CHAPTER 1

INTRODUCTION

Background of the Study

The extent of links between education and earnings is a determining factor in making decisions about investment in education. The purpose of this study was to estimate the private and social rate of return to education in Nepal using sample data from employees working in private sector of the economy.

Education is often considered as the single most important determinant of a person's economic and social achievement. Education provides both direct and indirect benefits for the individual who receives the education and the society with which this individual connects. At a national level, the effect of investment in human capital on productivity, technology and growth has long been stressed by economists. For poor countries like Nepal education plays a key role in poverty alleviation.

The study of the relationship between earrings and education has been the cornerstone of the economics of education. There are several reasons why this relationship has been investigated extensively throughout the world since "human capital" was established in the economic growth and development literature in the early 1960s (Schultz, 1961).

First, differences in mean earnings between graduates of successive levels of education reflect the premium associated with educational investment. This premium is definitely "private", in the sense that it accrues to the person who undertook the investment. Under certain conditions, however, this premium can also be used as a

proxy for the higher social productivity of the graduate, e.g. as evidenced by earnings differentials in the competitive sector of the economy. Thus, earnings differentials by level of education provide an expedient, empirical way of documenting first order relative scarcities in the market for graduate in a given society, and may provide a guide for educational investments.

Second, the above earnings premium can be combined with the cost (either private or social) of investing in different levels of education, thus leading to a cost-benefit analysis of investment in schooling, which is very similar to traditional cost-benefit analysis in other sectors of the economy. Since the 1960s there has been an immense literature devoted to the profitability of investments in human capital. Estimates of such profitability are better known as "rates of return to investment in education" (Pascharopoulos, 1985a).

Third, and beyond above efficiency considerations, the earnings premium associated with different levels of education leads to equity assessments in a given society, e.g. how does the provision of education, and at what level, contributes to poverty alleviation or a more equal income distribution?

Education is an economically, socially, demographically, politically, and culturally productive investment. It is widely accepted as a major instrument for promoting a nation's social and economic development (Tilak, 1989). Education is a cornerstone of economic growth and social development and a principal means of improving the welfare of individuals (World Bank, 1990).

There is an ample body of theoretical and empirical research on contribution of educational investment to individuals and society. The empirical evidence takes three major forms: (1) Cost-benefit studies that analyze the economic contribution of

formal schooling in terms of its private costs (earnings forgone and direct costs incurred while in school) plus public costs (government expenditure), and additional wages earned by those individuals who go to school and benefits to society;(2) Productivity studies that estimate the impact of education on farm and non-farm production. (3) Growth accounting studies that focuses on contribution of education to economic growth. In general, the results indicate that (1) Schooling provides high rates of return in terms of individual labor-earnings. (2) Educational profitability in terms of farmer productivity is positive but weak (3) The effect of schooling on informal enterprise-income is strongly positive; and (4) the contribution of educational investment to overall economic growth is somewhat inconsistent.

Nepal has devoted large resources to education of its population in the past several decades and still continues to do so as we move into 21st century (Appendix F). Education is seen as the key to maximizing human potential. Consequently, the government of Nepal is constantly trying to improve the education system and over the years, has channeled a considerable amount of public funds to education. These massive efforts to raise the level of education attainment of the people have largely been put into motion in the belief that productivity levels will be raised as a result of higher standards of educational attainment. There has also been tremendous pressure to expand education so as to give everyone "equal educational opportunity" for upward social mobility. Since the 1960s, the rate of educational expansion all over the world has been phenomenal, with developing and developed countries both devoting at least 15% of their annual budget on education. The large sums of money expended on education have raised questions on the efficiency of resource allocation within education.

The pattern of resource allocation in education has important implications for the labor market and economic growth. For example, if the demand for workers with particular levels of educational attainment is not meet, shortage of such personnel will create bottlenecks in production and retard economic growth. Conversely, an oversupply of workers of a particular level of educational attainment may lower the average wage and even reduce the chances of gainful employment. A pertinent question, with reference to Nepal, is how resources could be allocated to the various educational levels to produce a workforce equipped to meet the challenge of economic survival in a fast changing world (Phan, n.d.).

The allocation of scarce resources is a basic economic problem that all governments face. The choice among alternative investments depends on the objective of society and on relative costs and potential benefits of the investments. The goal is to achieve economic efficiency-having the investments generate a future increase   in national income. "There is evidence that increasing the spending on education in developing countries is at least as efficient as increasing the spending on these investments in physical capital or social infrastructure"(Mingat and Tan, 1988, p.103).

The assessment of priorities for investment in the education sector allows the government to make allocations across different education sub-sectors. Which level or type of education should grow faster which slower? The other goal is to maximize efficiency in allocating the scarce resources. Investment must be evaluated in terms of their likely pay off, which depends on the structure of education costs and the productivity of workers with different educational backgrounds, given the current economy, and the labor market. This type of analysis is important because it helps developing countries to make investment decisions in education.

Since human capital is widely viewed as a crucial input in the productive process, identifying the appropriate investment priorities in education and training is essential to a country's economic growth (Mingat and Tan, 1988). In this study, resource allocation in education is examined from the economic standpoint. It is hoped that the perspective which findings provide will be a contribution toward a more complete evaluation of the efficiency of resource allocation in education in Nepal.

This study used the human capital earnings model to analyze micro level survey data in an attempt to provide evidence on rates of return to schooling at individual and household level in Nepal. In other words, this study attempted to apply empirical approaches to evaluate the contribution of education to individual earnings in the wage sector and household incomes from farm and non-farm activities in the non-wage sector.

Purpose of the Study

The first purpose was to investigate the extent to which additional years of schooling have contributed to economic development in Nepal by gender, regional geography (rural/urban and ecological belt), religion, income quintiles, and types of school, level of schooling, and economic sector.

The second purpose was to examine the controversy over which would be the most profitable level of education in economic development in Nepal by analyzing the private returns to investments in education at individual level in Nepal by gender, regional geography (rural/urban and ecological belt), religion, income quintiles, types of school, and economic sector.

The third purpose was to examine the returns to investment in education at household level. The fourth purpose was to examine changes in return to education over 1995/96 and 2003/004 in Nepal. The fifth purpose was to examine the controversy over which would be the most profitable level of education in economic development in Nepal by analyzing the social returns to investments in education at individual level in Nepal by gender, regional geography (rural/urban, and ecological belt), religion, income quintiles, and types of school, and economic sector.

The sixth purpose was to provide a set of recommendations regarding education policies as well as their efficiency and effectiveness in relation to economic development in Nepal; this research also has further implications for other lower income countries.

<div align="center">Problem Statement</div>

What are the private rates of returns to additional years of schooling at individual and household levels in Nepal?

What are the private and social rates of return to education in the primary, secondary and tertiary levels in the wage sector in Nepal?

Over the last decades, many empirical studies and theories have indicated that education's contribution to human capital accumulation is critical to the economic development as well as poverty alleviation of a country. Today, one of the major educational challenges that a developing country such as Nepal, faces is the consideration of cost effective strategies to stimulate human capital development, since public expenditure on education is limited. However, there has been a controversy over the issue of which level of education would be the most profitable investments for the economic and social transformation of developing countries?

World Bank researchers have concluded that primary education is the largest contributor to economic development in developing countries followed by general secondary education. Moreover, they maintained that East Asia's economic miracle benefited primarily from heavy investment in lower levels of education that have targeted the poor. The share of educational budgets allocated by high performing Asian economies (HPAEs) to basic education is significantly greater than that allocated by other developing countries (World Bank, 1993). There is an argument that highly skilled workers are not efficient in a society where the majority of the population is illiterate (Ogawa, 1999).

On the other hand during the past two decades, high technology sectors have become a key factor in the process of economic development. As a result, today's industry needs a larger supply of well-educated people than in the past. Therefore, the economic and social transition of a nation requires high level of human capital in order for highly skilled workers to organize large-scale enterprises efficiently. Barro and Lee (1993), Barro and Sala-i-Martin (1995), and Barro (1996), reported that higher levels of education promote faster economic growth in both low as well as middle income countries.

The Asian Development Bank (1998) argued that in order to challenge the current economic crisis in East Asia, there is an urgent need for improving human resources through higher education in middle-income Asian developing countries. On the other hand, primary education should be prioritized in low-income Asian developing countries.

Using the case study of Nepal, this study investigated the most profitable level of education in relation to economic development as well as the extent to which an additional year of school contributes to economic development, vis-à-vis gender,

religion, income quintile group, ecological belt, rural/urban areas, types of school, and economic sector. This study also investigated the rough estimate of social rate of return to education and change of return to education overtime. Moreover, this study investigated return to education at the household level in the non-wage sector.

Research Questions

The purpose of this study was to analyze the rates of return to investment in education in Nepal. Specifically, the study seeks to answer the questions that follow.

1. To what extent have additional years of schooling contributed to individual's earning in Nepal by National level, Urban/Rural areas, Ecological belt, gender, religion, types of school, economic sector, and income quintiles in the wage sector?

2. To what extents have formal education in the primary, secondary, and tertiary level contributed to individual's earning in Nepal by National level, gender, Urban/Rural areas, Ecological belt, religion, types of school, economic sector and income quintiles in the wage sector?

3. Does schooling matter in the determination of household incomes from farm enterprises holding; if so, to what extent?

4. Does schooling matter in the determination of household incomes from non-farm enterprises holding; if so, to what extent?

5. What might be the rough estimate of social return by level of education as opposed to private return?

6. Do returns in the wage sector and non - wage sector vary over 1995/96 and 2003/004?

Statistical Hypotheses

This study proposed the following null hypotheses for testing purposes:

1. The additional years of schooling contributes to enhance wage earnings of the individuals.

2. Primary education contributes to enhance wage earnings of the individuals.

3. The additional years of average household schooling contributes to enhance net earnings of the farm households.

4. The additional years of highest schooling in the household contributes to enhance net earnings of the farm households.

5. The additional years of household head's schooling contributes to enhance net earnings of the farm households.

6. The additional years of average household schooling contributes to enhance net earnings of the non -farm households.

7. The additional years of highest schooling in the household contributes to enhance net earnings of the non- farm households.

8. The additional years of household head's schooling contributes to enhance net earnings of the non-farm households.

Descriptive Hypotheses

This study proposed the following descriptive hypotheses:

1. The private rate of return to an additional year of schooling is higher for urban areas compared to rural areas in Nepal.

2. The private rate of return to an additional year of schooling for females is higher compared to men in Nepal.

3. The private rate of return to an additional year of schooling varies across ecological belt in Nepal.

4. The private rate of return to an additional year of schooling varies based on the religion of individuals.

5. The private rate of return to an additional year of schooling varies based on the types of school.

6. The private rate of return to an additional year of schooling varies based on the economic sectors in Nepal.

7. The private rate of return to an additional year of schooling varies based on the income quintile groups in Nepal.

8. The private rate of return to primary education is the most rewarding level of education compared to secondary and tertiary education in Nepal by gender, location, ecological belt, religion, types of school, and income quintiles groups in Nepal.

9. The increase in value added production varies among three sets of years in school variable in farm household holdings.

10. The increase in value added production varies among three sets of years in school variable in non-farm household enterprises.

Significance of the Study

Statistical analyses performed on the Nepal living standards survey I (NLSS I, 1995/96) and Nepal living standards survey II (NLSS II, 2003/04) data collected from

Nepal to examine four significant issues: 1. How rates of return to education at individual level in the wage sector vary within Nepal by gender, urban/ rural, ecological belt, type of school, income quintile groups, economic sector, and religion. 2) How rates of return operate in Nepal during 1995 and 2003. 3) How rates of return to education vary by levels of education: primary, secondary, and tertiary; and 4). How rates of return to education at farm household and non-farm household level vary in the non-wage sector in Nepal. Using the rates of return analysis, this study first investigated which is the most rewarding level of education for various groups within Nepal. Recent studies analyzing the rates of return to education across countries in the world are summarized by Psacharopoulos (1985, 1994). In his summary, Psacharopoulos concluded that primary education has the largest impact on economic development in lower-income countries, followed by secondary and higher education. Until recently, no comprehensive cost-benefit studies covering all relevant issues seem to have been made in Nepal. This study looked at both private and social rates of return to educational investment at individual and household level in Nepal by focusing on gender, rural/urban areas, ecological belts, religions, income quintile groups, and types of school, and economic sector. This type of analysis is highly important in a country such as Nepal with a multi ethnicity, diverse geographical region, and ethnically/religiously diverse society.

This study not only accounted for the regional gaps in education as well as the variation in economic conditions within Nepal but also investigated in depth rates of return to educational investment in rural/urban areas of Nepal.

Moreover, from the individual's point of view, this study enables students and their parents to learn which level and types of school-namely private and public schools will provide higher returns. This study also provides basic guidelines as to

types of employment (self or dependent as well as agricultural and non - agricultural sector) that will be more profitable in the labor market in the long run.

Parajuli (1998, 1999) conducted study using NLSS I, 1996, and NLFS, 1999 data to investigate the linkage between educations and earning in Nepal. This study used NLSS II, (2003/04) household survey data that was professionally collected by Center Bureau of Statistics (CBS). Using this data, no body has looked at the private and social rates of return in Nepal.

It is hope that this study would contribute to sensitize the people of Nepal in economics of education. Moreover, this study provides comparative picture of rate of return by gender, religion, location, income quintile, economic sector, types of school, belts and over times. Finally, this study attempted to extend and fill several gaps in the education-earnings literature in Nepal.

In the literature, there are few concrete explanations on why and to what extent each level of education – primary, secondary, and tertiary – contributes to economic development. For instance, studies have indicated that the rate of return to primary education is the largest in lower income countries and that the returns decline by the level of the country's per capita income as well as the level of education. (Psacharopoulos, 1985, 1994: Ryoo, Nam and Carnoy 1993).

Assumptions

1. NLSS Data provided by CBS were Relatively Accurate.

2. The identification of rates of return to investment in education in Nepal may provide useful information (investment criteria) to the National Planning Commission of Nepal, Ministry of Education and Sports, other educational

institutions and parents to allocate scarce resources efficiently and effectively in education sector and within education sub-sectors.

Limitation of the Study

The following are the limitations of this study.

1. The study was based on Mincerian human capital earnings function method and short cut method.

2. The study couldn't use full cost method to estimate the rates of return.

3. This study couldn't estimate accurate social rates of return.

4. This study tested the significance of regression coefficient with simple t test. This study has not been able to test whether two regression coefficient are significantly different or not due to lack of time and other resource constraints.

5. All descriptive hypotheses have been explained without any statistical testing.

Delimitations of the Study

The delimitations associated with this study are as follows:

1. The study was limited to Nepal.

2. The study was based on secondary data.

3. Multicolinearity and Heterosedastcity problems of estimation were diagnosed but not provided remedy.

Definitions of the Terms

Economic Development

Economic development is more than economic growth. It includes economic transformation, modernization, and industrialization.

Economic Growth

The steady process by which the productive capacity of the economy is increased over time to bring about the rising levels of national income.

Human Capital

Productive investments embodied in persons include skills, abilities, ideas, and health resulting from expenditures on education, on-the-job training program, and medical care.

Primary Education

Education from class one to five is called primary education which the main function of which is to provide the basic elements of education, such as elementary schools.

Secondary Education

Education from class six to ten is called secondary education.

Tertiary Education

University education including +2 is called tertiary education.

Rates of Returns to Education

It is a cost-benefit analysis based on analysis of household survey to determine the coefficient by relative earnings and employment of workers at various educational levels.

Urban Areas

All the metropolitan and municipality cities in Nepal are called urban areas.

Rural Areas

All the village development committees in Nepal are called rural areas.

Social Rate of Return

Social rate of return is estimated from the benefits and costs accrued to the society (mainly the concern is for public subsidy).

Private rate of Return

Private rate of return is estimated from the benefits and costs accrued to individuals undertaking the investment.

Annual Earnings from Wage Employment

This variable is a sum of cash and in-kind earnings per year (including daily, piece-rate and long-term labor) for every individual with positive earnings.

Net earnings of Agricultural Activities

Total output minus the expenditure involved in the production process. Total output is calculated as the sum of value of total crop production, by product production, and non-crop production. Total expenditure includes cultivation costs (seeds, fertilizers, hired labor and irrigation), maintenance expenditure on farm machinery and buildings, veterinary services, and purchase of livestock.

Net earnings of the Non- Agricultural Enterprise Activity

Total production minus the expenditure involved in the production process. Total production is the gross revenues from home - enterprises and self-employment outside agriculture. Expenditure includes paid wages, energy and raw-materials costs, and other operating costs.

Opportunity Cost/Forgone Cost

The value of that which must be given up to acquire or achieve something.

Worker Effect

It is education's marginal product, the increased output per change in education, holding other factor quantities constant (Welch, 1970 p. 42, as cited in Addou and Moock). It is education's contribution to the quality of the individual as a worker.

Allocative Effect

The allocative effect of education refers to the more education farmer's ability to acquire and to decode information about costs and productive characteristics of other inputs (Welch, 1970 p. 42, as cited in Addou and Moock).

Input Selection Effect

Input selection effect which allows the farmer to selectively purchase inputs in the short run and operate in the long run are all captured in the process (Welch, 1970 p. 42, as cited in Addou and Moock).

Chapter Plan of the Dissertation

This study report has been organized in five chapters. Chapter One introduced background of the study, purpose of the study, statement of the problem, research questions, statistical hypotheses, descriptive hypotheses, significance of the study, assumptions, limitations of the study, delimitations of the study, definition of the terms, and setting of the study. The second chapter deals with the review of related literature and previous research in the area of the study. Chapter three explains the methodology followed while conducting this study. Chapter four present findings and

discussions of the study in sequence corresponding to the six research questions in this study. The last chapter (that is, chapter five) basically summarizes the whole study, presents a summary of major findings, and presents policy implications for educational policy development, draws conclusions and offers agenda for future research. Finally, sections on references and appendices are included. Following is a summary of the chapter plan:

1. Chapter One   : Introduction

2. Chapter Two   : Review of Related Literature and Previous Research.

3. Chapter Three   : Methodology.

4. Chapter Four   : Findings and Discussions of the Study.

5. Chapter Five   : Summary, Findings, Policy Implications for Educational

                        Policy Development, Conclusions, and Agenda for Future

                        Research

REFERENCES

APPENDICES

VITA

CHAPTER 2

REVIEW OF RELATED LITERATURE AND PREVIOUS RESEARCH

Successful research is based on all the knowledge, thinking, and research that preceded it, and for this reason a review of literature is an essential step in the process of undertaking a research (Anderson, 1990). With this assumption in mind, a number of literatures in education and earning will be surveyed and studied.

The purpose of this study was to estimate returns to education at aggregate and disaggregate levels in Nepal. Specifically, this study attempted to estimate returns to education in the wage sector and farm and non-farm enterprises holdings.

This chapter is divided into eleven sections: (a) Education system in Nepal, (b) Investment in education in Nepal, (c)Theory of human capital, (d) Human capital formation, (e) Conceptual framework (f) Analytical framework (g) Is education an investment or consumption good?, (h) Is education a good investment?, (i) Role of formal education for economic development, (j) Related research in Nepal and, (k) Related research in other countries.

Education System in Nepal

The formal educational system of Nepal consists of primary school, lower secondary school, secondary school and higher education. Primary school is free but not compulsory and gives five years of training. Lower secondary school, which is not free, provides an additional three years of education (grade 6, 7and 8). Secondary school corresponds to next two years of education (grade 9 and 10) and in their final year, all secondary school students take nationwide School Leaving Certificate (SLC)

examination in eight principle subjects. This is the toughest hurdle for many students, about one-third of examination candidates, nationwide; make it to next level each year. Higher education consists of two years of Certificate Level, three years of Bachelors degree and two years of masters' degree (Ph Ds are not counted). Formal education is provided by government, free of tuition fees, at all levels through Secondary School. University education too is heavily subsidized by the public sector, as is the case in many developing countries. At all levels, private schools and colleges do exist but their share of the market is mainly limited to urban areas and high-income population-groups, and is negligible on the whole public schools and colleges function under the ministry of education and all of them are funded by the central government.

Investment in Education in Nepal

Economic growth depends on the level of actual investment on education and this depends on the resources that can be allocated to education.

Public investment in education has gradually increased over the past five decades in Nepal. This sector absorbed 12.3 percent budget of the total annual budget in 1995/96 and 16.2 percent of the total annual budget in 2004/05. Expenditure on education was 2.95 percent of GDP in 1995/96, 1.4 percent of GDP in 1980/81 and 12.3 percent of total government expenditure on education in 1995/96, 9.4 percent of total government expenditure (TGE) in 1980/81. This rose to 2.6 percent of GDP and 13.1 percent of TGE in 1998/99. Regular education expenditure as a share of total government expenditure rose from 1990/91 to 1999/2000 from 4.8 to 19.4 percent and the development budget decreased from 10.9 to 7.9 percent (World Bank, 2001).

The primary education sub-sector has received highest priority in allocation of budget since 1991. The share allocated to primary education has been increasing. Primary education has received more than half of the education budget. Budget allocation on primary education has increased more than 2.89 times for the period 1991 to 1998, which the total education budget has increased 2.71 times. The average annual increase in total education budget has been 24.5% over the 1991/92 to 1998/99 period whereas the average annual increase in primary education budget over the same period has been 27.03% which is higher (Gurung, 1998).

In 1980/81, of the total expenditure on education, 37 percent was for primary and non-formal, 25 percent for secondary and 38 percent was for tertiary. In 1999/2000, the share of budget for primary education rose to 52.9 percent; non-formal, to 1.3 percent, secondary education had a slight reduction to 23 percent, technical and vocational education had 1.1 percent, and tertiary had the share of 23 percent (MOES, 2004).

Government spending on secondary education has increased more than 4.65 times for the period of 1991/92 to 1998/99 while the total education budget has increased 2.71 times. The emphasis on secondary education in the government budget has grown steadily, as reflected in the rise of the share of secondary education budget to total education budget from 13.45% in 1991 to 23.08% in 1998. The average annual increase in total budget has been 24.5% over the 1991/92 to 1998/99 period whereas the average annual increase in secondary education budget over the same period has been 52.27% which is over (Gurung, 1998).

Government spending on higher education has increased more than 1.77 times for the period of 1991/92 to 1998/99 while the total education budget has increased 2.71 times. The emphasis on Higher Education in the government budget has

decreased steadily, as reflected in the decline of the share of higher education budget to total education budget from 28.13% in 1991 to 18.44% in 1998. The average annual increase in total education budget has been 24.5% over the 1991/92 to 1998/99 period whereas the average annual increase in higher education budget over the same period has been 11.15% which is lower.

The pattern of allocation of education budget shows that over the years, there is a shift in favour of primary and secondary education against higher education. The increase in the proportion of higher education budgets in total education budgets reached 18.44% in 1998/99.

Over the last decade alone, investment in education has increased significantly. In 1993/94, the government spent 12.8 percent of the total budget in education, while in 2004/05 the government plans to spend 16.2 percent of total budget in education. The share of primary education rose from 37 percent in 1980/81 to 58.4 percent in 2003/04 (NDF, 2004).

