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Priority and willingness to pay for improving primary education in Tanzania

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Probit and grouped data models were used to estimate willingness to pay for improving primary education in Tanzania. The hypothesis is that parents are willing to pay for improving specific attributes associated with education quality and school curriculum. For school quality; the results indicated that parents preferred improvement in primary school administration and removing self-reliance activities from schools. Regarding school curriculum, preferences were on teaching good written and spoken English and teaching science and mathematical skills. However, the emphasis of Tanzania primary education policy is on teaching Swahili as a national language, and imparting agricultural technical skills to prepare students for rural life. Improvement in expected education quality doubled both the number of households willing to pay for primary education and resources available for education improvement. It is concluded that ongoing government investment in the primary education system should be an incentive for parents to cover some of the costs not as an end to the primary education user fee.

INTRODUCTION

Demand for public goods is either assessed by relating past expenditures and responsiveness to price or through asking people directly how much they would be willing to pay for a specified product via contingent valuation experiments. For public goods, the second method is preferred because the market for the good or services may not previously have existed or were provided free of charge, and price paid in the past may not reflect the maximum amount consumers are willing to pay. Moreover, expenditure may be related to non-price factors that cannot be captured by market forces (Russell et al., 1995; Nunes and Schokkaert, 2003). The contingent valuation (CV) is the basic approach used to measure nonmarket value, by estimating consumers' willingness to pay (WTP). WTP studies have mainly been used to quantify the value of a new program (Golan and Shechter, 1993; Johannesson et al., 1991). With the rise of cost recovery programs in developing countries, such studies are used to obtain information on the demand of specific public services. In addition, if user fees are introduced, they are used to estimate future potential revenue, financial feasibility and welfare, as a result of policy change (Mataria et al., 2007).

In Tanzania, beginning in the early 1960's, primary education was offered free of charge. Later, in 1985, the user fee policy was introduced as a cost and a risk-sharing instrument. However, most politicians did not support this policy. Ultimately, in 2002, the user fee was removed. As noted by Gertler et al. (1987) and Therkildsen (1998), discussions of educational policy reform in developing countries tend to suffer from an absence of empirically based analyses. As a first step, information on WTP should help assess parents' readiness to pay for their children's education and help in setting a reference point for any future decision-making process.

This study contributes to the literature on the willingness to pay for education services in Tanzania. We pay particular attention to education as a composite commodity with a number of different attributes. We assess the degree to which parents are willing to pay to improve specific attributes associated with education quality and school curriculum focus. A probit model and grouped data analyses procedures are combined to estimate willingness to pay to improve primary education quality and develop a curriculum that focus on desired attributes. The results indicate that providing primary education that is congruent with parents' expectations

(i.e., in terms of school quality and curriculum) doubles both the number of households that are willing to pay for primary education and resources available for primary education improvement. Removal of user fees may be politically sound, but in the long run it is more likely to make investment in primary education less sustainable.

BACKGROUND

Education played an important role in the reforms that Mwalimu Nyerere; the first President of Tanzania, proposed after independence in 1960. Nyerere believed that education should encourage both self-reliance and cooperation within communities. Under his leadership, Tanzania placed great emphasis on the practical aspects of education. Schooling at each level was to be complete in itself rather than a preparation for the next level. Accordingly, students were to be prepared not primarily for examinations, but for life in agriculture to which most of them would return. At that time, primary education was free under the universal primary education (UPE) program, and the government allocated about 20% of its budget to education. Villagers helped build new schools and, by 1977, gross enrollment rates in primary education peaked at 96%. About 7.7% of those who graduated from primary school entered vocational training programs each year. Secondary school enrollment had tripled by 1975, and many more students were enrolled at teacher training colleges. Literacy among adult men reached 75% in 1984, well above the African average of 48% (Oxfam, 1998; URT, 1984, 1992).

Tanzania achieved a great deal in primary education until the mid 1980's. Because of increasing economic downturn, social services, including education, suffered from deficiencies in financial resources. As a result, school enrollments declined and by the late 1980's enrollment rates for children of primary school age had fallen to around 75%. Disparities in both quality and enrolment across regions were substantial. Moreover, children completing the primary education cycle performed poorly; with over 80% scoring less than 50% in the Primary School Leaving Examination. This constituted a major drop of quality of the educational system (Al-Samarrai and Peasgood, 1992; Malekela, 1995; Sumra, 1995).

Between the mid 1980's and end early 2000's, parents were urged to contribute a voluntary user fee for each child attending primary school. The fee was Tanzania shillings (TZS) 200 ($1.02) per child per year in 1990 and TZS 2,000 ($3.03) per child per year in 1997. Payment of fees was not compulsory and was actually paid for less than one-third of the children attending school. In practice, however, children in some schools were denied access to school if the fee was not paid (Oxfam, 1998; URT, 1992; World Bank, 1988, 1991). Between 1987 and 1995 about one-third of total resources inflow to the public education sector was from user's fees (Therkildsen, 1998; World Bank, 1995). Apart from paying the user fee, parents purchased exercise and textbooks, supplementary school material, and contributed labor to construct classrooms and teachers' houses (Mason and Khandker, 1995).

