-0.017	-16.573
	(-1.21)	(-1.38)	(-1.37)	(-6.53)**
Number of females in HH?	0.018	0.014	0.014	-10.869
	(1.64)	(1.35)	(1.37)	(-5.13)**
Number of cows owned	0.045	0.053	0.053	-0.663
by the HH?	(2.35)*	(3.38)**	(3.33)**	(-2.91)**
Number of chickens owned	0.005	0.004	0.004	1.520
by the HH?	(2.32)*	(2.09)*	(2.13)*	(2.34)*
Number of guinea pigs	0.001	0.003	0.003	
owned by the HH?	(0.23)	(1.29)	(1.22)	
Number of acres of land	0.015	0.014	0.014	0.152
owned by the HH?	(2.13)*	(2.43)*	(2.43)*	(0.25)
Constant	-0.181	-0.172	-0.172	263.587
	(-3.81)**	(-3.60)**	(-3.61)**	(15.74)**
Number of observations	120	120	120	2088
R^2	0.31	0.31	0.32	0.07

Robust t statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%

The number of cows owned by the household is positively correlated with how wealthy the household is viewed. This confirms the popular view in the region that drinking milk is reserved to the better off. This finding holds for all our models using perceived health and the effect is the strongest of all productive asset effects. This is different from what we find using traditional wealth indicators. Here, there seems to be a significant negative effect, but the reduction in expenditure is extremely small. Adding an extra chicken to the average household adds about 0.005 to the wealth ranking score attached to this household, while it adds 1.5 tanzanian shillings to dayly household expenditure per adult equivalent. The number of guinea pigs does not seem to have a significant effect on the perceived wealth of the household. This contradicts our initial expectation that the number of guinea pigs could be useful poverty indicator, suitable for auto-targeting. Not surprisingly in an agricultural society, the acreage of land held by the household is positively correlated with perceived wealth. But this does not seem to affect household consumption per adult equivalent.

Conclusion

In this paper, we analyse the use of perceived wealth as an alternative for other monetary based methods like household income or expenditure in the analysis of micro-economic poverty in traditional, isolated rural societies. We argue that the information held by villagers about their immediate neighbors provide an accurate base to rank households according to their well-being, and can thus be used as an alternative to troublesome indicators like household income or household expenditure. The reason is that informants probably have a fairly good idea of issues like inequality in the distribution of income within the households they rank, their savings behavior, bargaining power in transactions… and use this information when they do the ranking. As information on these issues is difficult to capture using survey data, hence the researcher has to make assumptions on how to deal with them.

This study used the outcome of a typical participatory wealth ranking done in four villages in the Southern Highlands of Tanzania in addition to a survey on these households' characteristics, health and education, housing conditions and durables, and productive assets. The outcome of the wealth ranking is then explained by these various indicators derived from the survey using linear regression models. The aim of this was to identify alternative poverty indicators based on perceived wealth instead of poverty indicators based on household income or household expenditure. These poverty indicators could then be used for targeting subsequent interventions in the region.

As for the household characteristics, we found that households where a male is in charge are viewed as better off than households where a female is the household head, confirming the validity of the traditional poverty indica-

tor of female headedness. We found a robust positive correlation between the number of household members and perceived wealth, different from the negative correlations common when using household income or expenditure. More interestingly, it seems that this positive effect comes entirely from the number of women within the household. This suggests that, even though efforts are made to make the traditional wealth indicators more representative of the local situation of subsistence farm households (by including for instance home consumption of cash crops) a lot of the beneficial effects that women have on the well-being of the households are not captured by these indicators. It seems that the community rankings do better in reflecting the importance of activities like for instance fetching firewood or water for household well-being. We also found that households where one of the members migrated in search of labor are viewed as less well off.

For our indicators of human capital, we find that the only skill that seemed to determine where a household gets ranked are business skills. The number of adults that have attended school in the past also influences perceived well-being positively, as does the number of children aged between six and twelve years. A particularly interesting finding is that the number of household members in the age group between 12 and 18 years that are attending school induces lower perceived wealth within society, contrary to what is found using household consumption. This seems to reflect the use of information by informants on who these students are. They are not students enrolled in secondary education, but rather students that are still in primary education due to a high rate of repetition in the past. For the health indicators we tried to correlate to the wealth rankings, only the number of 'other' people residing in the household that suffered a major illness or disability seemed significantly negative.

The number of bikes owned by the household proved to be an exceptionally powerful wealth indicator in our four villages. A rise in one standard deviation of the number of bikes results in a rise of over 0.2 standard deviations of our dependent variable. Having a stone, brick or cement wall indicates being better of, having a thatched roof means the household is less well off. The number of cows is seen as a evidence of wealth. This is also true for the number of chickens, although, judged by the standardised beta coefficients, this effect is less than for cows. Land acreage held by the household was positively correlated to wealth.

Our analysis seems to confirm the validity of some of the popular poverty indicators identified using monetary based indicators, like the type of roof and walls. It also directs us at some interesting new findings, like the beneficial effects of having more females in the house than males. Although large scale surveys are clearly superiour in terms of comparability, we feel that participatory poverty assessments like this can be a very fast and cheap way to learn something about poverty in a geographically limited area like a village or a subvillage.

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