As the investment growth clearly indicates the government's intention to develop the sector, there are still reasons to put increased emphasis in the pursuit for better education. Educational investment also reduces incomes inequality in a number of ways. These include the ability of more educational provision to raise income in general and remove groups from poverty-richer countries tend to have lower levels of income inequality; the ability of education to raise incomes disproportionately amongst the poorer and provide avenues for social mobility; the financing and organization of education in ways which generally favour poorer rather than richer families in terms of participation and which thereby diminish inequality arising from higher income of more educated; and the interaction of educational levels with other

variables - fertility, mortality and health - which have a bearing on income distribution at the family and individual level (Jallade 1974, field 1980).

Although the level of public education spending is reasonable, there are important questions about the coverage, quality and effectiveness of education spending in Nepal (World Bank, 2000 b, p. 29). Internal efficiency is low at all levels of the education system; the adult literacy rate in 2002 was 44 percent in Nepal compared to 97.2 in Maldives, 92.1 percent in Sri Lanka, 61.3 percent in India, 41.5 percent in Pakistan and 41.1 percent in Bangladesh (UNDP, 2004). There are large variations between urban and rural areas and between geographical regions with regard to literacy, enrolment and gender and ethnicity balance at all levels of the education system. Drop out and repetitions are higher (82%) and the quality of education in government schools is low and pass rates are low (e.g. at primary level pass rates for government school is 44-50% and for private school, it is 75%) throughout the education system (World Bank, 2000 b, pp 29-33).

United Nations Development Programme (UNDP, 2001) summarizes some critical issues in delivering basic and primary education as follows: a) nearly 30 percent of Nepali children, mostly those from poor households lack access to basic primary education; b) high repetition and dropout rates have reduced the efficiency of the basic and primary education; c) public investment is still inequitable; d) a participatory and decentralized primary education system is essential to improve quality and efficiency; and e) there is growing concern about the duality of the education system -poor public education for the poor and high quality private education system for the rich. Thus though the education sector receives the largest sectoral share of public expenditure (16.2% in 2004/05), the quality of education

remains poor. The poor quality of education is not helping communities to increase their production and income; and so drop out rates are high (Regmi, 2005).

The Theory of Human Capital

The analysis of the labor market effects of education and training is the province of what economists call human capital theory. The essence of human capital theory is the idea that expenditures on education and training are investments individuals make in them to increase their market skills, productivity, and earnings. In explaining earnings differentials, therefore, human capital theory focuses on individual differences in years of schooling and length of on the job training, and the factors that cause some individual to invest in more human capital than others.

Acquired and useful knowledge and skill may be termed as human capital. Good education is an important means towards the product of material wealth (Natarajan, 1990). The most valuable of all capital is that invested in man. Human Capital can be developed through education, job training, medical facilities, public health, nutrition, housing, social services, and migration. Improvement of human capital leads to qualitative growth of manpower. Schultz considered high-level manpower alone as human capital. J.S. Mill questioned the very concept and said wealth existed for the people and people should not be considered as wealth.

The growth and decline of human capital falls into three categories (Natarajan, 1990). Education is primarily concerned with stage 1) Stage I: Gestation Period: In the first two decades of human capital formation, concentration will be on health, schooling and education in the wider sense. At this stage, calculation of opportunity cost (earnings foregone) is difficult and differs widely among the regions. 2) Stage II: Productive Period: The next three decades will be used in capital production due to

education and technology. Productivity analysis and cost benefit analysis will show rising trends in production and human welfare. 3) Stage III: Survival Period: From the sixth decades until death there is no productivity by human capital except in rare cases. Salient features of human capital are as follows (see Natarajan, 1990; Ogwawa, 1999; Mingat & Tan, 1998; Todaro, 1997; & Tilak, 1987): Human capital has longer gestation period than non-human capital; Human capital is a part of the individual –cannot be sold, mortgaged or transferred; Human capital appreciates in value up to a point in time; No two units of human capital are similar; Marginal returns may vary between persons with the same qualifications; Human capital has also non-economic attributes; Human capital is mobile and is subject to salary and status considerations; Depreciation of human capital is difficult to calculate; and the social and cultural environment influences productivity of the human capital. Over two centuries ago Adam smith (1937) observed:

> When any expensive machine is erected, the extraordinary work to be performed by it before it is worn out, it must be expected, will replace the capital laid out by it, with at least the ordinary profits. A man educated at the expense of much labor and time to any of those employments which require extraordinary dexterity and skill, it must be expected, over and above the usual wages of common labor, will replace to him the whole expense of his education, with at least the ordinary profits of an equally valuable capital (p.).

Smith's insight was largely neglected by later economists who concentrated on investment in physical capital. In the late 1950s however, economists such as Theodore Schultz, Jacob Mincer, and Nobel laureate Gary Becker rediscovered Smith's insight and developed it into the theory of human capital. As Becker states in his classic work, human capital, and any activity that entails a cost in the current period and raises productivity in the future can be analyzed within the framework of investment theory. With respect to human beings, a number of activities that individuals undertake fit this conception of an

investment: education, training, migration, health care, and job search are examples.

The type of human capital investment that has received the most attention from labor economists is education and trainings. While schooling is partly a consumption good for many people (that is, individuals pursue an education for the pleasure and satisfaction of the experience), it is also treated by most individuals as a clear investment in their future. Every college students, for example, is aware of the costs of pursuing a college degree. These include the direct costs of tuition, books, and other educational expenses, and the indirect or opportunity costs in the form of forgone earnings from work that are sacrificed to attend school. Counterbalanced against these costs are the anticipated benefits of increased earnings, more attractive employment opportunities, and higher status and social prestige.

When is an additional year of education a good investment? The quotation from Adam Smith provides the answer when ever the increased benefits both pay back the initial costs and yields a rate of return at least as high as alternative investments of one's time and money. A major contribution of the human capital theory developed by Becker and other is to take this insight of Adam Smith and show how it can be used to measure the private and social rate of return not only to education, but also to numerous other labor markets activates.

Human Capital Formation

Human capital investment in education, health, nutrition and other aspects of human development is more important now than ever for economic and social development. Particularly, in the past three and a half decades, many empirical studies have indicated the importance of human capital investment and it's linkage

with other factors, such as physical capital. The World Bank, the internationally largest single source of policy advice and external funds for education, has maintained this approach by stating that: "Investment in education contributes to the accumulation of human capital, which is essential for higher incomes and sustained economic growth. Education-especially basic (primary and lower-secondary) education- helps reduce poverty by increasing the productivity of poor, by reducing fertility and improving health, and by equipping people with they need to participate fully in the economy and in society" (World Bank, 1995, p.1).

According to the late Professor Frederick Harbison of Princeton University, "Human resources constitute the ultimate basis for the wealth of nations. Capital and natural resources are passive factors of production; human beings are the active agents who accumulate capital, exploit natural resources, build social, economic and political organization, and carry forward national development. Clearly, a country which is unable to develop the skills and knowledge of it's people and utilize them effectively in the national economy will be unable to develop anything else" (Todaro 1997, p. 378).

Other internationally influential institutions, such as the United Nations Children's Fund (UNICEF), United Nations Development Program (UNDP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), have also emphasized the role of education, especially in primary educational in relation to both economic and social development in developing countries. The international educational conference in Jomtein of Thailand in 1990, whose purpose was to promote education for all children in the world by the year of 2000, was sponsored, collaboratively, by the four international organizations listed above and was the largest ever held. In addition, many national governments today consider education to

be a key factor for a country's economic, social, and cultural development. Even local governments and non-profit organizations (NGOs) are looking at local-based educational policies (e.g. active community participation) that would increase local people's incentives, which would, in turn, enable students or local people to gain adequate knowledge and skills to qualify for their local labor market.

Theoretical Framework

This study reviewed the literature in education and economic development based on the question where does the idea of human capital come from and how has it developed theoretically?

Historical Perspectives

The concept of human capital, whereby human beings invest in education rises that their future income and productivity, is not new. Adam Smith pointed out in 1776 AD in The Wealth of Nations that "a man educated at the expense of much labor and time…May be compared to one of those expensive machines", thus drawing an analogy between investment in physical capital and investment in human capital.

However, the concept of investment in human capital to create future income was not fully developed until the early 1960s. Schult's (1961) presidential address to the American Economic Association, The Journal of Political Economy in the United States published a supplement on "Investment in Human Beings" in 1962, and the publication of Becker's (1964) NBER book "Human Capital" gave a real boost to the concept. Schultz analyzed educational expenditure as a form of investment and Becker developed a theory of human capital formation and analyzed the rate of return to investment in education and training (Parajuli, 1995).

Since that time, the concept of human capital has dominated the economics of education and has had a strong influence on other branches of economics such as labor markets and wage determination, economic growth and productivity, and health and migration (Meier, 1990; Todaro, 1997; Higgins, 1999).

The literature on human capital takes three major forms (Parajuli, 1995; Psacharopoulos, 1995; Ogawa 1999). Growth accounting studies that focus on contribution of education to economic growth; Worker-productivity studies that estimate the impact of education on farm and non-farm production; and Cost-benefit studies that analyze the economic contribution of formal schooling in terms of its private costs (earning forgone and direct costs incurred while in school) plus public costs (government expenditure) and additional wages earned by those individuals who go to school.

Growth Accounting Analysis

One of the first applications of this human capital theory was the explanation of sources of economic growth. The explanatory factors besides labor and physical capital were collectively termed as "residual" in the production function (Solow, 1957), and part of this residual was assumed to be human capital or education. An early attempt to ascertain the contribution of human capital towards economic growth was done by Denison (1967), who estimated the residual to be about one-fifth of the economic growth of the US in the period 1929 – 1957. Denison (1979) went on to estimate the education of the labor force accounted for 11% of the total economic growth of the US for the period 1948 to 1973. In a related study built on Schultz's "educational capital", Solomon (1971) showed that "human capital "of the US was significant compared to "physical capital". Bowman's (1980) review of growth accounting exercises for 22 countries for approximate period 1950 to 1962 showed

that only four (Argentina, Belgium, the U.K. and the U.S.) had the direct contribution of education to exceed 10 percent (as cited in Parajuli, 1995). In Psacharopoulos's (1985) survey of 29 countries, direct effect of education was around 8.9 percent of total growth. He argued that traditional estimates of the growth-accounting do not take into account the contribution of educated farmers and women, demographic effects on fertility and infant morality and life-expectancy and other factors, and so underestimate the real effect of education. (Parajuli, 1998 and Ogawa, 1999)

Mankiw, Romer, and Weil (1992) suggest that human capital's share in the aggregate production function framework should be about one-third (with two-thirds divided between labor and physical capital). Barro (1996) shows that enrollment rates, proxy for stock of human capital of labour force, are robustly correlated with growth rates. Barro and Lee (1993) and Barro (1996) find that increase in a year of male secondary schooling raises the growth rate by about one-and –half percentage points. However, Pritchett (1996) challenges this positive education-growth linkage and says that cross-sectional data on economic growth rates show that increases in educational capital have had no positive impact on per worker GDP growth rate. He also points that non-regression growth accounting measures of total factor productivity show strongly negative impact of human capital. He explains this apparent negative result in terms of measurement error, signaling (rather than productivity) effect of education, excess supply of educated labor force, and use of education in counterproductive environments. Gallup (1998) notes that Pritchett's model is rather poor in terms of choice of correlates and therefore his result cannot be taken as a powerful objection to productive contribution of education. He, however, suggests that weak empirical relationship between growth and education might be the result of unfavorable conditions in which the investments in education are made. Consistent

with this weak linkage are Radelet, Sachs and Lee's (1997) cross-country regressions that indicate education's positive but insignificant effect on growth.

Rate of Return Analysis

George Psacharopoulos, the author of several comprehensive reviews of rates of return to education over the last 25 years and the producer of many of the estimate in various countries, says in "Returns to Investment in Education: A Global Update" (World Development, 1994)" that given the growth of the literature, the compilation of returns to education has become untractable. For example, rates of return have been estimated for such diverse groups as Mainland Chinese working in Hongkong (Chung, 1998), or Mexican Americans and their Anglo counterparts who graduated from Pan American University (Raymond and Sesnowitz, 1983). By the volume of work and citations we find in the rate of return to schooling literature, Psacharopoulos has in some sense monopolized the literature of developing countries economics of education. His "Economics of Education Research and Studies" (1987) contains many articles and summaries on theoretical concepts and empirical methods and evidence of economics of education, including the rate of return to human capital concept.

The following section described about the private and social rate of return, two methods in the rate of return literature, empirical evidence, criticism on the empirical results and more controversies on the rate of return concept.

The private and social rate of return. Returns are expected from investment whether it is in physical capital or human capital such as education (Heggade, 1992; & Tilak 1987)

Individuals and families make educational investment with an eye on future earnings. Not only the expenses for education are regained, but many times over the

initial investment are also enjoyed during one's career. Persons with higher educational qualifications enter the job market at a later age, but their initial salary and earning differentials rise steadily. Thus age-earning profile differentiates several levels in the hierarchy.

A World Bank study of 44 countries in 1983 (as cited in Natarajan, 1990) gave the following findings about the rates of return of education: The rate of return to investment at any level of education in developing countries is far above ten percent; The rates of return to investment in primary education are higher relative to investment in other levels; The returns to investment decline as the educational level increases. The absolute returns to education are highest in poor countries; The private returns to education are generally several points higher than the social rate of return; Social rate of return differs between general education course and technical course; Two separate rates of return to college education are estimated by economists: The private rate of return and social rate of return.

One reason is that at state supported schools tax revenues from various levels of government cover about three fourths of the operating costs. A second reason is that many students receive financial aid from parents or third parties. On the benefit side, to calculate the social rate of return, economists use the pretax income of high school and college graduates. Assuming that firms pay workers an in come equal to their productivity, it is the difference in the pretax income of college and high school graduates that represents the additional output gained by society from its commitment of resources to education.

A number of studies have estimated the private and social rates of return for various levels of schooling. Based on data from the 1950s and 1960s, a typical estimate put the yield of an investment in a college education at a real rate of return

ranging from 10 to 18 percent. The private rate of return has usually been found to be larger than the social rate of return, and the rate of return for white men is usually found to be larger than for women or blacks. Since the real rate of return from other investments such as stocks, bonds, and savings deposits has generally been lower than this, education would appear to be a very sound investment. How ever, evidence points to deterioration in the rate of return to education in the 1970s.

Before these numbers are accepted uncritically, it is important to note that estimated rates of return are subject to many possible biases. On one hand, there are several compelling reasons to suppose that the actual return from additional schooling is considerably less than the reported 10 to 18 percent. One is the problem of "other things equal" – the higher income that is associated with more education may actually be due to the fact that the more educated also have higher ability, for instance. The social rate of return to education is also overstated to the extent that additional education serves merely to sort or screen people in the job market rather than to raise their levels of productivity.

A variety of reasons also support the view that the true rate of return to education is higher than the estimated figures suggest. One recent study numerated 20 different nonages benefits of additional education that are not included in the usual rate of return calculation. These omitted benefits included such things as a more pleasant or prestigious job, greater fringe benefits, better health, a reduction in crime, and the fact that education is a consumption good for many people. The authors of the study concluded that the total benefits from one additional year of schooling might actually be double those suggested by earnings data alone.

Two methods in the rate of return literature. Mincerian earnings function is probably the most widely used technique because it is a simple model and in its most

basic form requires just the earnings, education (number of years of schooling) and number of years of experience at work to estimate the rate of return. Other method or so-called "elaborate" or full method follows from the exact algebraic definition of the rate of return, which is the discount rate that equates a stream of benefits to a stream of costs at a given point in time. This second method stems directly from the Becker Model of human capital and requires a discounting of actual net age-earnings profiles. It is argued to be more appropriate method of estimating the returns to education because it takes into account the most important part of the early earning history o of the individual. However, this method requires comprehensive data-one must have sufficient number of observations in a given age-educational level cell for constructing "well-behaved" age-earnings profiles (i.e. not interesting with each other). The empirical studies by enlarge; have relied on these two methods (Parajuli, 1995; Ogawa, 1998; Psacharopoulos, 1991; Woodhall, 1970).

Empirical evidence. Psacharopoulos "Returns to Investment in Education" Global Update" (page 1340-1343, World Development, 1994) provides a fairly comprehensive update on the estimates of rates of returns to education. It also gives a good indication about the country coverage, time of the estimation and method of estimation used so far. Just looking at these figures broadly, we can come up with the following observations (which Psacharopulos and others have argued to be the case worldwide).

1. Rates of return in developing countries are higher relative to corresponding returns in more advanced countries.

2. Rates of return for all levels of education generally exceed the social opportunity cost of capital (common yardstick is 10%).

3. Private returns are higher than social returns, especially at university education.

4. Primary education has the highest return (both private and social) compared to secondary and university education.

5. Over time, the pattern tends to follow a slight declines in rates of return, but fairly stable.

Elsewhere, it is been shown that, overall, returns to female education are higher than those for males (Pscharopoulos and Tzannatos 1992 a). Profitability of vocational education relative to general education has been questioned through empirical analyses (Mc Mohan, 1988). Moreover, according to Psacharopoulos, physics, natural sciences and agronomy have the lowest social returns and engineering, law and economics have the highest private returns. In addition, public sector employment has been lagging behind the private sector employment in terms of rates of return, and that dependent employment has had a slight edge on self-employment (Parajuli, 1995; Ogawa, 1998).

Criticism on the empirical results. One can distinguish between private rates of return and social rates of return. Private rates of return to education compare the benefits of education to an individual to the costs of education to the individual; they inform private decisions regarding educational investment. Social rates of return to education compare the benefits of education to society to the costs of education to society; they guide public policies regarding educational investment (Tsang, 1988).

The rate of return information gives indication where the investment are profitable for private and society. There are many other considerations including rate of return to make definite decisions. The advocates of man-power forecasting scoff at the assumptions underlying rate of return calculations, while the proponents of rate of

return analysis are equally scornful of the idea that man-power requirements can be predicted accurately. Manpower requirement approach, social demand approach and rate of return approach should be understood as complementary, not competitive to educational planning (Blaug, 1967).

There are many criticisms regarding the usefulness of this approach. The social rates of return approach to public educational investment is attractive to cost analysts in that it is analytically simple, its results have explicit economic interpretations, and it is grounded in conventional economic theory. But even within the theoretical framework of human capital theory, most rates-of – return studies are subject to a number of methodological problems.

First, the results are based on past conditions; they may not be reliable predictors of future rates of return in dynamic settings. Second, most studies use cross-sectional data instead of longitudinal data in assessing the earnings level of an individual over time. Third, most studies use the quantity of schooling as a measure of human capital and ignore issues of educational quality and relevance, thus creating difficulties in interpreting the findings. Fourth, most studies ignore significant non economic benefits of education and factors other than education that influence an individual's employment and earning opportunities, resulting in biased estimates of the rates of return to education.

Although some studies have tried successfully to resolve these methodological problems, most of the rates of return studies, especially those in developing countries, have not. And fifth, in using earnings as a proxy for productivity, rates of return studies assume that the labor market is perfectly competitive. This is not likely to be true in developing countries where governments are big employers. It seems unlikely,

however, that these methodological problems will invalidate the conclusions of the rate of return literature discussed above (Tsang, 1988).

In reality, decisions on public educational investment are influenced by broader economic and political considerations, not based on social rates of return. Educational decision makers should be informed about the advantages and limitations of cost-benefit analyses in education that are based on the rates-of-return approach. These criticisms indicate that countries need to consider other factors also.

Bennel, (1996) closely examined the rate of return studies in the Psacharapolous updates and found that the reports were questionable at least in Sub-Saharan Africa (as cited in Parajuli, 1995 and Ogawa, 1999). He looked at the country coverage, data-quality, methodological issues such as sample selection, omitted variables, cost-benefit measurement biases, etc.

In various studies pertaining to this region and concluded that: a) data and methodologies used in individual country studies were deficient and / or incompatible, indicating that most past reports are flawed, and b) conventional rates of return do not prevail in present day Sub Saharan Africa because of markedly varied labor markets and chronically low internal and external efficiencies at all levels of education Bennel's attempt should be taken cautiously and positively. In other words, future empirical work on this field should, on one hand, try to address the issues by coming up with the best feasible methodology, and on the other hand appreciate the various difficulties facing such empirical work.

More controversies on the rate of return concept. Human capital conception is not free of controversy. One of these is the issue of innate ability. The main point of this controversy is that higher earnings of educated workers simply reflect their superior ability rather than the skills they acquire through education. Willis (1986),

after an exhausting review of the literature, concluded that the ability –education-earnings econometric and theoretical issues were so complex that it was difficult to reach any conclusions. Bound et al (1986) found no effect of ability in the case of the US. Glewwe (1991) came up with a similar result in the case of Ghana. Related debate is the so-called "screening" or "filter" hypothesis, which states that education, serves to screen individuals as opposed to enhancing their productivity (Berg, 1970, Arrow, 1973, and Spence; 1974). Ashenfelter and Krueger (1994) used a natural experiment using a sample of identical twins in order to assess the effect of selectivity bias on returns to education. They found no bias in the estimated returns to schooling (Psacharopoulos, 1994).

One other issue is that of school quality. Card and Krueger (1992a) examined the effects of school quality (proxied by class-size, semester-length and teacher-salary) on returns to education for 1980 US data. They found quality did have a significant positive effect on rates of return. Glewwe (1996) showed that data from Ghana indicate that school quality improvements have higher rates of return than do additional years of schooling at current level of quality. The role of socioeconomic background is another source of debate. Card and Krugar (1992a) showed that holding quality constant, there is no effect of parental income or education on rates of return Meanwhile Neuman (1991), using Israeli data, found that there is a positive effect.

Worker Productivity Analysis

The usual estimations for returns to educational investments are the rates of return to schooling or the marginal gains in earnings with one additional year of education. This standard method has been widely used at the individual level and the wage-sector. But when there is self-employment such as farming or even non-farm

enterprise, we face a difficulty in measuring such rates largely because those earnings are at the household level. An alternative technique is the estimation of the effect of education on productivity. Such a technique has been used in a number of empirical studies on farmer's efficiency and education. A survey for the World Bank of eighteen studies and 31 data sets concludes that if a farmer has completed four years of elementary education, his productivity is, on the average, 8.7% higher that that of a farmer with no education (Lockheed, Janinson and Lau, 1980). However, Phillips (1987) after analyzing the empirical foundation of Lockheed study suggests the need for skepticism on these results. Only 22 of 39 regression results (56.4%) show positive and significant effects on farmer efficiency; remaining results are either not significantly different from zero or are negative.

"Education and Development" (Table 1), a World Bank publication (1990), tabulates the data sources and results of some of the studies done in developing countries. These results support the general conclusion that education has a positive contribution to agricultural productivity but more conclusive evidence is seen only when complementary inputs (land, labor, and technology) are included in the education-productivity models.

