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Measuring the Burden of Disease and Returns to Education in Rural West Africa

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Measuring the Burden of Disease and Returns to Education in Rural West Africa

The Collection and Analysis of Mortality, Morbidity, and Socio- Economic Data in the Nouna Health District in Burkina Faso

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Preface

The success of health economics and its guidance for health policy heavily rests on the availability of reliable empirical evidence on the demographic, economic, and epidemiological environment, on behavioral relationships, and on the impact of policy interventions. For Sub-Saharan Africa, especially the epidemiological situation is unclear, since comprehensive systems of mortality and health statistics are often absent.

The economic analysis of health naturally places a special focus on the interrelation between health and economic well-being: the overall disease burden decreases when a country grows richer, and the share of communicable diseases decreases in the process of economic development, whereas the share of non-communicable diseases increases. In those parts of Sub-Saharan Africa that are mainly dominated by traditional subsistence farming, however, it is difficult to examine questions of income and health for simple fundamental reasons. A vital prerequisite for an empirical investigation is the thorough and accurate measurement of income. Yet, both the measurement of the burden of disease and the measurement of income are research tasks that are far from being fulfilled for Sub-Saharan Africa. A further issue that is related with economic well-being and health is education. For poor rural regions predominated by traditional subsistence farming it is far from clear whether investments in human capital are worthwhile.

The present study addesses this research gap by producing empirical evidence on the measurement of the burden of disease, the structure of income, and returns to education in rural West Africa. Concretely it deals with the collection and analysis of mortality, morbidity, and socio-economic data in the Nouna Health District in the North-West of Burkina Faso. The study was accepted as a doctoral thesis at the University of Heidelberg. Earlier versions of some of its chapters have been published as working papers or in international journals.

Essen, June 2003

Rheinisch-Westfälisches Institut
für Wirtschaftsforschung

Christoph M. Schmidt

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Furthermore, I am grateful to all the staff of the *Centre de Recherche en Santé de Nouna*, especially to *Bocar Kouyaté*, *Adjima Gbangou*, and *Yazoumé Yé* who not only naturally played a major role in establishing the Nouna Health District Household Survey, but who also helped me to understand and cherish the Burkinabé culture and population.

Last but not least I would also like to thank my colleagues *Boris Augurzky*, *Martin Biewen*, *Michael Fertig*, *Manuel Frondel*, and *Jochen Kluve* for providing a productive, co-operative, and cheerful working atmosphere.

Ralph Würthwein

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Introduction and Overview

The success of health economics and its guidance for health policy heavily rests on the availability of reliable empirical evidence on the demographic, economic, and epidemiological environment, on behavioral relationships, and on the impact of policy interventions. For Sub-Saharan Africa, especially the epidemiological situation is unclear, since comprehensive systems of mortality and health statistics are often absent (Kaufman et al. 1997; Cooper et al. 1998). There is a growing literature on the design and analysis of health surveys (e.g. Aday 1996; Korn, Graubard 1999), indicating the increasing demand for health surveys in academia and politics.

The *economic* analysis of health naturally places a special focus on the interrelation between health and economic well-being (e.g. Grossman 1972; Deaton, Paxson 1999; Smith 1999). On country level, for example, two well-documented empirical findings demonstrate the relation between health and well-being: (i) the overall disease burden decreases when a country grows richer, and (ii) the share of communicable diseases decreases in the process of economic development, whereas the share of non-communicable diseases increases – a phenomenon known as the *Epidemiological Transition* (Murray, Lopez 1996a). In those parts of Sub-Saharan Africa that are mainly dominated by traditional subsistence farming, however, it is difficult to examine questions of income and health for simple fundamental reasons. A vital prerequisite for an empirical investigation is the thorough and accurate measurement of income. Thus, both the measurement of the burden of disease and the measurement of income are research tasks that are far from being fulfilled for Sub-Saharan Africa.

A further issue that is related with economic well-being and health is education. A seminal paper on the relationship between health and schooling is provided by Grossman (1975). He states that the often observed high correlation between health and completed years of formal schooling can be interpreted in three ways that are not necessarily mutually exclusive: (i) increases in schooling lead to an increase in health, (ii) increases in health lead to a higher demand for formal schooling, and (iii) there is no causal relationship between

schooling and health but other exogenous factors such as physical and mental endowments affect both health and schooling. He suggests to model the relationship between health and schooling in a demand model for health or in a recursive system of human capital formation where the demand for schooling and the demand for health are simultaneously determined.

