The impact of education quality on rates of return to education in Namibia

Project Proposal

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Introduction

Namibia has expanded education opportunities for the vast majority of the population since its independence in 1990 and has almost achieved universal primary education (close to 95% enrolment rate). Expenditure on education accounts for more than 25% of total government expenditure. There is a growing demand for further expansion of secondary education (currently below 60% enrolment rate) and tertiary education (only 2% of the population has some kind of tertiary education). At the same time, there is concern among policy makers that quality improvement has lagged behind the vast expansion in access to education. Further, quality is not distributed evenly over all schools and these disparities surely translate into disparities in employment and earnings in later life.

Hanushek and Luke (2001) give the following interpretation of education quality.

"Although quality of education is hard to define precisely, we mean the term quality to refer to the knowledge base and analytical skills that are the focal point of schools."

Not only is the definition of quality problematic but its measurement is also difficult and controversial. In the literature two approaches have been common. The first approach is to use scores on standardised national or international tests, when they are available, as measures of education quality (Knight and Sabot 1990, Glewwe 1999, Hanushek and Luke 2001). The second approach is to proxy schooling quality indirectly by the level of school resources (Card and Krueger 1996b, Case and Yogo 1999). Though the debate on the relationship between school resources and student achievements in the United States is not conclusive (Betts 1999) other studies however, find strong relationship between school resources and achievements on standardised tests (Card and Kruger 1996a, Lee and Barro 1997, Godana and Ogawa 2003). Controlling for other factors like socio-economic background and school management, school inputs (PTR, teacher qualification or teacher salary, availability of teaching and learning resources) can be good proxy for school outcomes (test scores).

By following mainly the second approach some studies find strong evidence that education quality has a positive impact on life-time earnings (Card and Kruger 1996b, Case and Yogo 1999). Other studies do not find such a strong impact of education quality on life-time earnings (Heckman, Layne-Farrar and Todd, 1995)

Though the importance of quality education is recognised universally, there is very little research in Africa on how the quality of education impacts on the private and social benefit of education. None of the studies surveyed by Appleton (1999) incorporated the quality aspect in the estimation of returns to education. Failure to take account of the quality difference in different individuals' education may have distorted the estimation of the true returns to education. The work by Glewwe on Ghana (1999) is one exception where the decision on schooling, the production of skills and the impact of those skills on earnings are simultaneously addressed. An earlier work by Knight and Sabot (1990) on Kenya and Tanzania also addresses the same issues but without explicitly introducing schooling quality which is fundamental in Glewwe's work. This proposed study will closely follow the methods developed by Glewwe in his work on Ghana.

Education quality influences the level of benefit derived from expenditure on education. It also determines how that benefit is distributed among recipients of education. Therefore, it is necessary to attempt to measure quality of education and incorporate a quality index into the conventional economic returns to education estimations.

A proper understanding of the impact of education on individual as well as social welfare is important to determine whether individuals and society are making the right investment choices.

Research objectives

This research will address the following two issues:
The relationship between the level of different types of school resources and education quality
The impact of education quality on the rates of return to education
Addressing the first issue will enable us to determine the cost of improving education quality while addressing the second issue will enable us to determine the economic benefit of such an improvement. These two pieces of information (cost and benefit) are critical for investment decision in the education sector.