On the other hand, there are far fewer attempts that have been made to analyze the effect of education on non-farm productivity. Berry's (1980) review of a survey of productivity studies on urban workers indicates mixed results. Min's (1987) study on a sample of Chinese auto-factory workers shows a small but significant effect of vocational education, not academic education. Moock et. all. (1990) in a world Bank Living Standards Measurement Survey (LSMS) paper analyze the relationship between education and in formal non-farm family businesses that require knowledge

about technology but the impact is weaker for enterprises with more traditional practices (Parajuli, 1998).

In most cases of these productivity-estimations (agriculture and industry productivity), it is assumed that the education of the head of household acts as a proxy for the household education.

Conceptual Framework

The theoretical framework is provided by the human capital theory, the basic premise of which is that variations in income are wholly due to differences in labor productivity as a consequence of differing amounts of human capital acquired by workers via education or other means. Education is thus viewed as a form of investment in human potential. The more education an individual receives, the more productive he/she is assumed to become. This higher productivity is purportedly reflected in the relatively higher earnings he/she receives. In other words, unemployment tends to be strongly related, usually inversely, to education.

The approach used in the economics of education, a branch of the human capital school, is to calculate returns to educational expenditure by treating educational expenditure as investment in human capital and calculating the yield to educational investment in the same manner as for physical capital. The internal rate of return, which is the rate that equates the present value of benefits with the present value of costs, is the profitability measure used in this study to examine the efficiency of resource allocation.

It is recognized that individual, as well as society, gain from education. Thus the return to education includes private and social gains. The usual approach used to calculate the gains to individual is to compare the monetary cost of education, inclusive of income foregone, with the post-tax lifetime earnings. The rate of return to

the private individual is the private rate of return. in calculating the gain of society, the monetary cost to society is included in the cost of education and compared with his pre-tax earnings. The rate of return thus obtained is the social rate of return (Phan, n.d.).

Just as the private rates serves as signals to private investors, the magnitude and pattern of social rates of return provide valuable information to educational p0lanners. Discrepancies in social rates of return may be interpreted as dynamic disequilibrium positions. By varying the rate of investment in different educational investments, a more efficient pattern of resource allocation may be achieved.

While it is without doubt that many externalities such as a more informed electorate, harmonious inter-racial co-existence and higher standards of childcare and healthcare, may be derived from education, such diverse benefits, do not lend themselves easily to expression in monetary terms. As with other studies, such benefits will be excluded from this study.

Although, education has non-economic dimensions and benefits and cannot be treated purely as economic investment, such an approach does provide a rational basis for resource allocation. An added advantage is that comparisons between private and social gains are possible with the use of social and private rates of return. This is invaluable in decision making in which social equity considerations are important (Phan, n.d.).

Analytical Framework

According to Psacharopoulos (1995): The costs and benefits of education investments can be analyzed in the same way that these are calculated for other types of projects. In education, a series of expenditure occur over the life cycle of the graduates. For establishing education investment priorities at the margin, the net

present value or internal rate of return of the prospective operation can be computed (p. 1).

The notion of present value is the key in the rates of return to education analysis. The internal rate of return for a particular education represents the rate of return that equalizes the present value of expected benefits with the present value of cost. Alternatively the rate of interest at which the difference between discounts benefits and cost is zero (Ogawa, 1999).

The internal rates of return to investment in education are explained from the private and social points of view. The private rate of return is used to explain people's behavior in seeking different levels, and types of education, such as distributive measures of the use of public resources. It is also used to assess the equity or poverty reduction effects of public education expenditure as well as the incidence of the benefits of such expenditure (Psacharopoulos, 1995). Moreover, the private rates of return equalize the discounted present value of the private cost of attending school with the discounted present value after tax gains the individual recoups in subsequent productive activities (Schultz, 1993).

On the other hand, the social rates of return are used to set priorities for future investments from the point of view of government. The social returns include not only the private costs and the benefits but also the cost providing schooling and the gains in increased taxes that better educated workers pay, and the broader social benefits (Schultz, 1993).

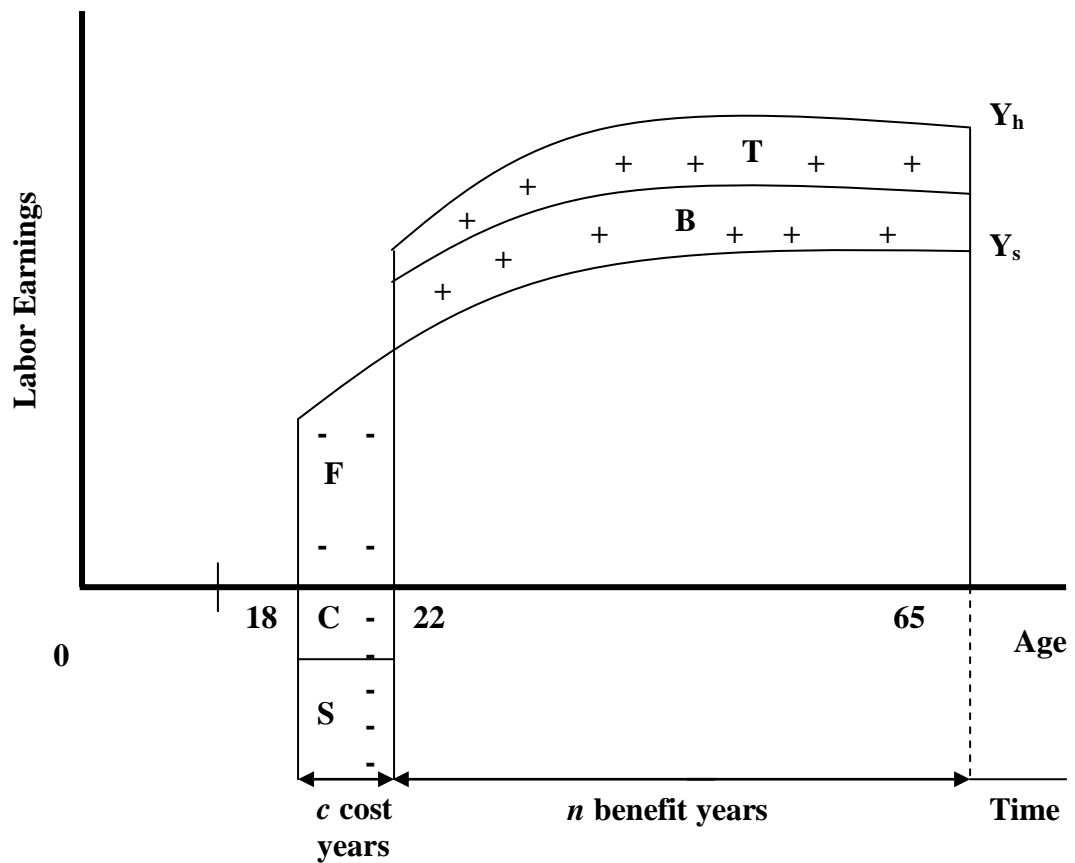*The Private Rate of Return to Education*

The concept of the rate of return calculation is illustrated in Figure 3.1 Suppose one wants to examine the rate of return to higher education, one would

compare the costs and benefits of investing in university education with the costs and benefits of secondary education. Suppose someone who has a high school diploma is expected to earn a certain amount of income after graduation and the income increases with one's experience (age). On the other hand, someone else who has university education is expected to earn more than the person with only secondary education and the farmer's income increases more steeply compared to that of the latter. Area B represents the extra economic benefits that the university graduate is supposed to gain. At the same time, he/she encounters some direct costs, including tuition, school fees, purchase of books, which is represented by area C. Area F represent the indirect cost (foregone costs) that he/she encounters. If one had not pursued university education, one could have commenced work at an earlier age.

If rates of return to secondary or primary education are conceptualized, similar diagrams could be created in order to compare secondary with primary education or primary with no education. When the rate of return to primary education is calculated the foregone earnings of those who have primary education diplomas are excluded.

In addition, Psacharopoulos (1995) mentions that although the costs for the privates rates of return to education includes foregone earnings while studying as well as any education fees or incidental expenses the individual incurs during schooling, because education is often provided free by the state, in practice the only cost in a private rate of return to calculation is the foregone earnings.

Figure 2.1

Rates of Return to Increased Education

Source: Psacharopoulos (1981), p. 322.

The formula of the private rate of return would be:

$$\text{Private Rate of Return} = \frac{B-(F+C)}{(F+C)} x100$$

The Social Rate of Return to Education

In the social rate of return analysis, education subsidies are included as the cost of education and tax is also considered as a portion of the benefits. Area S and T represent subsidies and tax respectively. The social rate of return is calculated using this formula:

$$\text{Social Rate of Return} = \frac{(B+T)-(F+C+S)}{(F+C+S)} x100$$

According to Psacharopoulos (1995), the key assumption in the social rate of return to education analysis is that observed wages are a good proxy for the marginal product of labor, particularly in a competitive economy using data from the private sector of the economy.

<div align="center">Methodology of the Rate of Return Analysis</div>

In order to estimate the profitability of investment in education, the following three methods are often used: (1) Mincerian earnings function method; (2) Full method or the elaborate method; and (3) Short cut method (Psacharopoulos, 1994). This study used the Mincerian earnings function method to estimate private rates of return to additional years of schooling and levels of education. In order to investigate the social rates of return to education, this study used short cut method. This study did not use the full method or the elaborate method.

The Mincerian Earning Function Method

The earning function method is explained by two linear regression analyses: the basic and extended methods.

Basic method. The basic Mincerian earnings function method takes the following form (Mincer, 1974).

Equation 1: $\quad$ In $Y = b_o + b_1 S + b_2 E + b_3 E^2 + b_4 G + b_5 R + \ldots + e$

Where Y is individual incomes; S is years of schooling; and E are years of post-school labor market experience, and other attributes such as gender (G) or race (R). The return to education (co-efficient) is $\delta In Y / \delta S = \delta Y / Y \delta S = b_1$, while the return to experience is δ In $Y \backslash \delta E = b_{2+} 2 b_3 E$, assuming Y, S and E are continuous. Gender and race are discrete, but S is also measured as discrete integer years of schooling. In

this earnings function, the labor market experience is calculated as follows.

Experience = Age-Schooling-School entry age

Extended method. A variant of earnings function is used to estimate private returns to different levels of schooling by converting the continuous schooling variables (s) into a series of 0-1 variables (dummy variables), each representing a different level or type of schooling (Equation 2).

Equation 2: $\ln Y = b_0 + b_1 P + b_2 S + b_3 T + b_4 E + b_5 E^2$

Where Y is individual income; P is primary education; S is secondary education; T is tertiary education; and E is years of post-school labor market experience.

After estimating the extended earnings function, the private rates of return (r_i) to different levels/types of schooling (i) are derived from the following equations.

R (primary vs. less than primary) = $r_p = b_1 / s_p$

R (secondary vs. primary) = $b_2 - b_1 / s_s - s_p$

R (Tertiary vs. secondary) = $r_t = b_3 - b_2 / s_t - s_s$

Where s_p, s_s s_t are the number of years of earnings foregone, respectively, by a primary, secondary and tertiary education student, assumed here to be 2, 5 and 4 years.

In this semi-log earnings function specification, the coefficient on years of schooling can be interpreted as the average private rate of return to one additional year of education, regardless of the education level to which this year of schooling refers.

On the other hand, the 'extended' earning function method is used to estimate returns to education at different levels by converting the continuous years of schooling variable into a series of dummy variables. These dummy variables refer to the completion of the main schooling cycles for primary, secondary and tertiary education, or to dropouts of these levels, or even to different types of curriculum (e.g. vocational and general) within a given education level. After fitting such extended earnings function, the private rate of return to different levels of education can be derived by comparing adjustment dummy variable coefficients.

The Full Cost Method

When individual earnings data are available, usually from Labor Force, Household Survey or Population Censuses, the standard internal rates of return to equation can be used to construct age-earnings profiles for each level of education. The internal rate of return for a particular education or training investment is the rate of return that equalizes the present value of expected benefits with the present value of cost or alternatively, the rate of interest at which the difference between discounted benefits and costs is zero.

$$\sum_{t=0}^{t=n} \frac{B_t}{(1+r)^t} = \sum_{t=-p}^{t=0} \frac{C_t}{(1+r)^t}$$

Where n is the number of years of post-education working life, and p is the number of years of education.

The Short-Cut Method

The short cut method is employed when the only earnings data available are the average incomes by level of education. The rates of return to education are derived using the following equation:

$$r_s = W_s - W_{s-1} / t_s (C_s + W_{s-1})$$

Where r_s is the rate of return to educational level s over education level s-1 as the control group; as W_s and W_{s-1} are the mean annual salaries of graduates with s and s-1 level of education, respectively; C_s is the annual cost per student of educational level s, and t_s is the number of years for educational levels.

Is education an Investment or Consumption Good?

According to Natarajan (1990), investment denotes using money to buy stock shares or property. Investment in durable goods brings higher dividends, profit, rent or interest. The investor's decision is influenced by possible returns on various kinds of investment. An investor prefers higher returns with least risk. J.K. Galbraith and Nobel Laureate Samuelson (as cited in Natarajan, 1990) considered education as a sound investment. Galbraith declared, "A dollar or a rupee invested in the education of human beings will often bring a greater increase in national income than a dollar or rupee devoted to railways, dams, machines, tools or other tangible goods" (Natarajan, 1990 p.6).

Some economists view education as a consumption of good. John Maynard Keynes considered general education in USA as mere consumption. Only when learning is merely to spend the leisure time or for pleasure without any economic motives may we term it as consumption. Learning classical language, fine arts and games in most of the cases is consumption activity. Course in humanities- some of them are called not-utility subjects-do not provide for better economic welfare. For many housewives-some of them are called non-utility subjects-do not provide for better economic welfare. For many housewives, higher education is merely a status symbol (Natarajna, 1990).

Schultz argues (as cited in Natarajan, 1990), "Although education is in some measure a consumption activity rendering satisfaction to the person who receives an education, it is predominantly an economic activity undertaken for the purpose of acquiring capabilities that render future satisfactions or that enhance the future earnings of the person as a productive agent." Thus a part of it is a consumer good similar to conventional, consumer durable and the other part is a producer good.

According to Prof. Brahman and (as cited in Natarajan, 1990), "That part of education which is essential for the production process to grow at the optimum rate is investment and that part which is in excess of the needs and requirements of the economy is consumption" (p.7).

Is Education a Good Investment?

It is well established that workers with more education tend to earn higher wages. However, an individual deciding whether to go to college would naturally ask, "will I increase my monetary and psychic income enough to justify the costs of going to college?" further, government policy makers trying to decide whether to improve educational programs or subsidize increased enrollments must ask, "will the benefits of improved productivity outweigh the costs?" (Ehrenberg and Smith, 2000)

There are two methods of assessing the returns to an investment. The present value method involves choosing a discount rate and then summing the present value of expected future benefits so that the total returns can be compared to investment costs. If the present value of returns exceeds such costs, the investment can be considered worth-while. The internal rate of return method calculates the discount rate that equates the present value of benefits with the investment cost. If the future returns from a particular investment decision are so large that the discount rate required to

equate benefits and costs exceeds the rate of return an individual insists upon before investing, then the decision will be considered worthwhile.

Is education a Good Investment for Individuals?

Individuals about to make an investment in a college education are typically committing themselves to costs of at least $18,000 per year. Is there evidence that this investment pays off for the typical students (Ehrenberg and Smith, 2000)? Several studies have tried to answer this question by calculating the internal rates of return to educational investments. While the methods and data used vary, these studies normally estimate benefits by calculating earnings differentials at each age from age/earnings profiles. Earnings are usually used to measure benefits because higher wages and more stable jobs are both payoffs to more education. It should be stressed that all such studies have analyzed only the monetary, not the psychic, costs of and returns on educational investments.

The rates of return to education typically estimated for the average American worker fall into the range of 5-12 percent (after adjusting for inflation), although they may vary across individuals with such factors as parental background, school quality, and even the level of education. These findings are interesting because most other investments generate returns in the same range. Thus, it appears, at least at first glance, that an investment in education is about as good as an investment in stocks, bonds, or real estate. This conclusion must be qualified, however, by recognizing that there are potential biases in the estimated rates of return to education. These biases, which are of unknown size, work in opposite directions (Ehrenberg and Smith, 2000).

Is education a Good Social Investment?

The issues of education as a social investment have been of hightened interest in the United States during the past decade especially because of three related developments. First, product markets have become more global, increasing the elasticity of both product and labor demand. As a result, American workers are now facing more competition from workers in other countries. Second, the growing availability of high technology capital, especially the desktop computer, has created new products and production systems that require workers to have greater cognitive skills and to be adaptable, efficient learners. Indeed, a recent study has indicated that the returns to a worker's having greater quantitative skills especially the skills taught in the united states prior to high school have risen in recent years (Ehrenberg and Smith, 2000).

Third, American elementary and secondary school students have scored poorly relative to students elsewhere in language proficiency, scientific knowledge, and (especially) mathematical skills. The American score lies below that in every other country. The combination of these three developments has caused concern about the productivity of America's future workforce, relative to workers else where, and to a series of questions about American educational system: Are we devoting enough resources to educating our current and future workforce? Should the resources we devote to education be reallocated in some way? Should we demand more of students in elementary and secondary schools?

According to Ehrenberg and Smith (2000), the United States devotes at least as many resources to elementary and secondary education as do other developed countries. In terms of dollars per student, the United States ranks first among the five countries, and in terms of the percentages of the population completing secondary school, it ranks in the middle. Moreover, the percentage of

the population completing college is higher than in every comparison country, and more or less doubles that of the European countries shown. Thus, with almost seven percent of its gross domestic product devoted to the direct costs of formal education (elementary, secondary, and college), and with forgone earnings (especially of college students) adding another 3 or 4 percent, the United States devotes a substantial fraction of its available resources to formal schooling. Whether this huge social investment pays off, and whether its returns can be enhanced, are important questions. In beginning to answer them, we must try to understand how education and productivity are related.

The view that increased educational investments increase worker productivity is natural outgrowth of the observation that such investment enhances the earnings of individuals who undertake them. However, this view that the educational investment is what causes productivity to rise is not the only possible interpretation for the positive relationship between earnings and schooling. Another interpretation is that the educational system provides society with a screening device that sorts people by their (predetermined) ability. This alternative view, in its extreme form, sees the educational system as a means of finding out who is productive, not of enhancing worker productivity (Ehrenberg and Smith, 2000).

Role of Formal Education for Economic Development

What role does education play in economic development? Based on the human capital theory, this section investigates the extent to which each level of formal education influences worker's productivity, earnings and national economic development. Most empirical studies indicate that primary education contributes more strongly to economic development compared to higher levels of education. This

section argues some possible explanations for this tendency and investigates the positive role of education in the process of economic development.

Role of Primary Education

Primary education provides the basis for human capital and the social foundation for efficient and equitable societies, without which economic development cannot be sustained. Yet many children never attend primary school or drop out early. The reasons for this are many, and they are often related to poverty (ADB, 1998).

The role of primary education is to produce literate and numerate populations that can deal with problems at home and at work. First of all, many developing countries are linguistically and culturally diverse, with more than two languages spoken by the population. For instance, in Nepal, more than 90 languages and dialect were spoken when the official language was chosen and even today only 48.61 percent of the people use the national language in daily conversations at home. In this circumstance, learning of the official language is extremely important to gain access to formal economy, in particular, literacy is necessary to keep records and acquire new knowledge at work.

The value of primary education for national development is well known. Across the world, rates of return on investments by level of education are highest for primary schooling, often exceeding 25 percent. In developing countries, these rates are higher than elsewhere because of the large difference in value between having no education and completing primary schooling.

The ability to read and write provides the individual with a huge advantage in countries where most remain illiterate. Whole new worlds open up to educated children leading to improved life-ling benefits to social welfare, including a longer,

more productive life, greater means to take advantage of economic growth through migration, greater opportunity for further education and training, better information for decision making leading to behavioral change with respect to health, nutrition, environment technology, and modern living.

As more and more children enter schools, education helps identify and screen future academic talent, and most students benefit from improved social skills, including self-esteem and the ability to work with others. The education of girls is especially relevant to the economy of the family and the nation. Because the benefits are so broad and pervasive, educational development is important everywhere.

Once nations realize that educating children pays big dividends and is important for sustainable national development, education becomes too important to leave to chance. Means are found to help children enter school, and once in school, to complete each grade without repeating or dropping out. Awareness campaigns to alert parents to the value of schooling are provided along with adequate funds for facilities to accommodate full enrollments. Finally, the cost of education by grade must be calculated and compared with what children learn to justify the expense of academic skills learned by the time the student completes primary school.

According to Ogawa (1999), basic numeric skills are also necessary because they enable the people to participate in economic activities, such as helping workers to make better judgments and plans. Lockheed, Jamison, and Lau (1980) studied education and agricultural productivity by measuring crop production and found that a farmer who completed four years of elementary education had, on average, a 8.7 percent higher productivity compared to another who did not have education. Moreover, Jamison and Moock (1982) also concur that more educated farmers have higher levels of profiles are able to use chemical fertilizers. In addition, Jamison and

Lau (1982) reported that compared to a farmer with no education, a farmer who has four years of primary education is able to improve seeds, irrigation, and fertilizers and in turn increase crop yields (productivity).

As descried by Morris and Sweeting (1995), not only does primary education provide a basic level of literacy, numeracy, and social cohesion in the early stage of industrialization, but also high levels of basic education and literacy are also necessary for economic take-off. In East Asia, the qualitative improvement of primary education and both qualitative and quantitative expansion of secondary education supported its economic transformation from low technology and labor-intensive production to more technologically sophisticated and higher-value technology production. Moreover, they also maintain that the first priority of human capital development in East Asia was given to primary education, then later to secondary education, and most recently to tertiary education in response to economic changes. World Bank (1993) also support this argument by mentioning that East Asian educational policies that had payoffs both for economic efficiency and equity.

In addition, the unit cost of primary education (cost to educate one student) is much lower than secondary and higher education, although its economic returns are seen as high from both the social and individual's point of view. Psachalopoulos (1994) posits that the rates of return to primary education are the largest followed by secondary and higher education in developing countries. In addition, World Bank's researchers have explained that in many low-and middle -income countries, the education policies have failed because they have stressed public expenditures for university education. According to Ogawa (1999), both Ghana and Malaysia became independent in 1959 from Great Britain. Since then, Ghana has prioritized higher education by spending most of her education expenditure on it. On the other hand,

Malaysia has heavily invested in basic education and as a result, today it has not only accomplished both universal primary education and high literacy rates, but it is also categorized as a newly expanding Asian economy. On the other hand, the literacy rate in Ghana is still relatively low and Ghana still retains the status of a low-income country.

Role of Secondary Education

Investment in education is beneficial in a multiplicity of ways, both for individuals and for society as a whole. Secondary education has been shown to contribute to individual earnings and economic growth. It is associates with improved health, equity, and social conditions. It buttresses democratic institutions and civic engagement. And the quality of secondary education affects the levels above and below it primary and tertiary education (World Bank, 2005).