The drive for cost-sharing had negative effects on the education system, especially for orphans and children from low-income families and vulnerable groups, such as street children, who could not afford to pay user fees and other mandatory contributions. As a result, the net enrollment rates declined from 68% in 1985 to 57% in 2000 (World Bank, 2003; URT, 2006; 2007a). The primary school user fee was eliminated in 2002, but families still have to pay for uniforms, testing fees and school supplies. The elimination of user fee led to a massive increase in the number of children enrolled in primary schools. However, there was a lack of resources for additional teachers, classrooms and books (Sitta, 2008).

The government started implementing the first phase of Primary Education Development Program in 2002 by introducing a capitation grant for primary schools with objective of allocating $10 per pupil in each school. The purpose was to enhance the access and quality of teaching and learning. The grant was to replace revenue lost because of the abolition of user fees. The grant money was used to purchase textbooks and other teaching and learning materials, as well as to fund classroom repairs, purchase of administration materials, and for examination expenses. The implementation of this program led to a number of successes. Enrolment in pre-primary education increased from 554,835 children in 2004 to 795,011 in 2007, an increase of 43.3%. Primary school enrollment rose from 4.4 million in 2000 to 8.3 million in 2007 (half of whom were girls). The net enrolment rate improved from 59% in 2000 to 97% in 2007. The number of primary schools also increased, from 11,873 in 2001 to 15,624 in 2007. The Primary School Leaving Examinations' pass also improved dramatically, from 22% in 2000 to 71% in 2006. A total of 45,796 new teachers were recruited and new 36,641 classrooms and 2,588 houses for teachers were constructed (URT, 2007b)

However, the results of the Educational Sector Review conducted in 2006 showed that access, equity and quality of primary education were still low. In particular, there was limited capacity in primary education governance, management, and monitoring and evaluation (TEN, 2008). The Government of Tanzania started implementing the second phase of the Primary Education Development Program (2007-2015) in 2007. The main objective of the program is to support the country's intention to achieve universal basic education and improve primary school education access, equity and quality by 2015. This program covers seven strategic components, namely: enrolment expansion, with focus on

ensuring access and equity at pre-primary and primary education levels; quality improvement; strengthening capacities; addressing cross-cutting issues; strengthening institutional arrangements; undertaking educational research; and conducting educational monitoring and evaluation. The capitation grant is still a dominant feature of the program. For example, more than 80 billion Tshs (about $63 million) was allocated to the primary education capitation grant in the 2009/2010 national budget (URT, 2010). However, recent studies indicate that apart from lack of transparency and accountability; the capitation grants are too small to cover the cost of improving access, equity and quality of primary education in Tanzania (UWAZI, 2010). In addition, the program depends heavily on loans from the World Bank and pooled funds from other bilateral donors. This raises the issue of sustainability.

While there is general agreement about the need for primary educational reform in Tanzania, there are conflicting views on how to go about it. One approach is to strengthen the supply-side of providing education through the public sector because the market cannot be relied upon to provide quality education for all; the other option is to strengthen the demand-side through the market, because the state has failed (Colclough, 1993; Kattan and Burnett, 2004). The current government is using the supply-side option under the current primary education improvement program.

This ambitious program is causing some concern and skepticism not only to parents but also to teacher and economic experts. First, the government had an analogous program in the 1960's but could not make it financially sustainable after donors pulled out. This led the program to collapse in the mid-1980s. Second, teachers in general argue that it is not enough to put an extra one million children in school without providing quality teachers. Not only should the teachers be provided with attractive remuneration but they should also be able to maintain a high quality of teaching. The current teachers' salaries are woefully inadequate leading to a lack of motivation. They are also faced with unfavorably high student/teacher ratios and most wonder how the system could cope with an extra million pupils. Under the new system, the government provides textbooks, teachers' salaries and other overhead costs. The parents, whenever necessary, through school committees, voluntarily donate money or materials for building of classrooms and teachers quarters.

The government acknowledges that there are resource gaps in the current and future recurrent budget, which must be addressed if the quality and quantity of education is to be maintained, let alone improved. Another difficulty and source of considerable controversy concerns parental contributions to basic education. Some education experts advocate the principle that parents should meet some of the costs of primary education through community financing. As outlined above, in practice, low public

spending on education has forced parents to meet a growing share of the costs of education. Advocates of user fees cite this as evidence of parents' willingness to pay to improve educational services in Tanzania. However, there is also evidence that educational costs in the 1990s imposed extreme hardships on poor households, excluding many of them from the educational system (Oxfam, 1998; World Bank, 1995, 2004). Since a formal market for education services has not previously existed in Tanzania, estimates of WTP will provide baseline information on the parents' demand for improved education services, and their potential role in terms of improving access, equity and quality of primary education in Tanzania.