T.P. Schultz (1999) takes up the human capital concept that comprehends both health and schooling as investments in human capital and analyzes the effect of human capital investments on income in Sub-Saharan Africa. He states that both the level of education as well as the health status of the population are lower in Sub-Saharan Africa than in other regions of the world. He argues that these conditions do not only reflect the lower level of development in Sub-Saharan Africa, but also help to explain that lower level and suggest a set of policies for improving Sub-Saharan Africa's standard of living. Using data from two *Living Standards Measurement Studies* (LSMS) (Grosh, Glewwe 1998), he reports coefficient estimates of returns to education for Ghana (1987–89) and Côte d'Ivoire (1985–87). In his analysis, *wage* returns for schooling are examined. For rural Sub-Saharan Africa, though, labor markets in the classical sense hardly exist. Therefore, an interesting question with regard to poor, rural regions of Sub-Saharan Africa is: are investments in human capital worthwhile in a region that is predominated by traditional subsistence farming?

T.W. Schultz (1975) argues that the value of schooling in farming depends on the opportunities that farmers have to modernize their production. Therefore, he concludes, in areas with traditional agriculture, there are no significant gains in output from schooling. Empirical research partly confirms the perception of low returns to education in poor subsistence economies with traditional agriculture. Psacharopoulos (1994) estimates that the return to education is lowest (6.4 %) in low income countries. For Sub-Saharan Africa in particular, he estimates a return to education of 5.9 %. There exist only few studies on Sub-Saharan Africa, though.

This thesis intends to produce empirical evidence on the measurement of the burden of disease, the structure of income, and returns to education in rural West Africa. It deals with the collection and analysis of mortality, morbidity, and socio-economic data in the Nouna Health District in the North-West of Burkina Faso. The thesis consists of five chapters[1]. In part, the thesis has been written while I was financed by the Sonderforschungsbereich 544. They profit extensively from the collaboration with the *Nouna Health Research Center (Centre de Recherche en Santé de Nouna,* CRSN) which implemented the

[1] Two of them have already been published as articles in international peer-reviewed journals (*Journal of International Epidemiology* and *Health Economics*), and one has been published in the working paper series of the Sonderforschungsbereich 544 Control of Infectious Diseases – a research grant of the Deutsche Forschungsgemeinschaft.

Nouna Health District Household Survey (NHDHS) in the field. Within the Sonderforschungsbereich 544, I was responsible for the design of the NHDHS. In collaboration with members of the CRSN and staff of the *Department of Tropical Hygiene and Public Health of the University of Heidelberg*, I developed the questionnaire and was responsible for the pretest, the time-frame, and various practical aspects of the survey. Furthermore, I was responsible for the supervision and cleaning of the data in Heidelberg and for the compilation of a final Stata version with which the empirical results of chapter 5 have been produced.

In chapter 1 the design and the implementation of the NHDHS is described. Chapter 2 depicts the cleaning of the raw data and the construction of income data. Chapter 3 presents a study on the measurement of the burden of disease. The study uses mortality data collected by the CRSN between 1997 and 1999. Chapter 4 deals with some methodological problems of the measurement of the burden of disease, whereas in chapter 5, returns to education are estimated using NHDHS data.

There are practically no papers in peer-reviewed journals that deal with the conceptualization and implementation of a sound survey, even though a sound survey is *the* crucial basis for any sound empirical research. Therefore, the intention of chapter 1 was not only to describe the design and the implementation of the NHDHS, but to suggest a prototype for the collection of morbidity and household data. Furthermore, I placed a strong focus on what research on survey methodology has contributed to the respective matter (e.g. questionnaire writing) and on the theoretical aspects of the particular topic that was to be assessed (e.g. nutritional assessment). Ultimately, this focus on survey methodology also led to a reference list that can be used as a comprehensive bibliography on the essential aspects of survey and questionnaire design[2].

Existing surveys usually either focus on socio-economic issues (like the LSMS of the World Bank) or on the mere collection of epidemiological data (like the existing systems of vital statistics). However, most questions in health economics can only be answered in a multi-causal, complex setting. For this reason, the NHDHS was designed as a multi-topic survey that simultaneously comprised extensive data on socio-economic status, a variety of questions on health issues, and a detailed record of epidemiological data.

Very few mortality data are available for Sub-Saharan Africa. The primary sources of information are model-based extrapolations and national statistics (Murray, Lopez 1996a; WHO 1998). Unfortunately, the latter either report hospital statistics which are most probably subject to severe underreporting,

[2] Readers interested in the separate reference list can download the working paper version at www.hyg.uni-heidelberg.de/sfb544/neues.htm.