Compared to primary and tertiary education, secondary education has been under researched from the economic point of view; however, it plays a critical role in the country's economic development by providing both academic and vocational skills to the people Ogawa (1999). Moreover, Ogawa (1999) described that from the cost-benefit point of view, the rates of return are the second largest following primary education from a global perspective. In low income countries, the private rate of return to secondary education is 18.7 percent and the social rate is 13.4 percent. The returns to general education are higher than vocational education from both the social and private points of view because the unit cost of vocational education is much higher (Psachalopoulos, 1994).

A case for expanding secondary education can also be made on the grounds of economic growth, even where the rate of return to secondary education is low in

comparison with that to tertiary education (as is the case in many Latin American countries; see de Ferranti et.al. 2003) and where expansion of secondary education might have a smaller short-term effect than would expansion of the coverage of the university system. Historically, the countries that have experienced the most rapid and sustainable increases in educational attainment, as well as outstanding economic performance, have pursued balanced upgrading of the primary, secondary, and tertiary levels of education.

Goldin (1999) demonstrates the importance of the extension of secondary schools in the United States between 1910 and 1940- a transformation that gave the United States a half – century lead over European countries. De Ferranti et.al. (2003) stress the importance of balanced upgrading of an education system after analyzing the examples of Korea, Singapore, Taiwan (China), and other East Asian "tiger", which make a stark contrast with the "unbalanced" transitions observed in many Latin American countries.

Investing in secondary education can have a direct impact on the effort to reach Millennium Development Goal 2 – achieving universal primary education. Increasing the provision and coverage of secondary education can boost completion rates in primary education. If a student has a realistic opportunity to continue with studies in (lower) secondary school, this can increase motivation (and the family's perceived incentives) for graduation from primary school. An analysis of global education trends by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) shows that developing countries need "some critical mass of secondary participation" (UNESCO 2004b, 9) in order to meet the goal of universal primary education. Clemens (2004, 19) observes that "no country today has achieved

over 90% primary net enrollment with-out having at least roughly 35% secondary net enrollment."

In Ghana, Lavy (1996) found that improving access to secondary education facilities not only improved enrollment at the secondary level but also served as an incentive for primary school completion. If transition rates from primary to secondary education fall, it is likely that primary completion will decline as well and that dropout rates in the final years of primary education might not be easily reduced. In addition, gender equality cannot be achieved without expanded and balanced access to secondary education.

Education for All (EFA) policies tend to position lower secondary education within the realm of basic (and compulsory) education. Lower secondary education is therefore, being increasingly identified with primary or basic education, and the emphasis is more on a general than on a specialized curriculum. For example, in many African countries junior (that is, lower) secondary education is now being incorporated as the last stage of basic education, which many governments are defining, when possible, as free and compulsory (Bregman and Bryner 2003). Curriculum, teacher training and recruitment, and even school organizational arrangements are increasingly converging at the primary and lower secondary levels. In addition to appropriate basic (and compulsory) education policies, the achievement of the MDGs and of the EFA goals set in the Dakar Framework for Action in 2000 call for a systematic policy for postbasic or postcompulsory education in developing countries.

Role of Tertiary Education

Is investing in higher education as important as investing in basic education in developing countries? To what extent has higher education contributed to the economic development in Nepal? Over the past two decades, high technology sectors have become the key factor in process of economic development. As a result, today's industry needs a larger supply of well-educated people than in the past. According to Castells (1994), high technology sectors, particularly information technologies (informatics, microelectronics, and telecommunication), became the fundamental factor in the process of developing over the past two decades. Therefore, the countries able to produce such technologies continue to enjoy a growing share of world markets.

In Nepal, the share of the industrial sector, particularly manufacturing to the total GDP has doubled between 1995 and 2003 and foreign investment has also increased since the 1990s. In this circumstance, to what extent should tertiary education be prioritized in a lower income country such as Nepal?

Studies of cross-national empirical analyses, such as those by Barro and Lee (1993), indicated that higher levels of education promote a more rapid economic growth in both low-as well as middle-income countries. Levin (1987) also mentioned that in a technologically dynamic environment, a more educated workforce is apt to do more work and produce work of higher quality than its less educated counterpart. He also asserts that the more educated a person is, the greater his or her ability to reason, communicate solve problems, and undertake other aspects of more complex jobs.

In addition, according to the World Bank (1994), the role of specialized institutions in higher education is to bear the main responsibility for equipping individuals with the advanced knowledge and skills required for positions responsibility in government, business, and the professions. Particularly, they produce new knowledge through research, serve as conduits for the transfer, adaptation, and dissemination of knowledge generate elsewhere in the world, and support government and business with advice and consulting services. Altbach (1989) also mentions that because industry today has become more sophisticated and needs a larger supply of well-educated personnel; universities have become the key source of training for technologically skilled manpower and have a key role in science research. According to Carnoy (1994),

> "……. higher education plays a crucial role in technology transfer and development at two levels: a) it has the capability to develop the production and management skills required to utilize and organize the new technology; therefore … Higher education is important to the technology transfer process in those industries that use the produces the site that can combine the basic research needed for the advance of such industries with the training of researchers and suppliers of research for industry" (as cited in Ogawa, 1999, p. 51).

However, Altbach (1989) pointed out that academic institutions have disadvantages from the viewpoint of applied R and D. Academic institutions are often more interested in basic science and in the issues that have more theoretical relevance to the international scientific community than to applied concerns that are directly relevant to industrial developing countries, since simply making the university research – oriented does not fulfill the conditions required for technological development or even for professionalizing science as an activity. On the other hand, both Carnoy (1994) and Altbach (1989) emphasized the importance of linkage among higher education institutions, the government, and research oriented-industries.

Research-based higher education institutions, the government, and research oriented-industries. Research-based higher education should develop close connections with research-oriented industries that are closely linked to the government to employ the products of scientific training and employ a significant number of university graduates in research-based activities (Ogawa, 1999).

Related Research in Nepal

Nepal has been almost absent from the rich literature on the relationship of education and earnings. Psacharopulos' (1994) update included Nepal and the only source cited is the USAID (19 88) project. Parajuli (1998) mentioned that he could not track the paper even when the reviewer was approached. The figures given are for secondary level and higher level educational rates of return (15% and 21.7% respectively) and the study is said to have used the elaborate method for rates of return estimation. These two are for the year 1982; coverage and sample are not given. On the other hand, there are some studies on Nepal regarding the relationship between farmer education and productivity. Jamison and Moock (World Development, 1984) analyzed a survey data from 683 rural households in 2 of Nepal's 75 districts. They claim that, controlling for ability and family background, the significant effect of education on farmer efficiency and productivity is only found is wheat production. Other studies by Sharma (1974) and Pudhassaini (1978, 1982) for rice and maize production. They use data from a small number of rural households in two different districts; one is the hilly region and one in the southern plains. The results show that education does have a significant positive effect on productivity but this is true only when a farmer has at least 5 years of education (there is minimum level for effects to show up). However, non-farm productivity studies are absent.

Pandey (1978) analyzed cross section urban earnings and cost data for Kathmandu City of 291 wage earners.

So, the present attempts at covering all these three areas (wage-sector rates of return, farm productivity and non-farm productivity) will extend and fill several gaps in the literature on Nepal. The richness of published data (national coverage and larger sample size, LSMS World Bank survey methodology, recent measurements, greater choice for additional variables) will allows researcher to come up with more representative estimates of present linkages between education and individual household incomes.

Pandey (1978) conducted the study to through some light on the investment in higher education in Nepal. The study is based on cross-section urban earnings and cost data for Kathmandu city collected in a survey conducted personally in two phases in 1974-75. From the total number of 5816 educated employed persons, sample of 291 wage earners was taken. The sample was stratified random sampling with sampling fraction (the fraction being 5%). All the respondents were approached through a well developed questionnaire which included various questions that were imperative for the study. Data on the earnings structure of matriculates were collected from the various official establishments.

The study covered the following types and levels of higher education in Kathmandu city for the rates of return calculation.

1. General undergraduates over matriculates; 2. Professional graduates over matriculates; 3 General graduates over matriculates (Professional higher education over secondary education); 4. Professional graduates over matriculates (Professional higher education over secondary education); 5.

General graduates over General undergraduates; 6. Professional graduates over General undergraduates; and 7. General post-graduates over general graduates.

Both private and social rates of return are calculated under adjusted and unadjusted categories. In order to construct adjusted age-earnings profiles, earnings are standardized by adjusting other socio economic variables with the method of multiple regression analysis. For this purpose, five independent variables are taken into consideration to isolate the effect of education on earnings.

All the rates of return are calculated by arranging the costs and earnings differentials by solving the polynomial with iterative procedure. The common equation to be solved in this respect is- $\sum E_t - C_t / (1+r)_t = 0$

Parajululi (1995) estimated that poorest 40% group receives 6% return, the middle groups receive 10% return, and the richest 20% groups receive 13% return. It is expected that high-income groups have higher return.

Parajuli (1995) estimated the returns to years of schooling and education in Nepal from farm household and non-farm household incomes. The return for farm household is 5.4% where as the return for non-farm household is 10.5% in Nepal

Parajuli (1995) conducted a study in order to present detailed evidence though the analysis of the Nepal Living Standards Survey (1995). The Nepal Living Standards Survey covered almost 3400 households and provided income data on 3562 persons. The relationship between education and income was made apparent through that survey by an earning function estimate of a 13.1 percent return to an individual for every additional year of schooling. Rates of return were estimated to be 11.6, 10.0 and 21.8 percent for primary, secondary and tertiary education respectively.

Parajuli (1995) estimated the rate of return to education by wage-sector, across economic sectors, gender differences, regional differences, across income quintiles, across educational level, household incomes in agricultural and non-agricultural enterprises in Nepal. More over, Parajuli (1995) conducted a study to estimate social rate of return from wage earning by males, females and quintile groups.

These results suggest that education is a profitable investment both from private and social perspective. High private rates of returns call for increased educational investments from private sector. However, imperfect capital markets (inability of disadvantaged population groups to borrow against future income) make it necessary for government intervention. Therefore, fiscal policies should expand educational opportunities, with considerations to relative profitability at different levels and in different regions. Equity, not only efficiency, is an important dimension to consider. School quality, not only quantity, might be a driving factor for the results we see from this analysis.

The labour force study (NLFS, 1999) affords a more recent assessment of the impact of formal schooling on income levels. The NLFS covered more than 14,000 households with data collection undertaken over a 12 month period to reflect seasonal variations in activity. It is a more reliable and useful source of data on education earnings functions. The NLFS shows that approximately 80% of Nepalese workers are within the agricultural sector and only about 20% of the total labour force is in the wage sector. A recent analysis of the external efficiency of the Nepalese education system has identified earnings differentials across occupational categories and education levels utilizing the NLFS database (World Bank, Dilip Parajuli, unpublished, 2000). It gives an all Nepal average monthly salary of Rs. 1,612 for a person without completed primary education compared to nearly Rs. 2,500 Rs. 3,000

and Rs. 4,900 for those who have completed primary, secondary and tertiary schooling respectively.

When the standard rate of return analysis is applied to NLFS 1999 data to estimate private returns, it revealed that each additional year of schooling yields an average private return of 9.7%. Disaggregating rate of return analysis to examine the returns of the primary sector gives a more accurate picture of the economic benefits that can accrue from primary schooling. Rate of return estimates for the sample population with a primary level of education or below (sample size approximately 3,500) has given an all Nepal average annual private return of 11.3% for every additional year of primary schooling. Annualized private rates of return in rural areas drop to 9.5% and then 9.1% for those employed in the agricultural sector for every additional year of primary schooling.

Related Research in other Countries

The only study on the returns to education in Turkey is that by Krueger (1971). Her earnings data were based on two surveys made in 1968: one by the Turkish Association of Metal Manufacturers which covered more than 100 firms in four urban areas; and the second by the American military mission in Turkey which was carried out in order to ensure that the remuneration of Americans was competitive with that in Turkish establishments. It covered 42 industrial companies employing 8,300 white-collar and 12,000 blue collar workers.

The social rate of return to higher education was found to be equal to 8.5 percent, while the corresponding private rate was equal to 26 percent. The private rates for secondary general and secondary technical were approximately of the same order of magnitude as the latter figure (24 and 22 percent respectively).

The study of the returns to education in Israel is from Klinov-Malul (1966) who estimated present values for different educational levels. The study was based on a family-savings survey of 3,000 urban families in 1957-8. Since the earnings refer to household heads, the profitability estimates are virtually for males only. We have estimated rates of return to investment in three educational levels in Israel on the basis of the data on earnings and costs reported in this study. The social rates of return were found to be 16.5 percent for primary, 6.9 percent for secondary and 6.6 percent for university. The corresponding private rates were 27 percent, 6.9 percent and 8 percent respectively.

Several studies exist which calculate the profitability of investment in education in India. The first one is by Harberger (1965) who used a sample survey covering the earnings of about 5,800 male workers in Hyderabad in 1956. as these earnings data were not classified by age he had to use certain assumptions about the distribution of the average earnings over the working lifetime. The social rates based on the assumption that the direct costs of education are equal to 50 percent of the foregone earnings, were 10 percent for secondary education and 16.3 percent for higher education. Harberger then compared these returns with those earned on physical capital investments. In another study (Nalla Gounden, 1967) data were derived from an urban income survey of about 5,000 males in 1960-1 by the National Council of Applied Research and from the monthly pay of about 4,000 engineers, as reported by the Council of Scientific and Industrial Research. In estimating the rates of return, an α coefficient of 0.5 was assumed. The social rate of return for primary education was equal to 16.8 percent; middle yielded an 11.8 percent rate; matriculation 10.2 percent; a bachelor's degree 7 percent, and an engineering degree

9.8 percent. Selowsky (1967) recalculated the rates of return for India based on Nalla Gounden's data, but without using the assumption of α =0.5.

Nalla Gounden also refers to a study of the returns to education in India by kothari (1967). The earnings data for this study refer to Bombay only and the social rates of return were 20 percent for high school. This study also produced a social rate for arts and science graduates of 13 percent and a rate for engineering equal to 25 percent.

Finally, Blaug et.al. (1969) estimated rates of return to investment in education in India, in their attempt to diagnose the origins of graduate unemployment in this country. The earnings data for this study were the same as the ones used by Nalla Grounded plus a sample of 20,000 employees in various factories. Adjustments were made for unemployment, wastage, income growth taxes and other factors influencing earnings. The private rates of return adjusted for wastage, unemployment, other factors (α =0.65) and growth (2 percent per year) were found to be 18.7 percent for primary, 10.4 percent for a first degree (over matriculation) and 15.5 percent for an engineering degree. The corresponding social rates were 15.2 percent, 8.9 percent and 12.5 percent, respectively. The methodological interest of this study lies in the fact that graduate unemployment is explained by the authors not in terms of "Structural imbalance" but by the persistence of an advantageous private rate of return over time.

Hoerr, of the Harvard development advisory service, has calculated the returns to education in Malaysia (Hoerr, 1970). Using a social-economic sample of 30,000 households in 1967-8 he estimated social private rates of return for six levels of education. Adjustments to the earnings data included an α coefficient of 0.60, labour-force participation rates and unemployment. The social returns were 8.2 percent primary, 12.8 to 15.6 percent secondary and 5.8 percent university, and the

co\responding private returns were 12.9 percent, 15.6 to 21.1 percent and 11.4 percent.

Clark and Fong's (1970) main data source in estimating the returns to education in Singapore was the sample Household survey of 1966. This survey provided earnings data for full-time employees by sex and education. Gross incremental lifetime income streams were adjusted for unemployment and labor-force participation. Private rates of return also contain a tax adjustment. Clark and Fong have computed both present values and rates of return separately for men mind women. The rates for men and women are not very different, except for the primary level (men 9.4 percent, women 3.8 percent). The overall social rates of return are 6.6 percent for the primary level, 17.6 percent for the secondary and 14.6 percent for the higher. The private rate for the secondary level is 20 percent and for the higher level 25.4 percent.

The return to education in The Philippines were studied by Williamson and Devoretz (1967) and again reported in Devoretz (1969). The study was based on a sample household survey in Imus, Cavite. The earnings data refer to the head of the household and were adjusted for survival. No taxes were deducted in calculating the private rates of return. Profitability estimates were made for primary, intermediate, high school, vocational and college education. Social rates of return were computed only for public educational institutions. Primary education yielded a 7 percent social rate of return, high school yielded 21 percent and college education 11 percent. Private rate of return were estimated both for private and public institutions but the rates were not very different from the social rates above. Vocational education gave an 11 percent social and private rate of return.

There is a USAID study on the return to education in South Korea by Kim Kwang Suk (1968). The earnings data were based on a sample survey in the mining and manufacturing industries which covered 13 percent of total employment. The social rates of return were found to be 12 percent for middle school, 9 percent for high school and 5 percent for university.

Pasachropoulos (1969b) has estimated rates of return to investment in education in Hawaii based on the reports of the 1960 Census of the Population and starting salary offers to University of Hawaii graduates. The private rate of return for elementary schooling had, of course, an infinite value. High school yielded a private rate of 5.1 percent and college 11 percent. The social rates of return for the three levels were 24.1 percent, 4.4 percent and 9.2 percent, respectively. In 1965 the private return to a master's degree was 6.7 percent and to a doctorate 12 percent.

There are tow studies of the returns to education in Nigeria. The fist by Bowles (1967b) refers to Northern Nigeria and the second by Hinchliffer (1969) to the Western Region.

Bowles used earnings data from a sample survey of employment in private firms in 1964 to estimate benefit-cost rations for different educational levels. His analysis showed that the most profitable level was primary education.

Hinchliffer (1971) estimated rates of return for the Western Region by using government pay scales for secondary modern, secondary grammar, and sixth form and university graduates. For the earnings of primary school graduates he used weighted earnings in wage farming, transport and the construction industry. Adjustments were made for the effects of unemployment and wastage.

The unadjusted social rates of return were 23 percent for primary education, 12.8 percent for secondary grammar and 17 percent for university over sixth form.

Hinchliffer has also estimated private rates of return to investment in education and these were 30 percent, 14 percent and 34 percent for the three respective levels.

The rate of return study for Ghana is also due to Hinchliffer (1971) and is based on government pay scales for secondary grammar, sixth from and university graduates. Middle-school leaver's earnings were obtained as a weighted average of earnings in wage farming, construction and the mining industry. Primary school leavers' earnings were obtained on the basis of average earnings of wage farming. Adjustments were made for the effects of unemployment and wastage.

The unadjusted social rates which refer to 1967 were 18 percent for primary, 13 percent for secondary grammar and 16.5 percent for university. Hinchliffe later estimated private rates of return for the above three levels and these were 24.5 percent, 17 percent and 37 percent, respectively. The private rates were calculated before adjustments for taxation and are therefore on the high side.

The study for Northern Rhodesia was made by Baldwin (1966) and was based on income data by level of education from the 1960 African demographic survey of urban areas. Baldwin calculated present values for different discount rates. Since these present values range from positive to negative numbers we have derived the approximate rates or return to each level by plotting them against the discount rates. The social rates of return, which refer only to primary education, range from 4.0 percent for the third year of primary to 22.5 percent for the completion of the sixth year of primary education.

World Bank (1999) conducted a study in Tanzania in order to estimate private rate of return to education in 1990/91 using earning functions theory. The study revealed that private rate of return are 3.6 % for primary school, 6.9% for secondary school, and 9% for university. Rates of return are significantly higher for women than

for men at all three levels of general education, but especially at the primary school level. Private rate of return increased sharply with education levels for men but are relatively flat for women.

Moreover, taking into account the costs incurred by the government, and continuing to exclude non-earnings benefits, lower-bound estimates for social rates of return are negligible for secondary education, and zero for vocational training and higher education. This is mainly due to high public expenditures per pupil in post primary education as a result of inefficient resource allocation. Thus, the economic cost of the public provision and financing of vocational training and higher education are as great as the net present value of economic benefits.

Ogawa (1999) conducted a study in Indonesia to estimate private rates of return to education by gender, ethnicity, regional geography, levels of education, and different types of school admission, employment, and occupation status. By analyzing the rates of return to education based on data taken from the household survey, this dissertation investigated the most rewarding level of education in a lower middle-income country in the early 1990s. This study found that the overall pattern of the rates of return analysis is that primary education is the most rewarding level of education compared to secondary and tertiary education in Indonesia. The rate of return to education (additional years of schooling) is higher in rural areas and lower-income provinces compared to urban areas and higher-income provinces of Indonesia and there is a negative correlation between years of schooling and its rate of return.

Psacharopolos (1994) contends that the rate of return to years of schooling is higher in countries that have lower education attainment and average income. This pattern can be explained by diminishing returns and demand and supply of education. For instance, in a society where the majority of population has lower education

attainment, demand for education is high; thus, the rate of return to education is higher. If the average level of schooling rises, projects and investments requiring highly skilled workers become less productive because of diminishing returns. Moreover, if the supply of schooling in high-income areas increases, educated agglomerates in urban areas likewise increases; thus; rates of return to years of education decline.

Psacharopoulos (1994) summarizes the rates of return investment in education from the global perspective and indicates that primary education is the largest contributor to economic development followed by secondary and higher education in lower income countries. From the social point of view, the rate of return to primary education is 18.2 percent, while the returns to secondary education and to higher education are 13.4 percent and 11.4 percent, respectively. From the private point of view, the returns are 29.9 percent in primary education, 18.7 percent in secondary education, and 18.9 percent in higher education. This tendency is found in many previous rates of return studies.

Furthermore, Psacharopoulos (1994) reported diminishing returns by levels of education and income. For instance, from the social point of view, the rate of return to primary education in low-income countries is 23.4 percent and the returns to secondary and higher education are 15.2 percent and 10.6 percent in low-income countries respectively. The returns also decline to 18.2 percent in low-middle countries and to 14.3 percent in upper-middle countries. The rate of return to primary education in high-income countries is not applicable because everybody graduates from primary schools. This finding should be applied to the regional/ecological/zonal levels of circumstances within a country. In general, educational attainments in lower income countries are lower.

According to Psacharopoulos's global survey, the rate of return to women's education is higher than that of men. The overall rate of return to women's education 12.4 percent compared to 11.1 percent of men's. The explanation of this finding is that the earnings for skilled women relative to unskilled women are higher than the equivalent ratio for men. Moreover, because education attainment for women is lower than for men in Nepal and demand for women's education is higher, the rate of return to women's education should be higher than men's.

Rates of return to education by gender are partly determined by the fact that women often experience discrimination in the labor market. If women suffer from greater discrimination in jobs which require no education, the rates of return to education for women will be higher than men's.

According to Coleman, Hoffer and Kilgore (1982) and Jimenez and Lockheed (1995), people who go to private schools do better in the labor market than those who go to public schools when private schools are more effective and provide better quality of education than public schools. In addition, students at private schools are from families with higher social backgrounds. Therefore, private school graduates will have greater opportunity to obtain highly paid jobs.