MATERIALS AND METHODS

Theoretical Foundation on Modeling Willingness to Pay

There are several procedures for soliciting WTP from respondents. However, contingent valuation analysis is commonly used for commodities with different attributes. The procedure involves asking respondents to indicate their preference by either ranking or rating each education attribute. In doing so, respondents are able to indicate what trade-offs they are inclined to make when selecting improvement in education quality and school curriculum focus. There are three major types of contingent valuation: rank-ordering; rating-ordering; and choice methods. Rank-ordering experiments ask respondents to rank products composed of sets of specific attribute levels, from the most preferred to least preferred product. Rating methods ask respondent to indicate their preference for individual products on a rating scale. Choice-based methods ask respondent to choose between two or more different products according to which product they prefer (Kalish and Nelson, 1991; Huber et al., 1993; Boyle et al., 2001; Louriero and Umberger, 2007).

The utility model analysis combines elements of rating and choice based methods for eliciting preference information. Utility models are most frequently used methods in commercial marketing research for estimating WTP for environmental preferences (Boyle et al., 2001), and for measuring multiple benefits of forest (Holmes et al., 1998; Huber et al., 1993). Following McFadden (1981) and Bockstael (1999) a utility model can be presented as the sum of a systematic utility function with random components such that:

$$V_i = \sum_j \beta_j A_{ij} + \theta X_i + \sum_j \lambda_j (Y_i - P_{ij}) + \varepsilon_i \quad (1)$$

In Equation (1), V_i is an indirect utility of consuming a composite commodity with attribute j by individual i, A_{ij} is

a vector of attribute levels or weights attached to attribute j by individual i, X_i is a vector of socioeconomic and demographic characteristics of individual i, Y_i is income of individual i, P_{ij} is the cost of attribute j to individual i, β_i, θ and λ_j are parameters of the model and ε_i is the random error term. Economic theory states that holding other variables constant, decrease in net income decreases utility. Accordingly, we expect that $\lambda_j\ is < 0$.

Consider an experiment aimed to estimate willingness to pay to improve primary education services in Tanzania using a bidding game. The comparison is between existing services and desired services. We can rewrite Equation (2) in term of Equation (1) differences as:

$$V_i^* = \sum_j \beta_j (A_{i,jm} - A_{i,j0}) + \sum_j \lambda_j (P_{i,jm} - P_{i,j0}) + \mu_i \ (2)$$

where V_i^* is the latent variable for utility difference, $A_{i,jm}$ and $A_{i,j0}$ is, respectively, the rank associated with the desired attribute j and rank associated with existing services, $P_{i,jm}$ and $P_{i,j0}$ are, respectively, cost of the desired services and current cost, and μ_i is the associated random error term. Notice that, for each respondent, income and demographic characteristics do not change and, hence, they drop out of the model. The change in utility in Equation (2) takes a value of 1 for those respondents who are willing to pay for education improvement and takes a value of 0 for respondents who are not willing to pay for education improvement, or who are willing to maintain the status quo such that $P_{i,jm} = P_{i,j0}$.

By definition, in Equation (2), λ_j, is the marginal change in price for attribute j (Hökby and Södergvist, 2001). The lower bound of marginal change in WTP is obtained by estimating price changes that would cause the respondent to be indifferent after a price for attribute j changes from $P_{i,j0}$ to $P_{i,jm}$. As shown by Johnston and Swallow (1999), and also by Persson et al. (1995), this is achieved through setting Equation (2) to zero and then solving for $(P_{i,jm} - P_{i,j0})/(A_{i,jm} - A_{i,j0})$. Since λ_j is negative, the average marginal change on WTP for attribute j is given by ($\Delta WTP_j = (\beta_j / \lambda_j)$). Nevertheless, the actual empirical model usually depends on data available and method used to generate the WTP data.

Data Description and Willingness to Pay Experiment

The source of data for this study is the Tanzania Living Standard Measurement Survey (LSMS), conducted between August 1993 and July 1994. The survey was sponsored and conducted by the World Bank, in collaboration with the University of Dar-es-Salaam and the Government of Tanzania's Planning Commission. In this survey, contingent valuation questions were asked to better understand individual household perception and valuation of primary education services available to the community. The survey attempted to identify the most preferred attributes within the primary education system and the willingness to pay for these attributes. Details of the survey and sampling procedure can be found at the World Bank's Living Standards Measurement Study (LSMS) website at http:/www.worldbank.org/lsm.

To obtain willingness to pay information, a two-step process was followed. In the first step, the goal was to find out the relative weights the respondent gives to different attributes of primary school quality under a fixed budget constraint. The attributes were selected based on what designers of education services tend to emphasize as important indicators of quality education in developing countries (Ferreira and Griffin, 1996). These five characteristics included: qualified school teachers; qualified headmaster; availability of textbooks for each pupil; clean buildings; and no self-reliance work in schools. A self-reliance work policy was introduced into schools in the early 1970's. Schools were required to meet some overhead costs by engaging pupils in production activities such as farming and livestock rearing.