Methodology

The research methodology will involve both a substantial amount of desk study as well as an extensive national survey. The data source will consist of both secondary sources and primary sources.
To investigate the relationship between different school resources and education quality, school level data from annual school census and scores on nation-wide exams will be used. The data collected by the Ministry of Basic education, Sport and Culture annually is quite detailed and includes information on physical facilities, teachers' qualifications, learner-teacher ratios, promotion, repetition and dropout rates, national examination results and many others. Since such school statistics is available as far back as 1980 it will be possible to track changes in the quality of education over time.
Using school level data, we will be able to regress education quality (average test scores) on school resources like pupil-teacher ratio, teacher's qualification, availability of teaching material and school physical facilities (a preliminary estimation for 2001 shows that school resources explain about 40% of the variations in average school performance). This is basically estimating an education production function. Such an investigation provides information on what type of school input matters most for improving school quality and together with information on the cost of different school inputs can guide investment decisions in the education sector. The approach of explaining quality using school characteristics may pose estimation problems as some of the explanatory variables are not entirely exogenous. Better quality may attract more students and thus raising the pupil teacher ratio and government may provide more resources to poor quality schools to improve their performance. The extent of such a reverse causation and the selectivity bias that it might introduce in the estimation will be investigated using appropriate econometrics techniques.
To address the issue of returns to education quality, we need to undertake an extensive national survey of individuals to collect data on schools attended, socio-economic background, current status of the individual and personal characteristics.

The national survey

The sample design for the survey was prepared in close consultation and with the assistance of the Central Bureau of Statistics at the National Planning Commission of the Republic of Namibia.
Sampling frame and stratification
The sampling frame to be used is an area frame based on the Enumeration Areas (EA's) of 2001 Census. The frame units which are called Primary Sampling Units (PSU's) could be an EA or more than one EA depending on their size.
Sampling

Since the design is a two-stage cluster sample, there are two stages of sampling. The first-stage sampling unit is the PSU and the second stage sampling unit is the household.
The first stage sampling unit is selected from the Sampling Frame of the CBS while the second stage sampling unit is selected from a current complete list of households within the selected PSU. This household list has to be prepared during the filed work before the interviewing.
Using Simple Random sampling technique and taking into account the design effect of the two-stage clustering, the sample size (number of respondents) is determined as 1200 with 5% margin of error. The respondents for the survey are individuals of working age (15 to 65 years of age).
Rough estimate of the eligible respondents is found to be 2 persons per household. Therefore, the number of households in the sample will be 600. It is also roughly found that about 20% of sampled households may not have any eligible respondent. The sample size has to be raised to compensate for this loss. Therefore, the number of households in the sample needs to increase to 750. Assuming 10% non-response, the number of households in the sample will be approximately 840. Thus, our sample size is 1200 individuals in 840 households.
The number of households to be selected from a PSU is taken as 20 and thus, the number of PSUs in the sample will be 42. These 42 sample PSUs are distributed all over the thirteen regions of the country ranging from 2 to 9 PSUs per region depending on population.
Due to cost and time consideration, we propose to limit the respondents to all urban areas and some rural areas comprising of villages and settlement areas. The sample will cover both wage earners and people in self-employment. Although the omission of part of the rural area (communal areas), mostly in subsistence farming, is regrettable, it is not that too restrictive. Wage employment accounts for 64% of the employed workforce nationally and as high as 87% in urban areas. Only 31.7% of the population indicated farming as their main source of income in the 1997 labour force survey.
In Namibia the contribution of agriculture to GDP is very low (around 10%). The informal sector is also very small and wages and salaries are a predominant source of income. This is unlike in most other African countries where most people earn their livelihood from agriculture and from informal sector activity.
To get a better mach of the school quality at the time the individual attended school it might be necessary to restrict the sample to the 15 to 40 age group. This age group constituted 80% of the total working age population in 1996. This might require some adjustment of the size of the sample.

The type of data to be collected for the study include:

School characteristics (school quality) (student-teacher ratio, teachers' qualification, class size, availability of teaching material and equipment, school infrastructure (building, water and electricity, furniture, etc)

Socio-economic background of the individual (Parents' profession, education, economic status, number of children in the family, dwelling characteristics (number of rooms, availability of electricity), place of birth, schools attended by the individual and duration

Respondent's current status (years of education, profession, sector, size of organisation, location, position, salary and benefits, work experience, age, race, sex, mother tongue, religion)

Personal characteristics (intelligence test using some method, for example Raven's progressive matrices and cognitive skill test)

Since school quality changes over time and individuals may have attended different schools of varying quality, it is necessary to collect data on which schools a person actually attended and for how long. Then a weighted school quality index for the individual can be computed. This is in contrast to previous studies (Glewee (1999), Ann Case and Motohiro Yogo (1999)) that had used school quality at only one point in time. Our study will capture not only quality differences across schools but also changes in school quality over time and therefore, the study will be an improvement on previous approaches.