Ogawa (1999) investigated the rates of return to education by occupation in Indonesia. Rates of return to education will be higher in highly skilled occupations. Although this sounds tautological, the fact is that in developing countries where the governments provide a large share of employment and where labor markets do not always function in a perfect way, persons with high levels of schooling may end up in lower skilled jobs. Ph. Ds driving taxicabs is the most popular example, but it is much more widespread than this. The hypothesis is that for workers with greater education, who obtain highly paid skilled occupations, the rate of return to education would be

higher but if they obtain unskilled, low-paid occupations, the return would be lower. For instance, if university graduates obtained professional or technical jobs, the rates of return to education for university graduates would be higher. On the hand, if they become taxi drivers, their rate of return to education would be lower.

Earning differential between racial or ethnic groups exist in most societies. They persist over time in democratic political conditions. It is true that different groups are not getting either equal access to human capital investment opportunities or equal treatment in labor markets or both (Carnoy, 1995).

Psacharopoulos (1993) estimated the returns to investment in education by countries of the world. Ogawa (1999) estimated the returns to investment in education in Indonesia by rural/urban areas and provincial level. Carnoy (1995) explained changes in earnings differences over time. Psacharopoulos (1993) estimated change in the returns to investment in education over a 15-year period.

World Bank estimated the private and social rates of return to education in Tanzania. Because non-monetary benefits are excluded from this analysis, the results are lower - bound estimates of actual returns. These results should be interpreted with caution for several reasons. First, the number of observations, particularly at the university level, is few. Second, but to data limitations, this analysis is confined to formal sector workers who account for less than 10 percent of the overall workforce. This is likely to bias upwards the rates of return, especially at lower levels of education. Third, the rates of return may also be biased because over 65 percent of the sample analyzed is employed in the public sector where pay scales are set administratively and may have little relationship to productivity. However, the general trends in this rate of return analysis are similar to those found for other countries.

Private rates of return to education in 1990/91 have been computed by estimating an earnings function that controls for human capital characteristics (education and training) along with individual, regional, and labor market characteristics (Dar and Levine, 1996).

On average, private rates of return are 3.6 percent for primary school, 6.9 percent for secondary school, and 9.0 percent for University. Rates of return are significantly higher for women than for men at all three levels of general education, but especially at the primary school level. Private rates of return increase sharply with education levels for men but are relatively flat for women

The private rates of return to education estimated for 1990/91 are lower than those reported by Psacharopoulos (1994) for seven sub-Saharan African countries (including Tanzania) in the 1970s and 1980s. Returns for these countries ranged from 8 percent in Ethiopia to 20 percent in Cote d' Lvoire. Pascharopoulos reports that the average return to education in Tanzania was 11.9 percnet in 1980 (Mason and Khandker, 1997). This return is slightly higher than the rates estimated above for formal education for women, and significantly above those rates for men.

There has been a long - standing debate about the contribution of educational investment to economic growth and income. As indicated by Lewin (1993), there is no single answer to the question "how much does education contribute to economic growth?" and even less to the question "how much does education contribute to development? The relationship between educational investment and economic growth is complicated by many intervening variables, which interact indifferent ways in different economies as different points of time. And, of course the definitions of characteristics of development are not stable either. But, does not mean that in either case we cannot draw inferences from the large volume of studies undertaken

(Subbarao, 1997, Foster, 1987, Lewin, 1993 etc). Rather, we have to recognize that what may be true under certain circumstances may not be true under others and the role education plays in supporting growth and development is one which is constantly evolving.

Subbarao (1997) points out that the most important lesson one can learn from his cross country and time series data is that growth is critical in the fight against poverty in every single region of the world. Economic growth requires skilled and educated workers. He also mentions that increasing the human capital of the poor is another key strategy to reduce poverty.

Recent research has shown that education has a powerful effect on increasing income to reduce poverty. Much economic literature focuses on measurable returns to educational investment to the individual and to society as a whole. Historical and sociological perspectives emphasize more the interactive relationship between educational development and economic change. The significance of increase schooling, as an instrument of economic development may be highly variable over time. Thus, as pointed out by Foster (1987), expansion may have substantial pay offs at some stages and not at others.

Some types of educational provision at different levels, of different orientations and of different qualities may have much grater effects than others. The early studies of Denison (1962, 1967, 1979). Harbison and Myers (1964), Schultz (1961) and Becker (1964) as cited by Lewin (1993) approached the problem of how much education contributes to economic growth by attributing a proportion of economic growth not explained by increases in capital, labour and productive land to improvements arising from increased educational levels in the labour force.

This produced results suggesting that 23 percent of United States economic growth was a result of educational investment between 1930 and 1960, 15 percent for the period from 1950 to 1962 and 11 percent for 1948 to 1973. This kind of analysis provides estimates of both the direct contribution of education and the indirect benefits that arise from advances in knowledge. When a similar analysis was conducted with other developed and developing countries, the result varied widely from 2 percent to 25 percent in a group of developed countries and from 1 percent to 16 percent in a group of developing countries (Psacharoppoulos and Woodhall, 1985). Bowman (1980) suggested that in over 22 countries where estimates could be made for the period of 1950-62 education made a direct contribution to economic growth of more than 10 percent in only four countries. This suggests that analysis to find out the contribution of education to economic growth is important in order to understand educational role in poverty reduction.

Harbison and Myers approach (1964) was to develop indicators of human capital and compare these with indicators of economic development. Predictably choosing different indicators produces different results, but the overall correlation between greater human capital and grater levels of economic development is robust.

Schults (1961) and Becker (1964) used an approach based on the rate of return to human capital. In their study they assumed that an individual invests in education. Returns are both private (to society in the form of grater productivity). Rates of return studies in developing countries have generally shown that return at the primary level are greater than at higher levels; private rates exceeds social rates; social rates of return are higher in poorer countries (Psacharopoulos 1981, 1985).

Wood (1994) has clearly demonstrated that the mass provision of good quality primary and secondary education are essential if countries are to compete successfully

in a rapidly globalizing world economy and more generally attain high sustainable rates of economic growth.

Hicks (1980) have compared literacy level (a proxy for educational level) with historic rates of economic growth in 83 countries. He concluded that the twelve developing countries with the fastest growth rates also had levels of literacy above the average (68% compared with 38% in 1960). These countries have higher income levels and since income is correlated to levels of literacy, this result might have been expected. However, when income level is controlled, the literacy rates were still 12 percent greater in the fastest growing countries suggesting that faster growth rates were coincident with more developed human resources.

Wheeler's study (1980) on economic growth and human resources in 88 countries takes into account interactions between economic growth and investment in human resources over time and gives some insight into the direction of causality. His findings imply that literacy does have a strong effect on output levels and that greater literacy influences fertility downwards. This study suggested that increases in average literacy rate from 20-30 percent are associated with increases in GDP from 8-16 percent with the strongest relationship in African countries. Marries (1982) used data from 66 counties to argue that the cost - benefit ratio on educational investment in human resources (based on primary enrolment rate) ranged between 3.4 to 7.4 compared to a ratio of 0.4 to 1.0 for investment in other types of capital. He also suggested that general investment has less effect on growth rates when it is not accompanied by educational investment. Pasacharopoulos and Woodhall (1985) also found that investment in human capital has higher rates of return than that in physical capital in many developing countries.

The above reviewed literature clearly demonstrates that investment in education is a prerequisite for economic development, and that continuing investment in quality of education at all levels together with development of appropriate skills for the workforce is a prerequisite for continued economic growth.

Continuing and non-formal adult education programs allow individuals to pursue both professional and personal development over a lifetime (ADB, 2002). The provision of a better education in rural areas such as primary education, literacy and basic skill training can substantially enhance economic growth of the communities (Edwards, 2002).

Even though several studies have established the role of education in economic growth and income, these studies have not provided a single answer to conclude on the relationship between education and economic growth. First there is no single answer to the question and there are many answers depending on circumstances, developmental status and the specification of variables. The direct policy implication of macro level research is limited. They are constrained by dependence on the historical relationship which may or may not persist, and the level of aggregation is often so high that different variables are treated similarly and the application of findings is analytically different. As some studies suggest a negative relationship, it would be optimistic to suggest that the widespread faith in education as a component of economic growth was an aberration that could persist for so long if it did not contain elements of truth no matter how difficult these are to demonstrate. The above literature review also found many methodological differences in the analysis of relationship between education and economic development. The differences are extensively debated in the literature (Psacharopoulos et. al. 1983 and Little 1984).

The contribution of education to household income through increased agricultural productivity has been widely studied. Agricultural productivity does seem to have a positive relationship to the education of farmers. Lockheed, Jamison and Lau (1980a) concluded that four years of primary education increased productivity by 8.7 percent with a standard deviation of 9 percent. This study indicated that education increased agricultural productivity by 9.5 percent in modern systems of agriculture and 1.3 percent only in traditional ways of farming.

The level of primary education plays an important role in farm business analysis. In a study conducted by Jamison and Lau (1982) in Korea, Malasyia and Thailand, it was found that four years of primary schooling was associated with a nine percent increase in farm production and that the rate of return to investment in education in these countries ranged from 7 to 40 percent. Educational background of rural people not only helps in farm business analysis, but also provides enough opportunities to enable many people to leave agriculture (Stevens and Jabara, 1988 p. 312) there by reducing the population pressure on land.

One of the popular methods of nonformula adult education is the agricultural extension activity. In this method emphasis is on imparting practical skills in community related projects that are flexibly structured, learner-centred, and self-governing (Grand staff, 1979). Though the return to agriculture extension is difficult to segregate as there are numerous exogenous variables involved experts have estimate a 15-20 percent return to agricultural extension. As in many developing nations, agricultural extension has been emphasized in Nepal. However, the pace of agriculture development is very slow (around 3 percent growth per annum). A study conducted in Haryana and Utter Pradesh, India (Feder and Slade, 1984) has shown that higher literacy level can reduce the knowledge gaps between different groups of

information receivers. It ultimately contributes in the development and use of common extension methods at lower cost.

Similarly, a study conducted by Carony (1992) concluded that education affects the productivity of small landholders and subsistence farmers immediately and positively. A farmer with four years of elementary education is on the average 8.7 times more productive than a farmer with no education. Moreover, farmers with more education get much higher gains in income from the use of new technologies and adjust more rapidly to technological changes. The provision of more and better educational services in rural areas can substantially improve productivity and livelihood (Gasperini, 2001).

In order to ensure increased productivity as per advancing research, there is a need to provide a continuous supply of updated farm information. Supply of such information helps in modernizing agriculture (Arnon 1989 p. 692). This process requires three functions to be performed: the integrative function - fitting new technologies into on farm situations; the innovative function provided by agricultural research; and the dissemination function (farmer education) provided by the extension service (Lion Berger and change, 1981). Farmer's education is related not only with increasing productivity, but also with the sustainability of development. Not only in developing agriculture, in developed agriculture as well, farmer's education is important to influence their behaviour against overproduction, environmental pollution, erosion and destruction of habitats and landscapes (Roling, 1987).

Schooling counts where technically superior factors of production are a principal source of agricultural growth. This proposition also implies that this source of growth is no longer restricted to the adoption of only a simple new factor, but requires the successful adoption of a complexity of agricultural factors (Kellong,

1980). In fact, the adoption process is a long, continuous one. In the process schooling of farm people plays an important role. For example, the modernization of Danish agriculture is a classic demonstration of the fact that new farm skills and new knowledge about agriculture can be a major source of agricultural growth (Youngson, 1959). The rapid growth of agriculture in Israel during the 1950s, especially in dairy and poultry, required high level of skill and knowledge (Gaathon, 1961). To see the favourable effect of schooling of farm people upon agricultural growth under Asian conditions, the success of Japan is commendable. Despite the severe limitations imposed by small area of land that is suited for farming the increases in agricultural production, including increases in labour productivity, have been remarkable. A high level of skill has been achieved in using new knowledge and modern material inputs not only in double cropping but in growing in some areas even three crops a year, and at the same time, increasing yields of each crop and producing more per farm worker (Schultz, 1964).

A provocative study by Minat and Tan (1988) suggests that project related training (PRT) yields high rates or return in both agricultural and non-agricultural development. This study is based on 115 World Bank projects taking the projects resources, rather than direct measures of earnings, as a criterion. High returns were concentrated heavily in countries where general an educational base is well established. Where illiteracy rates are high and educational participation rate are low, PRT does not appear to be an effective investment. This may arise both because individuals with low levels of formal education are handicapped in absorbing training inputs and because countries where educational infrastructure is weak may also be those where management capacity is least developed and organizational capabilities are most limited. In countries where at least half of the population is literate, rates of

return on PRT are more strongly positive in agricultural projects than in non-agricultural projects.

Studies of productivity in urban areas and in industry are much more common in developed countries. Much of the literature has addressed the debate between human capital proponents (who argue that education increases productivity by higher earnings) and screening theorists (who attribute the higher earnings of the more educated to factors other than the cognitive changes which are associated with studying to higher educational levels). The evidence does not favour one or the other view (Winkler, 1987 p. 287). Part of the reason lies in the difficulty of measuring the dependent variable productivity.

If simple output measures are not available e.g. piece work production under standardized conditions, comparison is difficult between workers with different educational levels. Comparison of jobs with different characteristics is problematic the relative productivity of lawyers and plumbers cannot simply be assumed to be reflected in their earnings for a long list of reasons. Hence synthesis of the evidence on urban and industrial productivity and education are not very meaningful.

There are certainly studies which show positive effects on productivity of education amongst urban workers in developing countries (Fuller 1970, Berry 1980). Equally there are those that question the strength and nature of such relationship and which show how widely such correlations can vary across different types of jobs from strongly positive to strongly negative (Little, 1984). There is evidence the employers often conceive of the problem in terms of minimum level of education suitable for different types of employment above which other factors may become more important in the selection of employees (Oxenham, 1984).

From the above review of the relationship between education and economic growth, it is clear that educated people have higher income earning potential and are better able to improve the quality of their lives. Persons with at least, a basic education are more likely to avail of a range of social services and to participate more actively in local and national government through voting and community involvement. They are less likely to be marginalized within the larger society. Education can thus be considered to be empowering. That is, it helps them to become more proactive gives them more control over their lives, and widens their range of choices. In fact, the "opposite of marginalization is empowerment, and education is one of the keys to empowerment, both for individuals and groups" (UNESCO, 1997). The combination of increased warning ability, political and social empowerment, and enhanced capacity to participate in community activities is a powerful instrument in increasing income in order to break the poverty cycle.

As has been reviewed above, educated people have higher potential income earning; however, are there other variables, which affect the impact of education on income? It will be an addition to the body of knowledge to have information on how education increases individual capacity to earn more. Is the relationship between education and income direct or interrelated with other variables like farm size, family health status, etc?

Concluding Remarks

Human capital theory was conceptualized in the 1960s. And since then, many empirical studies have indicated the importance of investment in education for economic and social development. Investment in education and human capital leads to acquisition of skills that raises efficiency, makes more widespread the use existing

technology, and promotes new technological development of a country. Women's education also plays a significant role.

The rate of return to investing in women's education in developing countries is often as high as or higher than that of investing in men's schooling (Psacharopoulos and Woodhall, 1985). This rate refers only to women's contribution in the market place. However, women's education contributes more to development through the improvement of children's health and nutrition and the lowering of fertility rates. In turn, investment in women's education even promotes social equity and economic efficiency of a country. Psacharopoulos (1995) also indicates that investments in education, health, family planning and nutrition improve the well being of individuals, family, and societies. They also improve equity, promote economic growth and reduce poverty.

CHAPTER 3

METHODOLOGY

In order to investigate the contribution of additional years of schooling as well as levels of education to economic development, this study used the rates of return to investment in education. This section presents description of data, sample, instrument, data collection procedure, survey limitations, description of variables, summary of statistics, theory of regression analysis, methodology of the rates of return analysis, and models used in estimation in this study. Summary of Statistics are shown in appendix K.

Description of Data

This study has used secondary data from Nepal Living Standards Survey I (NLSS I, 1995/1996) and Nepal Living Standards Survey II (NLSS II, 2003/04) conducted by Center Bureau of Statistics (CBS) of Nepal and the World Bank in 1995/1996 and 2003 / 2004 for the purpose of quantitative study or estimation of most profitable level of education in Nepal.

The NLSS I national survey of 3373 households provides observations from 73 of the 75 districts in the country. The survey follows the living standard measurement survey (LSMS) methodology developed by researchers at the World Bank over the last decades and applied in surveys conducted in more than 20 countries. These data are well suited to the issues raised in this study because detailed information about wages, educational attainment and other socio-economic characters was collected for large samples of men and women using the same sampling method

for each survey. The two sample used in this study are stratified random samples. This multi-module survey contains detailed information on respondents' occupational activities and earnings as well as a wide range of other data on the structure of the household, education, and other socioeconomic characteristics.

Nepal living standards survey 2003/04 is the second multi-topic national household survey conducted by the central bureau of statistics (CBS) from April 2003 to April 2004. As a follow up to the first NLSS of 1995/96, NLSS II should help to track changes in the living standards of Nepalese population in the last eight years. The survey follows the World Bank's living standard measurement survey (LSMS) methodology and uses a two – stage stratified sampling scheme, as was done in the first survey.

NLSS II enumerated 3912 households from 336 primary sampling units (PSU) of the country, compared to 3373 households from 274 PSU in NLSS I. In addition to these cross-sectional households, NLSS II interviewed 1160 households from 95 panel PSUs (962 out of 1160 households were panel households that were also interviewed in NLSS I). It should be pointed out that 96 from households 8 cross –sectional PSUs (out of 4008 households, 334 PSUs in total), mostly from far-western development region, were not enumerated as a result of prevailing insurgency in the country. This report is based on results from cross-sectional household data.

The data in our selected sample covers wage-sector earnings in both agricultural and non-agricultural sectors for all individuals aged 13 through 65 with positive earnings, and household net income-total production minus total expenditure involved in the production process-from agriculture and non-agriculture enterprise activities. Education data on literacy, levels attended and completed, and number of years of schooling is for all these individual wage-earners, and household heads who

run household agriculture activity and those who run non-agriculture enterprises, and all household members involved in such self-employment activities. Experience-at-work is imputed using the standard formula: Experience = Age-number of years in school-6, where 6 refers to the starting formal schooling.

Furthermore, individuals between the ages of 10-12 are excluded in the analysis because they have zero and negative earning. Wages are defined as gross annual earnings before taxes and transfers from the government. The earnings data taken from the household surveys were used for the calculation of the rates of returns to education analysis.

Sample

The following section presents sample frame, sample, distribution of the sample, and household listing operation.

Sample Frame (NLSS I)

A complete list of all wards in the country, with a measure of size, was developed in order to select from it with probability proportional to size (PPS) the sample of wards to be visited. The 1991 population census of Nepal was the best starting point for building such as sample frame. The central Bureau of statistics (CBS) constructed a data set with basic information from the census at the ward level. This data set was used as a sample frame to develop the NLSS sample (CBS, 1996).

Sample Frame (NLSS II)

The 2001 population Census of Nepal provided a basis for this survey's sample frame. The size of each ward (as measured by number of households) was taken as a unit of sample frame. Some larger wards were divided into smaller units (sub-wards) of clearly defined territorial areas supported by reliable cartography while some of the

smaller wards with fewer than 20 households were appended to neighboring wards in the same VDC. The resulting sampling frame consisted of 36,067 enumeration areas (wards or sub-wards) spread over 3 ecological zones, 5 development regions, 75 districts, 58 municipalities and 3, 914 village development committees (VDCs) of the country. The sample frame was sorted by district, VDC, ward and sub - ward and district were numbered from geographical east to west (CBS, 2004).

Sample (NLSS I)

The sample size for the NLSS I was set at 3,388 households. This sample was divided into four strata based on the geographic and ecological regions of the country: (i) Mountains, (ii) Urban hills, (iii) Rural hills, and (iv) Terai. Table 3.1 shows how the sample was allocated among the four strata:

The sampling design of the NLSS II included two components. The first one was nationally representative random cross-section sample 4008 households from six explicit strata of the country. The second one was panel sample of 1232 households drawn from those households interviewed in NLSS I.

Table 3.1 NLSS I National Sample

Stratum	Number of Households
Mountains	424
Hills (Urban)	604
Hills (Rural)	1,136
Terai	1,224
Total	3,388

The sample size was designed to provide enough observations within each ecological stratum to ensure adequate statistical accuracy, as well as enough variation

in key variables for policy analysis within each stratum, while respecting resource constraints and the need to balance sampling and non sampling errors.

A two stage stratified sampling procedure was used to select the sample for the NLSS. The primary sampling unit (PSU) is the ward, the smallest administrative unit in the 1991 population census. In order to increase the variability of the sample, it was decided that a small number of households – twelve – would be interviewed in each ward. Thus, a total of 275 wards were obtained.

In the first stage of the sampling, wards were selected with probability proportional to size (PPS) from each of the four ecological strata, using the number of household in the ward as the measure of size. In order to give the sample an implicit stratification respecting the division of the country into Development Regions, the sample frame was sorted by ascending order of district codes, and these were numbered from East to west. The sample frame considered all the 75 districts in the country, and indeed 73 of them were represented in the sample. In the second stage of the sampling a fixed number of households were chosen with equal probabilities from each selected PSU.

The two stage procedure just described has several advantages. It simplified the analysis by providing a self weighted sample. It also reduced the travel time and cost, as 12 to 16 households is interviewed in each ward. In addition, as the number of households to be interviewed in each ward was known in advance, the procedure made in possible to plan an even workload across different survey teams (CBS, 1996).

Sample (NLSS II)

The design of cross-section part of NLSS II was similar to that of the NLSS I. The total sample size (4, 0008 households) was selected in to stages: 12 households in

each of 334 primary sampling units. The sample of 334 PSUs was selected from six strata using probability proportional to size (PPS) sampling with the number of households as measure of size. The numbers are all multiples of 12 with the intention of implementing a two stage selection strategy with that many households per PSU in the second stage. Within each PSU, 12 households were selected by systematic sampling from the total number of households listed.

The NLSS II cross-section sample was allocated into six explicit strata as follows: Mountains (408 households in 34 PSUs), Kathmandu valley urban area (408 households in 34 PSUs), other urban areas in the Hills (336 households in 28 PSUs), Rural Hills (1,224 households in 102 PSUs), Urban Tarai (408 households in 34 PSUs) and rural Tarai (1, 224 households in 102 PSUs).

The NLSS II panel sample is composed of 100 of the 275 PSUs visited by the NLSS in 1995/96. The panel PSUs were selected with equal probability within each of the four strata defined by NLSS I, as follows: 12 (out of 33) in the mountains, 18 (out of 50) in the urban hills 33 (out of 92) in the rural hills and 37 (out of 100) in the Terai.

In NLSS I, the strata were composed of Mountains (424 households), urban hills (604 households), rural hills (1, 136 households) and Terai (1,224 households). The sampling frame was taken from the population census 1991 (CBS, 2004).