The WTP questions were administered in a bidding game. The seven bids included: 1,000; 3,000; 5,000; 7,000; 10,000; 20,000; and 25,000 TZS. The respondent was asked the following question. Suppose that a local primary school matches most desired attributes and a user fee (i.e., total cost) is charged for your child to attend the school, would you be willing to pay 1,000 TZS for one child, for one school year at this primary school? The answer was 'yes' or 'no'. If the answer was no the bidding game stopped. If 'yes' the bid was increased to 25,000 TZS. At 25,000 TZS bid, if the answer was 'no' the bid was reduced to 3000 TZS. The experiment continued in this manner, and was stopped when a 'yes' and a 'no' represented consecutive bids. For example, if a responded said 'yes' for 5,000 and 'no' for 7,000, the respondent's bid was between 5,000 (floor) and 7,000 (ceiling) TZS. This means that the respondent's bids followed the grouped data or interval data structure (Greene, 2000).

After the bidding game, the respondent was asked to

characterize the nearest primary school in terms of the five characteristics explained above, based on 1 (very poor) to 5 (excellent) scale. Table 1 presents the results on the desired and existing school quality attributes. Reading across the table, the most desired attribute was qualified school teachers that were scored by about 50% of the respondents. The second desired attribute was availability of textbook for each school kid that was scored by about 48% of respondents. The least desired was self-reliance activities in school that was scored by about 33% of the respondents. Undesirable characteristics were related to the unavailability of qualified headmasters/administrators (66%), and not having qualified teachers (51%). Rankings on availability of textbooks and the presence of clean buildings were variable. Most parents provide textbooks for their school children.

In the second part of the process, the respondent was asked to rank the attributes related to the desired school curriculum focus in terms of: teaching good written and spoken Swahili; teaching good written and spoken English; teaching good morals, respectful behavior and good citizenship; teaching technical skills for agriculture and business; and teaching mathematics and science skills. The respondents were also asked to rank the curriculum of the nearest primary school in terms of imparting the desired knowledge based on 1 (very poor) to 5 (excellent) scales. Table 2 presents the results related to the ranking on the desired and existing school curriculum attributes. About 47% of respondents preferred greater emphasis on mathematics and science skills. Good written and spoken English was second (34%) together with good morals and respectful behavior (also 34%). The respondents indicated that good written and spoken Swahili was relatively important (30%), as also were technical skills for agriculture and business (26%). As regards to the effectiveness of the curriculum offered by the nearest primary school, most of the respondents were dissatisfied with the teaching of mathematics and science skills (61%) and the teaching of written and spoken English (57%).

Other information recorded during the experiments was on the socioeconomic characteristics of the respondents and total expenditure on consumer goods that included expenditure for primary education. A total of 5,184 adults representing sample households from all 21 regions of the Tanzania mainland were interviewed. This study used 5,081 observations that had the complete information required for this analysis.

Empirical Econometric Model

In developing the empirical model to estimate willingness to pay, two factors were taken into consideration: the theoretical foundation presented above, and the data

generating process. We consider an improved education system, as a composite commodity with different quality attributes associated with school quality and improved curriculum. School quality attributes include those considered above, namely: qualified school teachers; qualified headmaster; availability of textbooks for each pupil; clean buildings; and no self-reliance work in school. Each parent is assumed to prefer a specific set of attributes and can rank or weight these attributes. In addition, the same parent prefers specific emphasis on a school curriculum that includes once again those attributes considered above, namely: teaching good written and spoken Swahili; teaching good written and spoken English; teaching good morals, respectful behavior, and good citizenship; teaching technical skills for agriculture and business; and teaching mathematics and science skills. Based on Equation (2), $A_{i,jm}$ constitutes the data generated in the WTP experiment and $A_{i,j0}$ constitutes data generated when ranking existing school quality attributes or school curriculum focus.

The respondents, however, were asked to place a price tag on overall improvement of education system as a complete composite commodity instead of the specific attributes of the improved education system. The experiment generated P_{im} (price or costs of improving overall education system) instead of $P_{i,jm}$ (price or cost of improving attribute j in the system). Correspondingly, P_{i0}, is the currently price paid or cost incurred (per child) to acquire primary education services. Importantly, V_i^* is observed when P_{im} is > 0, otherwise $V_i^* = 0$. This means that that demand for an improved education system is associated with positive bids for the services rather than wishful thinking (zero bids). Based on the theoretical background and the data generating process, the empirical model was specified as follows:

$$V_i^* = \sum_j \beta_{1j}(Q^*) + \sum_j \beta_{2j}(C^*) + \lambda(P^*) + \mu_i \qquad (3)$$

where $V_i^* = 1$ if $P_{im} > 0$ and 0 otherwise. In Equation (3), $Q^* = (Q_{i,jm} - Q_{i,j0})$; $C^* = (C_{i,jm} - C_{i,j0})$ and $(P^* = P_{im} - P_{i0})$.