The survey will not collect data on the quality of schools attended by an individual as it will be difficult for the individual to determine the quality of the school he or she had attended. Instead, the information on school quality will be derived from the statistics collected by the ministry of education and will be matched with the information from the survey on schools that the individual actually attended. In general it is likely that school choice is not exogenous and therefore, may create endogeneity problem. However, with Namibia's recent apartheid past and the wide spread poverty of the population it is highly unlikely that many families had freedom of choice of school for their children. Nevertheless, we can also use the quality of the school at place of birth or that of the nearest school instead of the actual school attended to avoid the possibility of endogenous school choice. Another approach will be to use Instrumental Variable method where family background and place of birth can serve as instruments.

Data on school quality together with all the other explanatory variables (2, 3 and 4) will be used to estimate an earnings (returns to education) function. The impact of school quality on earnings could be through two channels. Firstly it may raise just the level of earnings equally for all education levels, i.e. education quality only affects the intercept of the earning equation while the return to an additional year of education remains the same. In such a scenario the regression equation to be estimated will take the following form.

$$\log(w_i) = \alpha + rE_i + \beta X_i + \gamma Q_i + u_i \quad (1)$$

Where w is the individual's monthly wages or earnings, E is years of education and X is a vector of other variables (work experience, family background, etc), and Q is a composite or a vector of school quality variables and u represents other than observed factors.

The second channel through which education quality may affect a person's earnings is by affecting the marginal return to years of education, i.e. through the slope of the earnings function. It is expected that school quality will have "a potentially larger effect on individuals' earnings if they stay in school longer" (Card and Krueger, 1996). Therefore, equation (1) is modified to take the differential impact of education quality on the rate of return to additional year of schooling.

$$\log(w_i) = \alpha + r(Q_i)E_i + \beta X_i + \gamma Q_i + u_i \quad (2)$$

Equation (2) allows education quality to affect earnings through both the intercept and the slope of the earning's function. Equation (1) and (2) are what Card and Krueger (1996) call Class I and Class II models. In this study both equations will be estimated. Equation (2) can be simplified by assuming that the relationship between the rate of return and education quality is linear thus giving an interaction term between school quality and years of education.

One of the tasks of this research is to construct a suitable school quality measure that can be used to augment the standard earnings function estimations. As the main objective of this study is to determine the impact of quality of education on returns to education than just to years of education, considerable effort will be made both in measuring quality of education and in the way it is incorporated in the empirical estimation. Several approaches will be tried to see whether different quality measures significantly affect the earnings and education quality relationship. These approaches include:

the most common approach of using single or multiple school resource measures as a proxy for quality

using scores on cognitive tests as indication of quality controlling for years of education and family background

using an estimated education production function to predict the quality of education (test scores) at schools individuals had attended

Output of the research

The result of this study will be important for policy making in the education sector. Therefore, the study will be presented at a national workshop in which all stakeholders (the Ministries of Basic and Higher Education, the National Planning Commission, Ministry of finance and others) will be invited to participate. A policy brief will also be prepared outlining the policy implications of the findings of the study and policy options. As this will be a major project on the economics of education in our part of the region, the methodology developed and the lessons learned will be shared in the region and beyond through a publication of a book/monograph (the cost of which is not included in the project budget) and journal articles.

Schedule of project activities

	2003					2004												
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Desk study																		
Field-work preparation and piloting																		
Field work																		
Data entry, analysis and report																		
Dissemination																		

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