Table 3.2

Primary Sampling Units of the NLSS II by Region and Zone

Economical zone	Development Region					
	East	Central	West	Mid West	Far West	Total
Cross - section	75	126	65	39	29	334
Mountains	9	11	1	6	7	34
Hills	22	68	45	18	11	164
Tarai	44	47	19	15	11	136
Panel	23	39	19	11	8	100
Mountains	3	4	0	2	3	12
Hills	7	23	12	6	3	51
Terai	13	12	7	3	2	37
Combined	98	165	84	50	37	434
Mountains	12	91	1	8	10	46
Hills	29	59	57	24	14	215
Terai	57		26	18	13	173

Source: NLSS II, 2003/04.

Table 3.3

Number of Sample Households of the NLSS II by Region and Zone

Economical zone	Development Region					
	East	Central	West	Mid West	Far West	Total
Cross - section	900	1512	780	468	348	4008
Mountains	108	132	12	72	84	408
Hills	264	816	540	216	132	1968
Tarai	528/	564	228	180	132	1632
Panel	276	468	228	132	128	1232
Mountains	36	48	0	24	48	156
Hills	84	276	144	72	48	624
Terai	156	144	84	36	32	452
Combined	1176	1980	1008	600	476	5240
Mountains	144	180	12	96	132	564
Hills	348	1092	684	288	180	2592
Terai	684	708	312	216	164	2084

Source: NLSS II, 2003/04.

Table: 3.4

Distributions of Sample Households of the NLSS II by Region, Zone and Urban/Rural Residence

Economical Zone	Development region					
	East	Central	West	Mid West	Far West	Total
Mountain	108	132	12	72	84	408
Urban	12	-	-	-	-	12
Rural	96	132	12	72	84	396
Hill	264	816	540	216	132	1968
Urban	48	480	168	24	24	744
Rural	216	336	372	192	108	1224
Terai	528	564	228	180	132	1632
Urban	156	120	48	48	36	408
Rural	372	444	180	132	96	1224
Total	900	1,512	780	468	348	4008
Urban	216	600	216	72	60	1164
Rural	684	912	564	396	288	2844

Source: NLSS II, 2003/04.

Table 3.5

Enumeration Status of Households in the NLSS II

Sample		Sampled	Enumerated			Not Enumerated
Cross section	-	4008 (334)	Originally selected	Replaced	Total	96 (8)
Panel		1232 (100)	3493	419	3912 (326)	72 (5)
Combined		5240 (434)	962	198	1160 (95)	168 (13)
			4455	617	5072 (421)	

Source: NLSS II, 2003/04.

Distribution of the NLSS I Sample

The actual sample numbers 3373 households, 15 less than planned one ward (12 households) could not be reached and one ward had only 9 households. In all other cases, missing or non-respondent households were replaced using a pre determined random procedure. The following table gives the distribution of the actual sample (individuals, households, wards) by development region, ecological belt, and urban rural location (not that, under "Rural", "Eastern" denotes the eastern and central

department regions while "Western" includes the Western, Midwest, and Farwest Development Regions. For example, "Eastern Terai" covers the Terai parts of the Eastern and Central Development Regions).

Table 3.6

Distribution of the NLSS I Sample

Development Region	Number of Males	Number of Females	Total Individuals	Number of Households	Number of Wards
Eastern	1960	1959	3919	717	60
Central	3544	3585	7129	1320	110
Western	1596	1813	3409	624	52
Mid west	1064	1120	2184	360	30
Far west	1099	1115	2214	352	22
Ecological Belt					
Mountain	1083	1156	2239	409	32
Hill	4443	4734	9177	1740	142
Terai	3737	3702	7439	1224	100
Urban	1892	1868	3760	716	59
Kathmandu	1013	974	1987	396	33
Other Urban	879	894	1773	320	26
Rural	7371	7724	15095	2657	215
Eastern Hill/Mountain	1858	1984	3842	717	60
Western Hill/Mountain	2125	2373	4498	828	64
Eastern Terai	2139	2107	4246	744	62
Western Terai	1249	1260	2509	368	29
Nepal	9263	9592	18855	3373	274

Source: NLSS I

Households Listing Operation (NLSS I)

After the random selection of the 275 wards, a complete enumeration of households in the sampled wards was conducted in order to select and identify the households to be interviewed. The household listing operation was carried out in two phases between July 1994 and December 1994. Information collected focused on: locality, name of the household head, nick-name of the household head (rural), block number of dwelling (urban), and household size. The cover page for the listing was

designed to gather information on the mode of transport and time required to reach the ward; this facilitated the preparation of schedules for the field teams (CBS, 1996).

Instrument

The following section presents the survey questionnaire, field teams, and structure of the interviews.

Survey Questionnaire (NLSS I)

The NLSS questionnaire is different from other household survey questionnaires in several ways. First, information is collected on several aspects of household behavior demographic composition, housing education, health, consumption expenditures, income by source, employment. The questionnaire is therefore longer than usual survey questionnaires. Second, information is collected from all household members, not just from the head of household. This is done so as to gain a full picture of living standards for women and children as well. Third, a community questionnaire is also administered in addition to the household questionnaires. Community questionnaires were administered in all wards with different questionnaires for urban and rural wards to collect information on characteristics of the community, prices, and facilities available. This information supplements the information collected at the household level. The questions in the community questionnaire were answered by the ward or VDC chairman, or other such knowledgeable people in the ward. The contents of the household and community questionnaires are described below (CBS, 1996).

Survey Questionnaire (NLSS II)

Two types of questionnaires were administered in NLSS II: household questionnaire and community questionnaires (urban and rural). In order to generate

comparable data with NLSS I, as many of the NLSS I questions as possible were retained in NLSS II. However, some important additions were made on the household questionnaire to address some contemporary issues such as population migration and child labor. Some questions were omitted based on whether such questions were poorly answered or collected in NLSS I. Detailed discussion were made on the household questionnaire with members of NLSS II technical communities, representatives from different donor agencies and other stakeholders.

For instance, questions on anthropometrics section were dropped for the reason stated above. Questions on new areas of concern and economic activities were added (child labor merged from a planned ILO "Nepal child labor survey" for members 5 years of age and over). Sections on changes in household composition for the panel component of the survey and children (under 15 years of age) away from home were added. Questions on migration were asked of all members of the household 5 years and older in this survey instead of just the household head in previous survey. Other additions and modifications included own account production of goods, extended economic activities, underemployment status, health information including HIV/AIDS and household facilities. Some gender specific questions were added in agricultural wages whereas a few questions were dropped from the agriculture section.

There were separated sets of questionnaires for urban and rural communities, as in NLSS I. Community questionnaires were designed to measure community characteristics and market prices to supplement the information collected though household questionnaire.

The questionnaires were intensively with the feedback from pre-test in the field. The pre-test was done in different ecological zones, development regions and

urban/rural areas during July – August 2002. The pre-test was also designed to track panel households and the tracking was found to be 80 percent ((CBS, 2004).

Field Teams (NLSS I)

The data were collected by 12 field teams, each responsible for a particular area of the country. Assignment of wards to the various teams was done to balance the work load and travel time across teams. The teams were based in the appropriate district office of the CBS, and covered on average 23 wards. Each team consisted of one supervisor, three interviewers, and a data entry operator. One of the interviewer was also trained as an anthropometries, and was responsible for weighing and measuring children in all interviewed households. Each team included at least one female interviewer (CBS, 1996).

Field Teams (NLSS II)

Altogether 16 teams were deputed for fieldwork in different parts of the country assigning each team to the particular area (see box 1). The teams were developed on the basis of the geographical location of the BSOs as well as their workload analysis and traveling time. Each team covered 27 PSUs on average. There was one supervisor, there numerators and one data entry operator in each team. Of these, at least two female interviewers were included in each team. Each team was supported with logistics including equipments such as, laptop computer, solar panel, solar power box and other survey instruments and materials in the field. As a result of the obstacle in the field enumeration, some of the PSUs previously assigned had been transferred to the neighboring teams.

The supervisor worked as a team leader and was responsible for supervising, coordinating and monitoring the data collection activities. Other duties included

completing community questionnaires, check household questionnaire thoroughly and handle data entry activities in the field. The assigned job of the enumerator was to visit the households, interview the household heads and other members of the family as required, complete the household questionnaire maintaining data quality and revisit the households if any inconsistencies were shown in data entry program. In addition, she had to enter household and community data into a computer, flag any inconsistencies to the supervisor as shown by the computer and get the entry verified by the supervisor (CBS, 2004).

Structures of the Interviews (NLSS I)

Each ward was visited once. Within each ward, however, households to be interviewed were often visited several times, depending on how long it took to complete the questionnaire. In the first visit, the interviewer completed the listing of all the household members and made appointments to talk to each of them; in later visits, he/she interviewed the different members of the household. The amount of time taken to complete the questionnaire varied greatly from household to household, depending on the number of people there were in the household, how much land they owned, how many different kinds of economic activities they were undertaking, how many modern consumer goods they owned, and other such factors. In general, the larger the household, the more the people had to be interviewed, and hence the longer the interview in the household was likely to be. Usually it took at least two visits to complete the interview (CBS, 1996).

Structures of the Interviews (NLSS II)

Each team was provided with the name list of 12 household heads with 6 - extra just in case the selected household could not be found. The supervisor

distributed the households among enumerators. After completion of several forms, the data entry operator entered the data collected so for. If any inconsistencies appeared in this process, the households were immediately revisited to correct the mistakes in the field. The supervisor visited the knowledgeable persons and community leaders to fill out the country questionnaire.

The role of supervision was very crucial in accomplishing much a comprehensive and multi-topic survey. Thus, extensive field supervision both from the centre (CBS) and from the districts (BSOs) was carried out during the survey period. Moreover, the central supervision was carried by the core team members in the household survey section while the district level supervision was made by the statistical officers of the BSOs (CBS, 2004).

Data Collection Procedure

The following section presents data collection procedure.

Data Collection (NLSS I)

Data collection was planned over a full year to cover a complete cycle in agricultural activities and capture seasonal variations in other variables. Field work took place in four subsequent phases. During the first phase, which began on Ashad 15, 2052 (June, 25, 1995) interviews were carried out in 28 wards. Then the supervisors and data entry operators were called back to the CBS for a two week review of the data collected. Instructions were issued where errors and inconsistencies were found. The second phase of data collection work started from Bhadra (mid – August, 1995) and continued till the first week of Kartik. During this phase, work on 66 wards was completed. The third phase data collection work continued from Kartik (after Dasain) onwards to Poush. During this phase work on 93 wards was completed.

The fourth phase began in Magh and was completed by the end of Jesth, 2052 (June 15, 1996), as planned (CBS, 1996).

Data Collection (NLSS II)

Data collection was carried out from April 2003 to April 2004 in an attempt to cover a complete cycle of agricultural activities and to capture seasonal variations in different variables. Majority of the process was completed in three phases: the first one from April 2003 to July 2003, the second one from August 2003 to November 2003 and the final one from December 2003 to February 2004. The samples were equally distributed among phases for both cross-section and panel PSUs considering their geographic distribution. Breaks between these phases were used for discussion over difficulties in the field and preparation for the nest phase. during May 8-12 of 2003, discussion were held with data entry operators, supervisors and core teams members of the survey team at CBS to rectify some issues in the data entry program that came up in the field in the first round of the first phase. Conflict situations prevailing in different parts of the country hindered fieldwork in some of the PSUs and a fourth phase was created to complete the enumeration work in subsequent attempts and the field work was extended till April 2004. Out of a total of 434 PSUs 407 PSUs were completed in the first attempt, 14 PSUs were enumerated in the second attempt but 13 could not be enumerated at all.

The data in our selected sample covers wage-sector earnings in both agricultural and non-agricultural sectors for all individuals aged 13 through 65 with positive earnings, and household net income-total production minus total expenditure involved in the production process-from agriculture and non-agriculture enterprise activities. Education data on literacy, levels attended and completed, and number of years of schooling is for all these individual wage-earners, and household heads who

run household agriculture activity and those who run non-agriculture enterprises, and all household members involved in such self-employment activities. Experience-at-work is imputed using the standard formula: Experience = Age-number of years in school-6, where 6 refers to the starting formal schooling. The earnings data taken from the household surveys will be used for the calculation of the rates of returns to education analysis (CBS, 2004).

Survey Limitations (NLSS II)

The survey was unable to reach/interview all the sampled PSUs and their households. With the consultation of the design experts it was decided not to replace the affected PSUs for enumeration and ultimately they were dropped. In a few exceptional cases, data entry could not be done in the field for some rural PSUs but was done at the nearest market or district headquarters. And despite every effort to reduce other limitations, we also acknowledge the usual difficulties inherent in a household survey covering all parts of the country (e.g. discrepancies in reported use of metric/non-metric units of measurements, a longer recall period resulting in under/over reporting of certain income source or consumption item) (CBS, 2003/04).

Nepal is a market economic country. There is free labor market dynamics in Nepal. Since, this study is based on secondary data collected by CBS. CBS collected data of private sectors only. This exercise did not adjust the data based on the public sector wage argument as the data used was provided by CBS. The researcher did not do anything for this. The researcher however is aware of the issues.

This exercise did not adjust the data based on the public sector wage argument as the data used was provided by CBS. The researcher did not do anything for this. The researcher however is aware of the issues.

It is not necessary to normalize costs and earnings because this study used cross section data. It is not necessary to see inflation on cost and earnings being a cross section data. Model cannot handle unemployment rate. Nepal is a market economy country. CBS collected data from private sector only. Therefore, there is no problem of compressed wage. This data was collected in insurgency period. Therefore, rates of return to education become low. The earning is gross earning. CBS collected data without deducting tax. The effect of insurgency on rates of return is to be researched.

The researcher has not adjusted earning data provided by CBS. The definitions of earnings given by CBS are as follows. Annual earnings from wage employment are a sum of cash and in-kind earnings per year (including daily, piece-rate and long-term labor) for every individual with positive earnings. Net earnings of agricultural activities are total output minus the expenditure involved in the production process. Net earnings of the non-agricultural enterprise activity are total production minus the expenditure involved in the production process. The Mincerian earnings function model does not capture the non-monetary costs and benefits. For detail information, see NLSS II Report, p. 34.

The cost of the investment comprises: (1) the direct costs for the individual, these include all expenditures related to school attendance, and for society, the full resource costs of providing the educational service, including any subsidized costs not borne by the individual or the individual's family, plus (2) the average earnings foregone as a result of the investment. Theoretically the social rate of return should also include any external benefits not captured by the individual student or, if education is treated as a family investment, by the individual and his or her family. Unfortunately, not only is the size of education's external benefits nearly impossible

to determine, but some policymakers and researchers question even their existence, rendering the rate of return literature the subject of some debate even 40 years after the re-birth of this methodology around 1960 (Schultz 1961). Of course, the same uncertainty as to precise social rates of return applies equally to investments in most other sectors. Some education economists have argued that adding external benefits to estimates of social rates of return would result in estimates about twice as large as those measured according to standard methods (Haveman and Wolfe 1984; Wolfe 1995).

In this study, only foregone cost and monetary benefits were used. Private cost, non monetary and monetary costs and benefits are not included. Cost of society has not included while calculating private rates of return. Non monetary benefits to the individual household have not also included.

The rate of return analysis was based on a very rich data set in terms of coverage, methodology, and quality. Since, this study used secondary data collected by CBS and World Bank. The ownership of data is on CBS. The data management was done by highly professional term of CBS using computer software. Nobody has raised question regarding the accuracy of the data. Therefore, there is no doubt of inaccuracy of data used in this study. For detail about data management, see NLSS I and II reports.

Before doing regression analysis, much time was spent to get familiarity with the data. Means, standard deviations, maximums, minimums, skewness, and kurtosis of earnings and years of schooling were examined. Particular attention to the number of valid (nonmissing) cases was given. Histograms (bar charts of the frequency distribution) were drawn to give a good idea of how the data are distributed across

different possible values of the variables (Annex). Descriptive statistics and histograms for transformed variable In Y are also presented (Annex).

Description of Variables

The following section presents the description of wage sector, household (self-employed) agriculture income, and household (self-employed) enterprise income.

Wage Sector

Individual annual earning (log) from wage-employment is the dependent variable in our estimation model. We calculate this variable as a sum of cash and in-kind earnings per year (including daily, piece-rate and long-term labor) for every individual with positive earnings. Our standard specification explanatory variables are: a) years of schooling, maximum class completed, to capture the investment in formal education, b) year of experience (already defined) at work to capture the post-schooling investments in human capital, c) experience-squared term to account for the concavity of the earnings-experience profiles, and d) the log of weeks worked per year as a compensating factor for labor supply.

Dummy variable specification has dummies for each education level-primary, secondary, and higher, less-than-primary is control dummy-to replace years of schooling in the basic specification.

And these two main specifications are used for the entire sample, gender, urban/rural areas, developmental regions, ecological belt, school types, religion, ethnicity, occupation, income quintile, agriculture sector, and non-agriculture sector. Further segregation is made by geographical region (Kathamdu urban, other urban, and four rural regions: rural east hills, rural west hills, rural east Terai and rural west

Terai; please refer to the map of Nepal for locations) to do a comparative study in rates of return to education.

Household (Self-Employed) Agriculture Income

Dependent variable is the net earnings of agriculture activities, i.e. total output minus the expenditure involved in the production process. Total output is calculated as the sum of value of total production, by-product production, and non-crop production such as livestock or poultry (both sales and home consumed in all cases). Total Expenditure includes cultivation costs (seeds, fertilizers, veterinary services, and purchase of livestock. Year-of-schooling is measured at three levels: education of the household head, that of the person in the household with the highest education, and mean education of household members involved in the production process. Experience and its squared term are defined accordingly to account for these three variables. Here, the basic Mincerian specification is extended to include non-human capital input variables. Land capital is measured by market value of land under cultivation, labor is measured by the sum of in-house and hired labor cost, and technology use is measured by machinery, fertilizers, seeds and irrigation cost. Regional and gender categorizations continue as in individual wage-earnings functions.

Individuals are placed in five quintile-groups based on household incomes-fifth or top quintile refers   to the richest 20% of the sample population. Quintiles from first to four refer to poorest 80% of the population.

Household (Self-Employed) Enterprise Income

Dependent variable is the net earnings of the non-agriculture enterprise activity, i. e. total production minus the expenditure involved in the production

process. Total production is the gross revenues from home-enterprises and self-employment outside agriculture. Expenditure includes paid wages, energy and raw-materials cots, and other operating costs. In this specification, schooling and experience variables are defined in the same way as in agriculture net income functions other control variables are market value of the enterprise capital, operating costs and in-house labor days.

Summary of Statistics

This section presents summary of statistics in the labor market, agriculture production, and non-farm production. A series of tables that illustrate the descriptive statistics are presented in appendix.

Labor Market (NLSS I)

In our sample, individual wage earners are selected to be in the age-bracket 13-65 and to have positive earnings. The final sample observations are 3696 on which the estimations are based. Descriptive statistics of the sample are presented in Table 88, 89, 90, and 91 (see appendix K). Table 88 shows that two-thirds of the samples are males. All wage earners have less than three years of schooling on average but those who attended school have, on average over 7 years of schooling. Only 3% of the total labor forces have university education.

58% samples are worked in agriculture sector. 31% samples are worked in rural east Terai where as 10% samples worked in Kathmandu urban. 42% samples worked in central development region where as 6% samples worked in far-western development region. 45% samples worked in Terai belt, 40% in hill belt and 13% in mountain belt. 95% samples had public schools education where as 4% samples had private schools education.

83% samples are worked in rural areas where as 16% samples are worked in urban areas. 86% samples are Hindus and 7% are Buddhist. 58% samples are agricultural worker, 22% are production worker and 5% are professional workers. 13% samples are Chhetri, 10% Brahmin, 9% Newar, 4% Muslim, 2% Gurung and 5% Kami. 37% samples are poorest 40%, 40% samples are next 40% and 21% samples are richest 20%.

Non-agricultural workers earn more than 4.6 times as those in agriculture and almost five–fold advantages in terms of mean –years- of- schooling. By gender, females earn less than half of what males earn and lag behind in mean-school-years by almost 2.2 years. More than 89% of females have less than primary education. Urban individuals earn almost five times than those of rural individuals and have four-fold advantage in terms of schooling years. By quintile groups, richest-20% earns four times than those of poor-80% and four-fold advantage in schooling years.

By types of schooling, private schooling earns 1.3 times than those of public schooling and one - fold advantage in schooling years. Among the development regions, CDR samples have earned highest (Rs. 14,404) where as EDR earned the lowest income (Rs. 5772). CDR has also the highest schooling years 3.32 and MWDR has the lowest schooling years. Among the geographical locations, Kathmandu urban has highest wage (Rs. 37051) followed by other urban (Rs. 17023). Rural areas earning ranges from Rs. 5545 (RW Terai) to Rs. 6955 (RW Hill)

Labor Market (NLSS II)

The final sample observations are 4331 on which the estimations are based. Descriptive statistics of the sample are presented in Table 92, 93, 94, and 95 (see appendix K). Table 95 shows that two-thirds of the samples are males. All wage

earners have less than four years of schooling on average but those who attended school have, on average over 7.5 years of schooling. Only 3% of the total labor forces have university education.

52% samples are worked in agriculture sector. 30% samples are worked in rural east Terai where as 9% samples worked in Kathmandu urban. 46% samples worked in central development region where as 6% samples worked in far-western development region. 50% samples worked in Terai belt, 50% in hill belt and 9% in mountain belt. 94% samples had public schools education where as 4% samples had private schools education.

75% samples are worked in rural areas where as 24% samples are worked in urban areas. 79% samples are Hindus and 9% are Buddhist. 14% samples are craft worker, 13% are elementary worker and 4% are professional workers. 42% samples are Janajati, 23% higher caste, 18% Dalit, 9% Terai middle caste, and 6% Muslim. 40% samples are poorest 40%, 39% samples are next 40% and 20% samples are richest 20%.

Non-agricultural workers earn more than five times as those in agriculture and almost five–fold advantages in terms of mean –years- of- schooling. By gender, females earn less than half of what males earn and lag behind in mean-school-years by almost three years. More than 81% of females have less than primary education. Urban individuals earn almost six times than those of rural individuals and have three-fold advantage in terms of schooling years. By quintile groups, richest-20% earns eight times than those of poor-80% and 3.5 fold advantage in schooling years.

By types of schooling, private schooling earns 1.2 times than those of public schooling and 1.4 fold advantage in schooling years. Among the development regions,

CDR samples have earned highest (Rs. 34,844) followed by WDR (Rs. 20312). FWDR earned the lowest income. WDR has also the highest schooling years 3.98 and EDR has the lowest schooling years 2.75. Among the geographical locations, Kathmandu urban has highest wage (Rs. 123508) followed by other urban (Rs. 30879). Rural areas earning ranges from Rs. 8983 (RE Terai) to Rs. 13808 (RW Hill).