In Equation (3) V_i^* is the latent variable for changes in the indirect utility, $Q_{i,jm}$ and $C_{i,jm}$ are, respectively, respondents' ranking on the desired level of school quality attributes and specific curriculum items; $Q_{i,j0}$ and $C_{i,j0}$ are, respectively, respondent's evaluation/ranking of a nearby school in terms of school quality attributes and specific school curriculum focus. From Equations (2) and

Table 1. Respondent's Ranking on Desired and Existing School Quality Attributes

School Attribute/Rank	1	2	3	4	5
	----------------Percent of Respondents-----------				
Ranking on Desired School Quality Attributes[1]					
Qualified school teachers	1.89	7.83	13.65	26.92	49.71
Qualified headmaster	10.78	18.88	23.19	22.59	24.56
Availability of text books for each child	3.63	8.57	16.24	23.45	48.11
Clean buildings	16.19	32.00	18.66	14.82	18.33
No self reliance activities	32.62	21.26	16.11	11.50	18.51
Ranking on Existing School Quality Attributes[2]					
Qualified school teachers	50.88	24.37	14.48	6.7	3.57
Qualified headmaster	65.66	17.77	8.59	5.27	2.71
Availability of text books for each child	20.58	12.77	17.72	26.61	22.32
Clean buildings	29.66	17.53	20.95	24.21	7.65
No self reliance activities	7.65	9.29	16.74	15.66	50.66

Number of respondents=5081.
[1] The ranking is based on the 1 (least desired) to 5 (highly desired) scale.
[2][2] The ranking is based on the 1 (very poor) to 5 (excellent) scales and reflects respondents ranking of school quality attributes of the nearest primary school.

Table 2. Respondent's Ranking on Desired and Existing School Curriculum Attributes

School Curriculum Attribute/Rank	1	2	3	4	5
	----------------Percent of Respondents--------				
Ranking on Desired School Curriculum[1]					
Good written and spoken English	17.19	14.45	15.12	19.26	33.98
Good written and spoken Swahili	13.08	23.16	16.42	17.16	30.18
Good morals and respectful behavior	7.52	15.72	21.03	22.20	33.54
Technical skills for agriculture and business	22.45	21.75	14.96	14.92	25.93
Mathematics and science skills	5.94	12.40	13.26	21.14	47.27
Ranking on Existing School Curriculum[2]					
Good written and spoken English	57.23	14.50	14.33	5.59	8.45
Good written and spoken Swahili	3.11	10.56	10.64	1.27	74.42
Good morals and respectful behavior	5.09	15.49	11.81	17.77	49.84
Technical Skills for agriculture and business	4.43	13.39	9.42	12.38	60.38
Mathematics and science skills	61.01	18.25	11.02	5.21	4.51

Number of respondents=5081.
[1] The ranking is based on the 1 (least desired) to 5 (highly desired) scales.
[2] The ranking is based on the 1 (very poor) to 5 (excellent) scales and reflects respondents   ranking of school quality attributes of the nearest primary school.

$$(3), Q_{i,jm} + C_{i,jm} = A_{i,jm}, \quad \text{and} \quad Q_{i,j0} + C_{i,j0} = A_{i,j0}.$$

Furthermore, P_{im} is the respondent's bid for overall education improvement and P_{i0} is respondent's current expenditure per child. Thus, $(Q_{i,jm} - Q_{i,j0})$ is the desired marginal change in a specific school quality attribute, and $(C_{i,jm} - C_{i,j0})$ is the desired marginal change in a specific curriculum offered in school. Equation (3) can be estimated as a probit equation (Greene, 2000) and the total marginal change in WTP for primary education improvement (ΔWTP) is approximated as:

$$\Delta WTP \cong \frac{\sum_j \beta_{1j} + \sum_j \beta_{2j}}{\lambda} \qquad (4)$$

However, the problem with Equation (3) is that P_{im} is not observable or is generated by a specific data structure. Moreover, several studies show that characteristics and income levels of respondents influence bids for education improvement (Arends-Kuenning and Amin, 2004; Huber et al., 1993; Johannesson et al., 1991). The data generating process of P_{im} follows the grouped data structure, where lower and upper terminal points were generated by respondent's bid for primary education improvement. Therefore, the econometric models used to estimate

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WTP were specified as follows:

$$V_i^* = \sum_j \beta_{1j}(Q^*) + \sum_j \beta_{2j}(C^*) + \lambda(EP_{im}^* - P_{i0}) + \mu_i, \quad (5a)$$

$$P_{im}^* = \theta_0 + \sum_{n=1}^{N} \theta_n X_{in} + \lambda_0 Y_i + \eta_i \quad \eta_i \sim (0, \sigma^2), (5b)$$

$$P_{im} = B, \; if \; P_{iB-1} \le P_{im}^* < P_{iB}, \; B = 1,..,8. \quad (5c)$$

In Equation (5a), EP_{im}^* represents the expected value of bid for each respondent. In Equations (5b) to (5c), P_{im}^* is the latent variable for positive terminal points. Equation (5c) defines the grouped data structure where $P_{im}^* = 1$ if the respondent's terminal points were in the (0-1,000) TZS interval, $P_{im}^* = 2$ if the respondent's terminal points were in the (1,000-3,000) TZS interval, and so forth, such that $P_{im}^* = 8$ if the respondent terminal points were in the (20,000-25,000) TZS interval. All other variables are explained in Equations (1) to (4).

Equations (5a) and (5b) were estimated in a three-step procedure. In the first step, Equation (5b) was estimated as the grouped data regression model involving only respondents with positive bids. To remove the effect of anchoring the bids, a multiplicative heteroskedastic model was estimated (Roe et al., 1996; Holmes et al., 1998; Braun et al., 2005). In the second step, the results of the first step were used to estimate the expected value of bids (EP_{im}^*). The third step involved estimating Equation (5a) as a probit model using the complete sample. Summary statistics of variables that was included in econometric models and some other sample information are presented in Table 3.

Expected signs, and reasons for including each variable in the econometric model are presented in Table 4. The variables included were selected on the basis of theory, logic, data availability, and what have been used in analogous WTP studies.

RESULTS AND DISCUSSION

Priority on Education Improvement

Results of the probit and grouped data econometric models are presented in Table 5. In Table 5, the likelihood ratio test statistic tests whether all predictors' regression coefficients in the model are simultaneously zero. In both models this null hypothesis that the independent variables included in the models have zero slopes were rejected at 1% level of significance. For the probit model, during the analysis one variable on curriculum attribute (i.e., teaching good morals,

respective behavior, and good citizenship) was dropped due to a collinearity problem. The statistically significant variables in the model for school quality attributes were qualified school teachers, an excellent headmaster, and no self-reliance school activities. Statistically significant variables for school curriculum attributes were teaching well written and spoken Swahili, and teaching mathematics and science skills. The price or cost of education variable was also statistically significant.

In the probit model, negative signs on the parameters imply that an increase in the magnitude of the variable decreases WTP, and vice versa for positive signs. Also note that the probit regression coefficients give the change in the z-score or probit index also known as cumulative normal probability for a one unit change in the predictor variable. For continuous independent variables, a one unit increase in the independent variable, the z-score increases/decreases by the magnitude of the estimated coefficient. For indicator or dummy independent variables increases/decreases of the z-score is in relation to the reference variable. Therefore, the estimated coefficients show the importance of the independent variable in the regression model and can be used for ranking or prioritizing the importance of each independent variable (Greene, 2000; Long and Freese, 2006; MacKinnon et al, 2007).

Based on the sizes and signs of estimated coefficients (Table 5), the respondents' first priority was improvement in school quality rather than improvement in the school curriculum. Respondents' preferences for school quality improvement, in order of importance, were improvement in primary school administration (i.e., having an excellent headmaster), removing self-reliance activities from schools, having qualified school teachers, having clean buildings and having textbooks available. Preferences with reference to components in the school curriculum, once again in order of importance, were teaching mathematics and science skills, teaching good written and spoken English, teaching agriculture and business skills, and teaching good written and spoken Swahili.

In general, the results seem to reflect opposite views as regards to emphases placed on Tanzania's primary education. The emphasis of Tanzanian primary education policy has always been on school self-reliance to meet some of the overhead costs, teaching Swahili as a national language, and imparting technical skills for agriculture and businesses to prepare students for living and working in rural areas. Parents' preferences were therefore not congruent with the Government of Tanzania policy with respect to primary school education priorities. These policies; together with parent's perceptions of deficiencies in the primary school delivery system, may have contributed to parent's reluctance to contribute the user fees.

For the grouped data or the bid model (Table 5) and for continuous variables the negative signs on the estimated

Table 3. Summary Statistics of Variables Used in the Econometric Models

Variables	Frequency		Amount		
	Nos. in Sample	Percent	Units	Av. Per Household	Std. Dev
Number of students in primary schools	4,840	100.00	Number	0.95 0.95	2.11
Households with primary school children	2,565	50.48	Number	1.89 1.89	1.21
Contributing of user fee	883	34.42	Tshs	7,945.00 7,945.00	3,227.42
Age of respondents	5,081	100.00	Years	38.11 38.11	13.85
Distance to nearby school	5,081	100.00	Kms	1.26 1.26	5.49
Households annual expenditure	5081	100.00	Tshs	748,614 748,614.35	823,729
Households WTP for education improvement?					
0 = No	3,198	62.94			
1 =Yes	1,883	37.09			
Sex of respondent:					
0 = Male	2,624	51.64			
1 = Female	2,457	48.36			
Relationship of respondent to household head:					
1 = Was in fact household head	3,102	61.05			
2 = Wife	1,660	32.67			
3 = Son or Daughter	218	4.29			
4 = Others (close relatives)	101	1.99			
Parent involvement in school activities:					
0 = No	508	9.92			
1 = Yes	4,614	90.08			
Educational level of respondent:					
1 = No education	1,073	20.95			
2 = Elementary education	930	18.16			
3 = Primary education	2,480	48.42			
4 = Secondary education	463	9.04			
5 = Higher education – college/technical	176	3.44			