Agriculture Production (NLSS I)

Criterion of sample selection was positive net income. The final sample observations are 2519 households on which estimates are based. Summary statistics are presented in Table 96, 97 and 98 (see appendix K). These households earn slightly more than 23,000 rupees net earnings on average even though the average plot value is a staggering number: 2, 55,000 Rupees. On average, education of household head is higher than the mean-household, but less than half of that of the highest-educated person in the household. 91% of landholdings are operated by male household-heads. Only 2% of households are in Kathmandu urban area and 6% in other urban areas. Only 7% of households are in urban areas and 92% are in rural areas. Net earnings are higher than those of rural households, and their education at all levels is also far better than rural households. Their labor input in terms of monetary value seems to be greater than that for rural households. As expected, urban landholding are far more expensive as measured by market value. Within rural Terai, RE Terai households earn more, are better educated, and use more technology than the RW Terai. Within hills, RE hill households are better than RW hill in almost every category net earnings, education, and use of technology. Within urban, other urban seems to do better than the Kathmandu urban.

Within the belt, Terai belt households are better than other belts in almost every category earning and education. Within development regions FWDR

households better than other development region in earning. WDR is better in education and CDR is better in use of technology.

Agriculture Production (NLSS II)

Criterion of sample selection was positive net income. The final sample observations are 2841 households on which estimates are based. Summary statistics are presented in Table 99, 100 and 101 (see appendix K). These households earn slightly more than 20,000 rupees net earnings on average even though the average plot value is a staggering number: 4, 31,000 Rupees. On average, education of household head is equal to the mean-household, but less than half of that of the highest-educated person in the household. 81% of landholdings are operated by male household-heads. Only 15% of households are in urban area. And surprisingly, their net earnings are less than those of rural households, even though their education at all levels is far better than rural households. The labor input in terms of monetary value seems to be greater than that for urban households. As expected, urban landholding are far more expensive as measured by market value. Within rural Terai, RW Terai households earn more, are better educated, and use more technology than the RE Terai. Within rural hills, RE hill households are better than RW hill in almost every category net earnings, and use of technology. Within urban areas, other urban seems to do better than the Kathmandu urban.

Within the belt, Terai belt households are better than other belts in almost every category earnings and education. Within development regions, WDR household are better than other development region in education. EDR is better in earnings and CDR is better in use of technology.

Non-Farm Production (NLSS I)

Sample selection criterion is positive net income. The final sample observations are 802 household enterprises on which the estimations are based. As seen from Table 102 and 103 (see appendix K), net earnings for non-farm households are quite sizable compared to farm net earnings. However, market value of enterprise is smaller than average land-value. And these non-farm households are better educated too. By region, urban enterprises dominate rural enterprises in every category: net earnings, education (both mean years and levels), in-house labor supply and operating costs. Urban enterprises constitute over two-fifth of the sample.

By sectors handcrafts and textiles have the lowest education earnings profile; other sectors (non-trade and non-textile/handcrafts, includes finance, manufacturing, informational tourism) comes next, and the trade (retail/wholesale, hotels) has the highest education earnings profile.

Non-Farm Production (NLSS II)

Sample selection criterion is positive net income. The final sample observations are 1085 household enterprises on which the estimations are based. As seen from Table 104 and 105 (see appendix K), net earnings for non-farm households are quite sizable compared to farm net earnings. However, market value of enterprise is smaller than average land-value. And these non-farm households are better educated too. By region, urban enterprises dominate rural enterprises in every category: net earnings, education (both mean years and levels), in-house labor supply and operating costs.

By sectors, trade sector has the highest education earnings profile; other sectors (non-trade and non-textile/handcrafts, includes finance, manufacturing,

informational tourism) comes next, and the handcrafts textiles has the lowest education earnings profile.

<div align="center">Theory of Regression Analysis</div>

It is a branch of statistical theory that is widely used in almost all scientific disciplines. In economics it is the basic techniques for measuring the relationship among variables that constitute the essence of economic theory and economic life. Let $Y = f(X, Z)$. Here Y is dependant variable and X,Z are independent variables. A linear regression model can be written as: $Y = a + bX + cZ + U_i$, where a, b, c are the parameters to be estimated. U_i is the disturbance term or an error term. The error term represents the effect of all those factors which are not suspected by the investigator. The linear regression model, therefore assumes that error term has zero mean i.e. $E(U_i) = 0$.

The other assumptions are homoscedasticity, no autocorrelation and the normality of disturbance term etc. It is necessary to explain the methods to estimate the parameters. One of the methods to estimate parameter is the so called ordinary least square (OLS) method. If $\hat{Y}$ is the estimated dependent variable, in order to minimize error $\Sigma\left(Y - \hat{Y}\right)^2$ is to be minimized.

From calculus we know that

$$\delta\Sigma(Y - Y)^2 / \delta a = 2\Sigma(Y - a - bX - cZ) \quad (-1)$$

$$= 2\Sigma(a + b + cZ - Y)$$
$$= -\Sigma Y. + ax + b\Sigma x + c\Sigma Z$$

Similarly,

$$\delta\Sigma\left(Y-\hat{Y}\right)^2/\delta b=-\Sigma YX + a\,\Sigma X + b\,\Sigma\,X^2 + c\,\Sigma X^2$$

$$\delta\Sigma\left(Y-\hat{Y}\right)/\delta c=-\Sigma Y2 + a\quad\Sigma Z + \delta\Sigma XZ + C\Sigma Z^2$$

Setting each equal to zero we have three equations and three unknowns a, b and c.

$$\Sigma Y = aX + \delta\Sigma X + C\Sigma Z$$
$$\Sigma XY = a\Sigma X + \delta\Sigma X^2 + C\Sigma X^2$$
$$\Sigma YZ = a\Sigma Z + \delta\Sigma X^2 + C\Sigma Z^2$$

In matrix notation.

$$\begin{bmatrix}\Sigma Y\\ \Sigma XY\\ \Sigma YZ\end{bmatrix}=\begin{bmatrix}n & \Sigma X & \Sigma Z\\ \Sigma X & \Sigma X^2 & \Sigma X^2\\ \Sigma Z & \Sigma XZ & \Sigma Z^2\end{bmatrix}\begin{bmatrix}a\\ b\\ c\end{bmatrix}$$

By investing 3×3 matrix and multiplying the values of a, b and c and be estimated.

(b) Co-efficient of multiple e determination (R^2). It is a statistic with unknown properties based upon the ratio of variation in the dependant variable explained by the hypothesis to the total amount of variation i.e. $R^2 = \dfrac{RSS}{TSS}$ where RSS refers to regression Sum Square and TSS refers to Total Sum Square. The more the variation unexplained (ESS-Error Sum Square is high) by the line, the less supportive of the hypothesis by the data. If the proportion of variation unexplained approaches zero R^2 approaches 1. Two Pointe should be kept in mind about R^2.

(i) A common error is often made when R^2 of two competing models are used for comparison.

(ii) Other warning about the interpretation of R^2 is that whereas a high value of R^2 means high correlation, it does not necessarily indicate cause and effect to

prove or disprove the hypothesis. R^2 only establishes relationship. We can

adjust R^2 by computing $R^2 = 1 - \dfrac{ESS/df}{TSS/df}$ which shows the proportion of

variation that is explained.

(c) hypothesis testing - There are two popular tests to find out the significance of

regression co-efficient:

(i) 't' test - It is a test on a particular co-efficient. It can also be used to test

hypothesis.

(ii) 'F' test - It is a variance test. It test the significance of the entire analysis. F can

be calculated from the formula given by $F = \dfrac{RSS/df}{ESS/df}$ we can also design a

incremental F test or Dropper Smith test. 'F' value tests the goodness of fit of

data by the regression model.

(d) Problems of Estimation - There are basically five types of problem in

estimation process (Lohani, 1978).

(i) Auto-correlation - One assumption in ordinary squares model is that successive

disturbance terms are drawn at random i.e. the errors of one period are

independent to the errors of the other period. In cross-sectional data, such a

problem does not appear. So the present analysis is free from the problem of

autocorrelations.

(ii) Multicollinearity - It arises whenever various explanatory variables stand in an

exact or almost exact linear relation to each other. It arises when some or all of

the explanatory variables in a relation are so highly correlated to each other

that it becomes very difficult to separate their influences and obtain seasonally

precise estimates of their relative.

(iii) Heterocedasticity- This is basically a problem when the errors do not have constant variance. So the condition of constant variance is known as homoacedasticity.

(iv) Important variables exclude - Some important variables may be excluded so that the estimation can't be accurate.

(v) Simultaneous equation basis - The problem arises if one tries to estimate a single equation which is a part of the system of equations. Two stage least Square (TSLS) method eliminates such a bias.

This study attempted to diagnosed multicollinearity, heteroscedasticy, and normality problem. Since, this study used cross-section data. There is no problem of autocorrelation.

Methodology of the Rate of Return Analysis

In order to estimate the profitability of investment in education, the following four methods are often use: a) Mincerian earnings function method (Mincerian Method) b) Full method or the elaborate method; c) Short-cut method; and d) Net present value method (Psacharopoulos, 1994). In this study, only the Mincerian earnings function method was used to investigate the ten hypotheses presented in Chapter I. This method is the most convenient but is inferior compared to the Full Method because it requires less data.

In order to investigate the social rate of returns to education, the full method is often used. This study also used the short cut method to calculate rough estimate of social rate of return to education. This study did not use the net present value methods. The short cut method and the net present value method are now used less frequently in the literature (Psacharopoulos and Ng, 1994).

The Earnings Function Method

We start with the derivation of this function. Suppose that:

Y_0= Earning with no schooling

Y_t= Earnings received each year after obtaining t years of schooling

C_t= Dollar Amount of investments in year t of schooling

R_t= Rate of return on investments in level of schooling t to a full-years' potential earnings one would earn if the person left school after completing (t-1) years.

If there is one-period investment in schooling for the individual, earnings after schooling is completed, is given by:

Y_1=Y_0+$R_1$$C_1$=$Y_0$(1+$R_1$$K_1$)

For two periods:

Y_2=Y_1+$R_2$$C_2$=$Y_0$(1+$R_1$$K_1$)(1+$R_2$$K_2$)

By Mathematical Induction:

$$Y_1 = Y_0 \prod_{t=1}^{5} \left(1 + RK\right)$$

Where S refers to number of years of schooling completed.

Taking natural logarithms:

$$LnY_1 = LnY_0 + \sum_{t=1}^{5} Ln(1 + R_1 K_t)$$

Assuming $R_t K_t$ is small, we can apply the rule for natural logs, namely Ln $(1+x) = x$ for small x. For simplicity of exposition, we further assume that R and K do not vary with years of schooling ($R_0=R_t$, $K_0=K_t$). Then,

$$LnY_t = LnY_0 + \beta * S$$

Where, beta = R_0*K_0

Addition of a residual to above equation and estimating the coefficient of schooling *(S)* in the regression equation gives an estimate of average percent increase in earnings per year of schooling. We should note that *beta,* the coefficient, is *not* the rate of return from schooling; rate of return *R* is estimated from beta if only K is known. However if K=1, i.e. the investment in schooling equals the full-year potential earnings is assumed, the coefficient estimated is the rate of return to schooling. Chiswick (1997) notes that K = 1 is a reasonable assumption if 1) there are no out-of-pocket costs and forgone earnings (opportunity costs) equal the full years earnings, 2) the sum of direct costs and opportunity costs equals full year potential earnings, and 3) the elasticity of earnings with respect to units of time worked is unity. But he goes onto say that such assumptions are break down in a number of circumstances. For our purpose, we stick by the assumption that K does equal to unity primarily because in our case, directs costs of school are fully borne by the government and that we work with annual earnings so that elasticity of earnings with respect to weeks worked is close to unity.

The expression

$$In\ Y_i = In\ Y_0 + \beta S_1$$

is the basic schooling model as developed my Mincer (1974). When we consider post-school investments, namely on-the-job experience, it is safe to assume

that the investment ratio K_t (Direct Cost to Forgone earnings) declines with time. Going through a derivation similarly to the one we did above and assuming that post-school investment ratio declines linearly with time (beginning with K_0 at experience = 0 and reaching zero at experience = T, where T is the total period of positive net investments) we come to the basic earnings function of Mincer:

$$In\, Y_i = \alpha + \beta S_i + \lambda EX_i + \gamma EX_i^2$$

Where, EX is years of experience on the job.

For a more detailed derivation, see Mincer (1974). The inclusion of experience as the independent variable is meant to capture the post - school investments that are difficult to measure empirically. The squared term is included to capture the "downward turn" of the function at higher experience levels because as one gets older, experience (a direct function of age) goes past a certain peak after which annual earnings begin to decrease.

This human capital earnings function relates the natural logarithmic of earnings to investments in human capital measure in time, such as years of schooling and years of post-school work experience is a very popular method and is said to have worked very well with cross-sectional data. Some of its desirable features (Chiswick 1997) include:

1. It is not an ad hoc specification. It is derived from an identity and consequently, the coefficients of the equation have economic interpretations.

2. The use of natural logarithms of earnings rather than earnings reduces the heteroskedastic effects and brings the residuals closer to normal distribution. This is especially helpful if we expect earnings to be positively skewed and earnings differentials to increase with at higher schooling levels.

3. It uses the available data very efficiently. Since we rarely get data on individual schooling costs, this function involves converting relationship between earnings and monetary investments in human capital to relationship between earnings and years of investment in schooling and training.

4. The flexibility of the function allows easy incorporation of additional variables on the extended to include household earnings from farm and non-farm activities with physical capital and labor inputs as control variables. Moreover, the specification can be modified to substitute years of schooling with dummy variables for each educational level. This flexible nature of the function allows our study to extend to wage and non-wage sectors of economy.

5. Coefficients are devoid of units and measure the elasticity of earnings with respect to years spent in school or experience or other variables. This means, they are comparable across time and regions.

One can add an educational level dimension to the rate of return analysis. There are two main approaches to this. First approach is to add e* S-squared term to the basic model, where e is the estimated coefficient on years-of-schooling -squared. Differentiating with respect to S gives r = B +2e*S,

Where B is the coefficient on S. Substituting different values of S in the right hand of this expression gives the rates of return to primary school (S = 5), secondary school (S=10), Higher education (S=16).

Second approach is to specify different levels of schooling by a series of dummy variables, say *pri, sec* and *univ*.

Then the function becomes:

$$In\, Y_i = \alpha + \beta 1 \mathrm{Pri}_i + \beta 2 Sec + \beta 3 Univ + \lambda EX_i + \gamma EX_i^2 + \varepsilon$$

In this case, the rates of return to different levels are derived from the estimated coefficients B_1, B_2, B_3 in the above function as follows:

$$R_{\text{(primary vs. less than primary)}} = B_1/S_P$$

$$R_{\text{(secondary vs. primary)}} = (B_2-B_1)/(S_S-S_P)$$

$$R_{\text{(university vs. secondary)}} = (B_3-B_2)/(S_u-S_S)$$

Where S denotes the number of years of schooling of the subscripted educational level (p = primary, s = secondary, u = university). Again, care has to be taken regarding the foregone earnings of primary school-aged children. In the empirical analysis that follows we have assigned only two years of foregone earnings to this group (Psacharopoulos, G. and Ng, Y.C. 1992). The rationale for this approach is that it is effectively using the following formula:

$$R_{(h)} = (InY_h-InY_{h-1})/ (S_h-S_{h-1})$$

Where h represents a higher educational level relative to h-1. The advantage of the *second* approach is that a great deal of sensitivity is added.

Problems with Mincerian Earnings Function

There are a couple of problems with this earnings function method of testing the theory. Firstly, it makes following implicit assumptions: age-earnings profiles are flat or equidistant between adjacent levels (or years) of schooling throughout their range, such profiles last for ever and only cost to schooling is the foregone earnings of the individual. These can be defended as Blinder (1976) does on his earnings - function literature. The other problem, however, is that we can't estimate social rates of return (one can't easily incorporate cost data in it) directly from regression results; we need to use the results (coefficients) and then incorporate costs afterwards to get the social returns (an example shown in the estimation result section). Also, it

underestimates the returns to primary education because it assumes that primary school children also forgo earnings, which is not true in most cases. Most of the literature on rates of return has been using some or other variation of this model. And it has been claimed to have done a surprisingly good job in the estimation process despite its simplistic approach and assumptions.

Extension to Productivity Study

As mentioned above, this approach need not be limited to labor-earnings. It can extend to earnings from farm and non-farm enterprises. However, we now need to worry about the effects of other inputs such as physical capital (land and/or machinery), technology and labor. The reason is that, unlike labor-earnings, earnings from farm and non-farm activities are largely determined by the size of inputs (labor or land or machinery); failing to control for inputs will give a biased estimate of the independent effect of education on productivity. So variation of the mincer model may look something like, in case of a farm-production.

$$In \quad Y_h = \alpha_0 + \alpha_1 \quad In\,L + \alpha_3 \quad In\,T + \beta S_h + \lambda X_h$$

Here, Y is household h' s farm-earnings, L is labor-hours spent, T is the farm - size, S is either the maximum or average education (number of years of schooling)of the household, X denotes other characteristics pertaining to land or household (for example, use of certified seeds, chemical fertilizers and irrigation). The coefficient, beta, on schooling variable (S) still gives the rate of return to an extra year of education to farm earnings. Similarly, household non-farm enterprise earnings can be used to estimate the effect of education. Now L can remain as labor house but T can be replaced by the market value of the physical capital of the enterprise (K), and X and be replaced by operating cost of the enterprise. The use of capital and labour-hour

inputs as control variables enables us to separate the contribution of education from other inputs. In fact, this production function approach may look like growth-accounting approach where different inputs (labor, physical and human capital) contribute a certain percentage of the growth of the economy.

In many empirical studies of productivity, "engineering" production functions are utilized. Here, the dependent variable Y measures output in terms of quantities (say kg of rice from the farm sector, or meters of textile cloth from the enterprise) rather than dollar amounts. This approach has been in most developing countries data sets (Jamison et.al, 1982, 1987) and has been regarded as a useful approach for one reason: quantity in kilogram eliminates the necessity to include regional price indices to account for differing price for the same good and quantity.

Why value - Added Production Function?

However, production function with either gross output value of value-added as the dependent variable is a better one because it captures both the direct and indirect effects of education on the output. There are three potential benefits of education to farm (or non-farm) production: the "worker effect" which improves the quality of labor controlling for non-labor inputs, the "allocative effect" which improves farmer's ability to process information and allocate inputs across competing uses, and "input selection effect" which allows the farmer to selectively purchase inputs in the short run and operate in the long run are all captured in the process (Phillips 1987). Use of gross output value captures the first two effects and value-added captures all three effects. (Kilogram output captures only the workers effect). Therefore, we work with value added production (not gross revenues or quantities) which gives a better insight into how education might affect farm (or non-farm) production.

The earnings function method is explained by two liner regression analyses: the 'basic' and 'extended' methods. The 'basic' earning function method comes from the seminal work of Mincer (1974), which involves the fitting of a semi-log ordinary least squares regression using the natural logarithm of earnings as the dependent variable, and years of schooling and potential years of labor market experience and its square as independent variables (see equation 1 below). In this semi-log earnings function specification, the co-efficient on years of schooling can be interpreted as the average private rate of return to one additional year of education, regardless of the education level to which this year of schooling refers.

Methodological Implications in this Study

By using the 'Basic' earnings function method, this study investigated the extent to which additional years of schooling contribute to economic development by focusing on the following points. First of all, it investigated the returns to years of schooling at the national level by gender and rural/urban areas of Nepal. Second, it analyzed the returns by gender at the ecological belt. Third, it looked at the returns by types of school which include public and private schools; fourth, it investigated the returns by religion. Fifth, it estimated the returns to years of schooling by economic sector. Finally, it estimated the returns to years of schooling by income quintiles.

By using 'extended' earnings function method, the study investigated the private rates of return to different levels of education. It covers the following six areas: a) returns at the national levels by gender and rural/urban areas of Nepal; b) returns by gender at the ecological belt c) returns by types of school; d) returns by, religious group. e) returns by economic sectors, and f) returns by income quintiles.

This study applied and extended the basic Mincerian earnings function method to calculate rate of return to education from farm household and non-farm household in the non-wage sector.

This study used short cut methods to estimate rough social rate of returns to education.

Models used in Estimation

There are there main empirical methodologies used in education-earnings literature. The "elaborate" method that requires detailed age-earnings data to calculate the internal rate of return to educational investments. This study could have used this method to calculate rates of return to different levels of education but the researcher do not desire to do so for main two reasons: 1) Although there are sufficient number of age-earnings observations in any educational level for the entire sample, the same is not true when we segregate the entire sample by gender, religion, sector, region and quintile groups: 2) age-earnings observations at initial years of graduation from any given level of education suffer from short-durational incidence of "graduate unemployment" (Psacharopoulos, 1981), and therefore exhibit saw-tooth pattern making the rate of return analysis very sensitive. The second method is the short-cut method, a useful approach when only average earnings (overall ages) are available. But by definition, it is an inferior method. The final method discussed in detail is the Mincerian earnings function and its extension to include both levels of education dimension and farm and non-farm productivity. Flexibility of this functional form (and other useful features described above) enables us to analyze earnings data for individuals in the wage-sector and households in farm and non-farm enterprises most efficiently, comparably (across different groups of regions or sectors) and consistently. Therefore, the researcher will follow the "Mincerian" approach. The

researcher is going to use this earnings function and its variations for our estimation of rates of return to education. Four basic forms to calculate private rate of return and one more model to calculate social rate of return is also presented below.

Model 1: Basic Method

Standard Approach: Continuous school variable

$$InY_h = b_0 + b_1 S_h + b_2 E_i + b_3 E_i{}^2 + b_4 InW_i + \mu \ \dots \ (1)$$

In = Natural logarithm, Y = yearly earnings in rupees, b_0=intercept, S= schooling in years, E = experience = age - S-6, E^2 = experience - squared, W = number of weeks the person worked in that year, μ = error term,

Model 2: Extended Method

Dummy Approach: Different levels of education enter as dummy variables (Less-than-primary schooling level as control dummy)

$$InY_n = \beta_0 + \beta_1 P + \beta_2 S + \beta_3 T + \beta_4 E_i + \beta_5 E_i{}^2 + \beta_6 InWi + \varepsilon \ \dots \ (2)$$

Where In = Natural logarithm, Y= yearly earnings in rupees, S = schooling in years, E = experience = age-S-6; E^2 = experience –squared, W = number of weeks the person worked in that year, P = primary level, S = secondary level, T = Tertiary level, μ = error term.

In equation (1), education variable enters as a continuous (years-of-schooling) variable, and therefore coefficient, beta, on S gives rate of return to an extra year in school. Weeks - worked per year is included to compensate for individual labor supply. In equation (2), education variable is broken up into five dummies: less than primary, primary, secondary and tertiary. Less-than primary is the control dummy and does not enter in the equation. The reason for this dummy-approach is that it enables

us to calculate rate of return to a particular level of education relative to other levels. The coefficient for each dummy gives the earnings premium (not rate of return directly) associated with each successive level of education relative to less-than primary level.