coefficients mean that the increase in the value of the variable decreases the probability of making a higher bid and vice versa. For a dummy variable this is related to the reference variable that was not included in the model. The statistically significant variables with negative influences on bids were the sex of respondents, the number of children the household had in school and relationship of respondent to the household head. Male respondents were more likely to make higher bids than female, and this was also the case when the respondent was the household head. Male respondents are likely to control more resources than females and are therefore more likely to make higher bids. Households with more children in school were likely to make lower bids. These results can be related to income levels, actual payment of education user fees, and the total cost of education per household. In Tanzania, it is the household head that pays for most of the household expenditure; a representative may not have enough confidence to make higher bids. Having more than one child in school increases the cost of education. As the number of children in a household attending primary school increases, it is not unreasonable that respondents are likely to make lower bids in order to cut down on total cost.

Statistically significant variables that had positive influence on bids were parent involvement in school activities, and annual household expenditure. Parent

Table 4. Variables Include in the Econometric Models: Expected Signs and Reasons

Variable	Expected Sign	Reason
Probit/WTP Model		
School quality attributes	+/-	Higher ranks are associated with greater utility and vice versa
Curriculum attributes	+/-	Higher ranks are associated with greater utility and vice versa
Change in price/cost	-	High costs decrease income, thus utility of money spent on education
Grouped Data/Bid Model		
Sex of respondent [a]	-	Due to lower income, females are more likely to make lower bids
Relationship of respondent to household head [a]	-	Representative/relative of the household head are likely to make lower bids
Age of respondent in years	-	Due to limited resources, older respondents are likely to make lower bids
Distance to nearest primary school (km)	+	Improved services incentive to students coming from further away
Parent involvement in school activities [a]	+	Involvement inculcates responsibility/awareness of problems facing school
Educational level of respondent	+	Educated individual will prefer improved education system
Number of household children in primary school	-	Number of children in household in primary school increases total cost
Total household expenditure (TZS)	+	Wealthier individuals are likely to make higher bids than the poor

[a] The way in which this variable was measured or coded can be deduced from looking at the specific variable in Table 3.

Table 5. Results of Econometric Models

Variable	Estimated Coefficient	Asymptotic Standard Error
Probit/WTP Model		
Constant	2.2229	0.1864
School quality attribute variables:		
Qualified teachers	0.306	0.1306**
Excellent headmaster	0.3842	0.1822**
Availability of textbooks	0.2645	0.1926
Clean buildings	0.3091	0.1947
No self reliance works	0.3628	0.1876**
School curriculum attributes:		
Written and spoken English	0.0058	0.0881
Written and spoken Swahili	-0.0128	-0.0052**
Mathematics and science skills	0.0831	0.0418*
Agriculture and business skills	-0.0003	-0.0006
Price or cost of education change	-0.0001	-0.0000**
Likelihood ratio test statistic	419.4357**	
Grouped Data/Bid Model		
Constant	9,821.0654	1137.6524
Sex of respondent	-1,420.0705	464.4069**
Respondent relationship to household head	-233.2572	193.2149*
Age of respondent	-52.8705	17.5093
Distance to nearest primary school (km)	2.6731	4.6792
Parent involvement in school activities	1,854.1803	326.4669**
Education level of respondent	-24.7435	15.1819
Number of students in household in primary school	-363.1738	173.6708*
Total household expenditure (Tshs)	0.002	0.0003**
Sigma (standard deviation on bids)	8,787.1430	166.0867**
Likelihood ratio test statistic	199.6560**	

** Significant at 5% level of significant; * significant at 10% level of significance.

Table 6. Estimated Average Bids Using Grouped Data Model (Tshs)

Range of Bids	Cases	Mean	Std. Dev.	Minimum	Maximum
0-1000	327.00	476.85	92.16	0.00	496.13
1000-3000	217.00	2,025.77	7.29	2,008.01	2,086.04
3000-5000	245.00	4,017.16	6.19	3,999.71	4,036.10
5000-7000	118.00	6,008.81	8.13	5,992.01	6,047.48
7000-10000	267.00	8,499.90	20.05	8,456.96	8,681.31
10000-13000	147.00	11,472.19	19.43	11,435.12	11,586.02
13000-20000	218.00	16,105.58	96.64	15,966.65	16,376.00
20000-25000	344.00	22,160.50	103.90	22,031.55	23,174.79
All bids	1,883.00	9,147.00	7,992.25	0.00	23,174.79

Table 7. Estimated Total Marginal Changes in WTP (Tshs)

School Attributes	Sample Average	Average Per Respondent
Qualified teachers	1,079,523.00	573.00
Excellent headmaster	1,354,615.57	719.01
Availability of textbooks	931,890.38	494.63
Clean buildings	1,088,874.93	577.96
No self reliance works	1,278,244.53	678.47
Sub-Total (School Quality)	5,733,148.42	3,043.07
Written and spoken English	20,499.61	10.88
Written and spoken Swahili	-45,021.62	-23.90
Mathematics and science skills	292,707.31	155.36

involvement in school activities indicates parent commitment to education as well as increasing awareness of school problems and needs. Hence, this is likely to encourage higher bids. Also, richer respondents have more resources and are understandably more likely to make higher bids.

Results on Marginal Changes in Willingness to Pay

Table 6 presents the average value of bids that were estimated using Equations (5b) and 5(c). For all respondents the mean expected value of bid was 9,147 TZS. The range was from 477 to 22,161 TZS per child per year.

The estimated total marginal changes in willingness to pay are presented in Table 7. The results in Table 7 were calculated using Equation (4). Intuitively, the numbers on the sample average column represents the total amount of money that would have been collected if the respondents actually paid the money; indicated during the willingness to pay experiment. The average per respondent column represents the amount expressed at an individual level. About 6 million TZS ($12,000) could have been collected from those willing to pay for education improvement during the experiment (or 3,185 TZS ($6.37) per respondent or household). Of these, about 5.7 million TZS (3,043 TZS ($6.09) per respondent or household) would have been offered for school quality improvement, and 0.29 million TZS (141 TZS ($0.28) per

respondent or household) for curriculum improvement. It is important to note that this amount was in additional to the actual monetary cost incurred by respondents for primary education.

Going back to Table 3, about 883 households (17% of the sample households or 34% of households with primary school children) incurred monetary costs relating to primary education. These households paid a total of 7 million TZS ($14,000) or 7,945 TZS ($15.89) per household. Education improvement increases the number of households that are willing to pay for education to 1,883 or 37% of the sample households, which is equivalent to 73% of the households with primary school children. Adding together the actual cost incurred by respondents for primary education and the total marginal changes in WTP, the total amount of money that could be available for primary education (from the sample) from parents was therefore 13 million TZS ($26,000) or 2,686 TZS ($5.37) per child compared with the earlier (without improvement) 1,446 TZS ($2.89) per child.

It is clear that parents' expectations regarding school quality and the type of curriculum offered in schools were important in stimulating the parent's willingness to pay a user fee for primary education improvement. Therefore instead of abolishing the primary education user fee, the Government of Tanzania should find the most efficient means of institutionalizing it and making it permanent. Developing a productive and financially sustainable

primary education delivery system would require addressing priorities set by parents.

CONCLUSION

This paper revisits the contentious issue of parents' willingness to pay for primary education in Tanzania. In this study, education is considered to be a composite commodity and parents are willing to pay for specific attributes that affect both school quality and curriculum focus. For school quality these attributes included: qualified school teachers, an excellent headmaster, availability of textbooks for each pupil, clean buildings; and, no self-reliance work in schools. Attributes relating to school curriculum focus included teaching good written and spoken English, teaching good morals, respectful behavior and good citizenship, teaching technical skills for agriculture and business, and teaching mathematics and science skills. A probit model and grouped data analysis techniques were combined and used to estimate marginal changes in willingness to pay for primary education improvement in terms of school quality and school curriculum.

The general results indicate that about 37 percent of the respondents were willing to pay for education improvement. The first two preferences for school quality improvement were improvement in primary school administration (i.e., having an excellent headmaster) and removing self-reliance activities in schools. For curriculum development: parents preferred teaching good written and spoken English and teaching science and mathematical skills. It is apparent that parents' preferences are mismatched with the current Tanzanian educational policy that emphasizes Swahili and self-reliant related activities in school.

Results on willingness to pay indicate that providing primary education that meet parents' preferences and expectation could double both the number of households that would be willing to pay primary education user fees. Removal of primary education user fees and reliance on donor funds; may be politically attractive but potentially disastrous for the primary education system in Tanzania. Rather the strategy chosen should be one of a broader government commitment to achieving universal primary education for all children through developing a transparent policy on the collection and allocation of user fees and other resources that account for priorities and preferences expressed by parents. The current ongoing primary education improvement program and related investment in the primary education delivery system should be viewed as a short term incentive that create an enabling environment for parents to cover some of the costs, and not as an end to the primary education user fee per se. The abolition of education user fee should go hand in hand with considering other

sustainable sources of revenues to replace the losses. Otherwise it is a counterproductive exercise.

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