In this case, the rates of return to different levels are derived from the estimated coefficients B_1, B_2, B_3 in the above function as follows:

R (primary vs. less than primary) $= B_1/S_P$

R (secondary vs. primary) $= (B_2-B_1)/(S_S-S_P)$

R (university vs. secondary) $= (B_3-B_2)/ (S_u-S_s)$

Where S denotes the number of years of schooling of the subscripted educational level (p = primary, s =secondary, u = university). Care has to be taken regarding the foregone earnings of primary school -aged children. In the empirical analysis that follows we have assigned only two years of foregone earnings to this group (Psacharopoulos and Ng, 1992).

Model 3: Household Net Revenues from Agriculture

$$Iny_h = \alpha + \beta S_h + \lambda EX_h + \gamma EX_h 2 + \rho InT_h + kInL_h + \partial InK_h + \eta \ \ldots\ldots (3)$$

Where Y is the household income from agriculture (total output-expenditure), S = average education of household, EX = experience, and its squared term, T = Technology cost, K = Land-value, L = Labor cost (in-house plus hired).

In equation (3), coefficient on household-education (measured as years-of – schooling) is the rate of return to an extra year in school, controlling for input variables. Coefficients on the input variables measure elasticities: percent change in net earnings per percent change in any one of these inputs. Equation (4) is a very

similar specification to equation (3). A more detailed description of the variables used in these four equations will be provided below.

Model 4: Household Net Revenues from Non-Agriculture Enterprise

$$InY_h = \alpha + \beta S_h + \lambda EX_h + \gamma EX^2{}_h + \rho inK_h + \kappa lnOC_h + \sigma lnL_h + \mu \dots (4)$$

Where Y is the household income from enterprise (total output-expenditure), S = average education of household, EX = experience, and its squared term, K = market (capital) value of the enterprise, OC = operation cost, L = labor cost.

Model 5: Social Rate of Return from wage Earnings (Short-Cut Method)

The following example refers to calculating rate of return to university level, but same approach can be replicated for other levels of education.

At university level, private return, R_p equal (average earnings at this level, W_u minus average earnings at secondary level, W_s) divided by (years of schooling at this level, S multiplied by average earnings at secondary level, W_s. In equation-from it is: $R_p = (W_u - W_s)/(S*W_s)$

For social return R_s calculation, we get public expenditure per student at this level (*Cu*) and then get social return using the following equation: $R_s = (W_u - W_s)/S*(W_s + C_u)$.

Two equations give this expression: $R_s = [R_p/(1 + C_u/W_s)]$. In my final calculation, I take the estimates for private returns from regression coefficients and discount is by a factor which equals one plus the ratio of per student public subsidy at university-level to a university graduate's forgone earnings because he chose to enroll at that level.

The researcher will be working with these five models and their variations in estimation.

Data Analysis

Data obtained from the household surveys was used in quantitative analysis. The data was analyzed without and with outliers. An outlying observation, or outlier, is an observation that is much different (either very small or very large) in relation to the observations in the sample. More precisely, an outlier is an observation from a different population to that generating the remaining sample observations. The inclusion or exclusion of such an observation, especially if the sample size is small, can substantially alter the results of regression analysis (Gujarati, 2006).

0.5 percent each of both ends of the per capita income distribution are defined as outliers and excluded from the analysis in both 1995/96 and 2003/04 data. 38 outliers in wage sector, 25 outliers in agriculture household sector and 9 outliers in non-agriculture sectors were in 1995/96 data out of 3696, 2519 and 802 observations respectively. Similarly, 43 outliers in wage sector, 29 outliers in agriculture household sector and 11 outliers in non-agriculture sectors were in 2003/04 data out of 4331, 2841 and 1083 observations respectively.

All the testable coefficients were derived by using multiple regression technique. STATA Version 8.2 computer package was used to analyze data. Hypotheses testing were done in 95%, 99% and 99.99% confidence interval. Multicollinearity, heteroscedasticity, and normality test were carried out to diagnose the violence.

Concluding Remarks

The internal rate of return of an education project can be estimated from either the private or the social point of view. In this study, both the private and social rates of return to education were calculated. Therefore, using the Mincerian earnings function method, this study examines the following key significant issues that related to economics of education in Nepal: a) how private rates of return to education vary within country, by gender, belt, religion, type of school, sectors, and income quintiles; b) how private rates of return operate in a lower income country Nepal in the during 1995/96; and 2003/04; c) how private rates of return to education vary by level-primary, secondary, and higher education; d) how rate of returns to education vary by farm household income and non-form household income and e) how social rate of returns operate in Nepal.

CHAPTER 4

FINDINGS AND DISCUSSIONS OF THE STUDY

This chapter presents eight statistical hypotheses testing and summary of the results of the rates of return analysis carried out based on the NLSS I and NLSS II data.

Coefficients of years of schooling and education level were tested at significance level .05, .01 and 0.001. All the coefficients were significant accept household head's schooling in farm production in 2003/04. Hence, the proposed null hypotheses presented below were all rejected. It implies that additional years of schooling contributes to individual earnings significantly; there is a significant contribution of level of education to individual earnings; and there is a significant contribution of average household schooling; Highest schooling in the household; and household head's schooling to household value added income.

A series of summary table that illustrate the statistical analysis in this chapter are also presented in appendix A (based on the model one), Appendix B (based on the model two), Appendix C (based on the model three), Appendix D (based on the model four), and Appendix E (based on the model five).

Significance Test of Statistical Hypotheses

The details about the significant results and relationships are explained are following sections.

Statistical Hypothesis 1: The additional years of schooling contributes to enhance individual earnings.

H_0: $b_1 = 0$ i.e. The additional years of schooling does not contribute to enhance individual earnings.

H_1: $b_1 \neq 0$ i.e. The additional years of schooling does not contribute to enhance individual earnings.

Let's test, at the 0.01 significance level, whether school year is a significant explanatory variable for wage income. Testing the significance of an explanatory variable is always a two-tailed test (Rubin and Levin, 2000). Since the p value (see appendix N) is less then 0.01 for school year variable. We reject null hypothesis (H_0) and accept alternative hypothesis (H_1). Now we can conclude that b_1 is significantly different from zero. In other word, school year is a significant explanatory variable. p values are also less than at 0.05 and 0.001 significance level. We can conclude that school year is a significant explanatory variable of wage. In other word, we can conclude that the additional years of schooling contribute to enhance earning of the individual.

Similarly, additional school year is a significant explanatory variable for wage income by gender, location, belts, type of school, religion, sector, and income quintile.

Statistical Hypothesis 2: Primary education contributes to enhance individual earnings.

H_0: $b_1 = 0$ i.e. Primary education does not contribute to enhance individual earnings.

H_1: $b_1 \neq 0$ i.e. Primary education contributes to enhance individual earnings.

Since the p value (see appendix P) is less then 0.01. We reject H_0 and accept H_1. Now we can conclude that coefficient of primary education is significantly different from zero. Primary education is a significant explanatory variable for wage income. In other word, primary education contributes to enhance earning of the individuals.

p values is also less than 0.05 and 0.001 (see appendix P). We can conclude that coefficient of years of schooling is a significant explanatory variable of wage income.

Statistical Hypothesis 3: The additional years of average household schooling contributes to enhance farm household net income.

H_0: $b_1 = 0$ i.e. The additional years of average household schooling does not contribute to enhance farm household net income.

. H_1: $b_1 \neq 0$ i.e. The additional years of average household schooling contributes to enhance farm household net income.

Since the p value (see appendix P) is less then 0.01. We reject H_0 and accept H_1. Now we can conclude that b_1 is significantly different from zero. Average household school year is a significant explanatory variable. In other word, additional years of average household schooling contribute to enhance farm household net income.

Since p values are also less than 0.05 and 0.001 (see appendix P). We can conclude that average household school year is a significant explanatory variable of household net income at 0.05 and 0.001 significance level.

Statistical Hypothesis 4: The additional years of Highest schooling in the household contributes farm household net income.

H_0: $b_1 = 0$ i.e. The additional years of Highest schooling in the household does not contribute farm household net income.

H_1: $b_1 \neq 0$ i.e. The additional years of Highest schooling in the household contributes farm household net income.

Since the p value (see appendix P) is less than 0.01. We reject H_0 and accept H_1. Now we can conclude that b_1 is significantly different from zero. The additional highest schooling in the household is a significant explanatory variable. In other word, additional highest schooling in the household contributes farm household net income.

Here, p values are also less than 0.05 and 0.001 (see appendix P). We can conclude that highest schooling in the household variable is a significant explanatory variable of household net income.

Statistical Hypothesis 5: The additional years of household head's schooling contributes to enhance net earnings of the farm households.

$H0$: $b1 = 0$ i.e. The additional years of household head's schooling does not contribute to enhance net earnings of the farm households..

$H1$: $b1 \neq 0$ i.e. The additional years of household head's schooling contributes to enhance net earnings of the farm households.

Since the p value (see appendix P) is greater than 0.01. We accept H_0 and reject H_1. Now we can conclude that b_1 is not significantly different from zero. Household head's schooling is not a significant explanatory variable. In other word, household head's schooling does not contribute to enhance net earnings of the farm households.

Since p values are also greater than 0.05 and 0.001 (see appendix P). We can conclude that household head's schooling is not a significant explanatory variable of household net income.

Statistical Hypothesis 6: The additional years of average household schooling contributes to enhance non-farm household net income.

H_0: $b_1 = 0$ i.e. The additional years of average household schooling does not contribute to enhance non-farm household net income.

. H_1: $b_1 \neq 0$ i.e. The additional years of average household schooling contributes to enhance non-farm household net income.

Since the p value (see appendix P) is less then 0.01. We reject H_0 and accept H_1. Now we can conclude that b_1 is significantly different from zero. Average household school year is a significant explanatory variable. In other word, average household school year contributes to enhance non farm household net income.

Since p values are also less than 0.05 and 0.001 (see appendix P). We can conclude that average household school year is a significant explanatory variable of non farm household net income at 0.05 and 0.001significance level.

Statistical Hypothesis 7: The additional years of Highest schooling in the household contributes non-farm household net income.

H_0: $b_1 = 0$ i.e. The additional years of Highest schooling in the household does not contribute non-farm household net income.

H_1: $b_1 \neq 0$ i.e. The additional years of Highest schooling in the household contributes non-farm household net income.

Since the p value (see appendix P) is less then 0.01. We reject H_0 and accept H_1. Now we can conclude that b_1 is significantly different from zero. In other word, highest schooling in the households is a significant explanatory variable.

p values are also less than 0.05 and 0.001 (see appendix P). We can conclude that highest schooling in the households is a significant explanatory variable of non farm household net income.

Statistical Hypothesis 8: The additional years of household head's schooling contributes to enhance net earnings of the non-farm households.

H_0: $b_1 = 0$ i.e. The additional years of household head's schooling does not contribute to enhance net earnings of the non-farm households.

H_1: $b_1 \neq 0$ i.e. The additional years of household head's schooling contributes to enhance net earnings of the non-farm households.

Since p value (see appendix P) is less then 0.01. We reject H_0 and accept H_1. Now we can conclude that b_1 is significantly different from zero. In other word, household head's schooling is a significant explanatory variable.

Since p values are also less than 0.05 and 0.001 (see appendix P). We can conclude that household head's schooling is a significant explanatory variable of non farm household net income.

Dealing with Research Questions

Research question wise rates of return are presented below.

Research Question 1

To what extent have additional years of schooling contributed to individual's earning in Nepal by national level, gender, urban/rural areas, ecological belt, religion, types of school, economic sector, and income quintiles in the wage sector?

The Private Rate of Return to Years of Schooling in the Wage Sector

This section presents private rates of return to each additional years of schooling in Nepal by urban/rural, gender, ecological belt, type of school, religion, economic sectors, and income quintiles.

The private rates return to years of schooling in rural and urban Nepal. It should be noted that the Mincer - type earnings function, originally developed and based on data for United States, can be successfully applied to the study the individual earnings power in a less developed country like Nepal. The signs and statistical significance of the regression coefficients and percentage of earnings variance explained by the equation indicate the good performance of our basic model (Appendix A).

Our basic model explains 85% of the variation in earnings. The overall rate of return to an extra year in school is 9% in 2003 (coefficient = .089, t- value = 36.98). In other word, a rate of return of 9 percent in additional years of schooling implies that if an individual invested Rs. 1, 00,000 on an additional year of schooling, his or her annual income would be Rs. 8,000. Experience and its squared terms have coefficients of statistical significance and right signs, positive and negative respectively, and elasticity of earnings with respect to weeks worked is 1.01, greater than unity. This 9% return to schooling is low estimates, compared to other studies.

The return for males is slightly higher (8.1 percent) than for females (8.0 percent). The rate of return to female is higher than males in 1995/96 whereas it is almost same in 2003/04.

The return in urban areas is higher than that in rural areas in 1995/96 and 2003/04. In urban area, the rate of return for females is higher than that for males, whereas in rural area, the rate of return for males is higher than that for females.

The rates of return to additional years of schooling have increased in 2003/04 as compared to 1995/96 (Table 4.1)

There are at least three reasons why we might expect rates of return to schooling differ by gender. First, cost of resources to invest in schooling might be less for males because their gender roles allow them to spend more time at school (females might have to help their mothers at household work, look after younger siblings etc.). Second, labor markets may be in disequilibrium either because there is sex-discrimination or because gender specific traits such as manual. Dexterity, stamina, or passiveness might make moderately schooled females more productive in certain industries. Third, cultural norms, in a country like Nepal where after-marriage female-hours are mostly spent at home-make females less likely to participate in labor markets even if they are educated.

Table 4.1

The Coefficient on Years of Schooling and F Statistics by Gender and Urban/Rural Areas in Nepal (%), Dependent Variable = In Y

	Mean annual income (Rs.)		Mean years of schooling		Coefficient (Percent)		No. of observation	
	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004
Nepal								
Overall	9889	24311	2.5	3.5	8.2 (28.6)***	9.0 (37.0)***	3696	4331
Male	11898	31293	3.25	4.3	7.0 (14.8)***	8.1 (27.4)***	2527	2891
Female	5547	10293	1.06	2	8.7 (20.8)***	7.9 (18.9)***	1169	1440
Rural Nepal								
Over all	6100	10645	1.75	2..5	5.7 (15.8)***	6.7 (22.2)***	3085	3269
Male	7346	13503	2.36	3.2	4.2 (10.2)***	5.8 (15.8)***	2074	2133
Female	3544	5278	0.51	1.2	4.8 (5.0)***	3.0 (5.5)***	1011	1136
Urban Nepal								
Overall	29020	66378	6.6	6.8	8.4 (14.6)***	10.4 (21.4)***	611	1062
Male	32737	81355	7.2	7.5	7.7 (11.1)***	9.0 (15.7)***	453	758
Female	18361	29033	4.6	5	8.1 (8.1)***	12.2 (13.2)***	158	304

Note: t-statistics are in parentheses; p<0.05 (*); p<0.01 (**); p< 0.001 (***)
Source: NLSS I and NLSS II

Figure 4.1: Rates of Return by Gender, Location, Ecological Belt, and Types of Schools (2003/04)
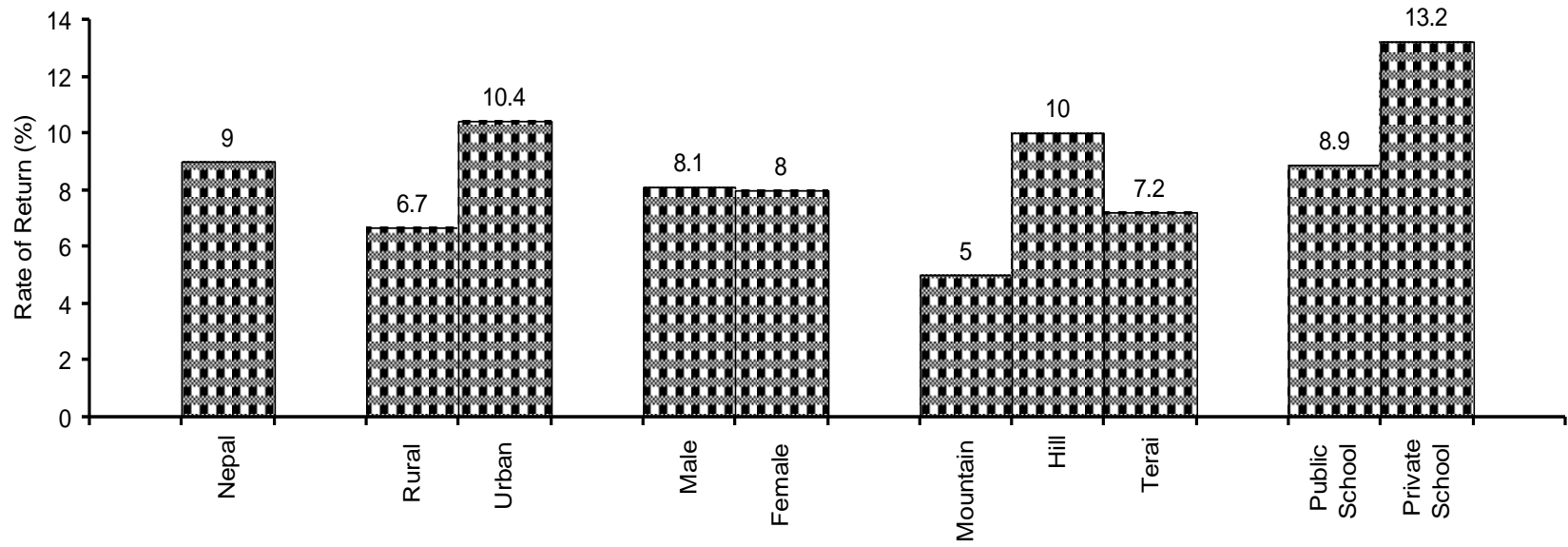
The rate of return to female is higher than male even though females earn less on average and this paradoxical result suggests that overall; females' forgone earnings are lower than that of males. One reason might be a measurement problem, where we fail to capture the real opportunity costs of females going to school. Less-educated females have smaller annual earnings from wage-sector because they do more of non-wage work that is not measured. And this downward-bias in measurement for females with low education means educated females forgo lower earnings when they attend more years-of-schooling.

Thus higher rates of return earnings-experience profile lies slightly higher and are flatter for females, as the impact of experience on earnings is relatively smaller. This can be seen though a larger constant tern and smaller experience-coefficient for fameless. Seasonality of employment (weeks worked) has approximately the same effect for both sexes. Experience variable, as defined, is usually not a very good proxy for actual female work experience because of their child-bearing trait. Nevertheless, the variable is highly significant in our specification.

The private rate of return to years of schooling across ecological belt. This study also breaks down the rates of returns to years of schooling into gender at the ecological belt in Nepal. Table 4.2 shows the rates of return in different ecological belt with their Mean years of schooling and annual income. The returns of mountain, hill, and Terai regions are 5 percent, 10 percent, and 7.2 percent respectively. The rate of return in hill is highest among the ecological belt. The rates of return for females are higher in hill and mountain region where as the rate of return for male is higher in Terai region. The rate of return for male is higher than female in Terai region.

There is no return to additional years of schooling for both males and females in mountain belt. The rates of return have increased in all belt in 2003/04 as compared to 1995/96.

Table 4.2
The Coefficient on Years of Schooling and F Statistics by Gender and Ecological Belt in Nepal (%), Dependent Variable = In Y

	Mean annual income (Rs.)		Mean years of Schooling		Coefficient (Percent)		No. of observation	
	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004
Mountain								
Overall	5335	9829	1.5	3	2.4 (2.3)**	5.0 (6.1)***	496	398
Male	6364	11897	1.9	3.6	-0.2 (0.2)	2.6 (2.7)***	342	275
Female	3051	5205	0.6	1.5	-0.6 (0.3)	4.5 (3.3)***	154	123
Hill								
Overall	15683	41459	4	4.7	7.4 (18.0)***	10.0 (25.2)***	1502	1725
Male	18772	53658	4.9	5.5	5.6 (11.2)***	8.3 (17.2)***	1047	1150
Female	8576	17061	2	3.1	8.6 (11.8)***	10.0 (15.4)***	455	575
Terai								
Overall	6093	13525	1.6	2.7	6.6 (14.1)***	7.2 (22.4)***	1698	2208
Male	7236	17388	2.17	3.5	5.8 (11.0)***	7 (7.0)***	1138	1466
Female	3772	5892	0.4	1.2	5.7 (4.1)***	4.1 (6.9)***	560	742

Note: t-statistics are in parentheses; p<0.05 (*); p<0.01 (**); p< 0.001 (***)
Source: NLSS I and NLSS II

Ecological belt also differ both in educational opportunities available, labor market settings and opportunities, and differential quality of schools across the belt, we would expect rates of return to education differ across them.

The private rate of return to years of schooling by types of school. This study finds that the rates of return to years of schooling in private education are higher than those in public education. The return in public education is 8.9 percent, while it is 13.1 percent in private education. The rates of return to additional years of schooling for both public and private schooling have increased in 2003/04 as compared to 1995/96.

The returns in private education are higher because quality of private education is better than public education Nepal. Therefore, the rates of returns to public education are lower. In addition, students at Private schools are usually from families with higher social backgrounds. Therefore, Private school graduates will have greater opportunity to obtain highly paid jobs.

Table 4.3
The Coefficient on Years of Schooling and F Statistics by Gender & Types of School in Nepal (%), Dependent Variable = In Y

	Mean annual income (Rs.)		Mean years of schooling		Coefficient (Percent)		No. of observation	
	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004
Public school	17489	43161	7	7.3	8.0 (27.9)***	8.9 (36.2)***	3652	4218
Private school	29835	41396	9.6	9.8	11.1 (2.9)***	13.2 (6.6)***	40	91

Note: t-statistics are in parentheses; p<0.05 (*); p<0.01 (**); p< 0.001 (***)
Source: NLSS I and NLSS II

The private rate of return to years of schooling across religion. The study finds that return for the Buddhist religions are highest (9.3 percent) followed by Hindu (9 percent) and Muslim (4 percent). The returns for Buddhist females are higher than for males. The returns for Muslim females are negative. The returns for Hindu male and female are almost equal.

Individuals with Muslim religious background are less educated and their average income is lower than other religious groups.

The returns to female education are higher in Hindu, Buddhist and other religion whereas Muslim women have no return to education. The rates of returns have increased in 2003/04 as compared to 1995/96 for Hindu, Buddhist and other religion.

Table 4.4
The Coefficient on Years of Schooling and F Statistics by Gender & Religion in Nepal (%),Dependent Variable = In Y

	Mean Annual income (Rs.)		Mean years of schooling		Coefficient (Percent)		No. of observation	
	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004
Hindu								
Over all	9624	26539	2.58	3.8	8.1 (26.7)***	9.0 (33.6)***	3190	3458
Male	11616	34444	3.32	4.7	7.0 (19.6)***	8.1 (24.7)***	2169	2305
Female	5394	10735	1.01	2.1	8.7 (13.2)***	8.0 (16.5)***	1021	1153
Buddhist								
Over all	14061	19725	2.94	2.9	7.6 (7.7)***	9.3 (10.7)***	290	412
Male	15967	23550	3.12	3.1	6.8 (5.7)***	8.2 (7.9)***	209	279
Female	9142	11701	2.46	2.4	7.6 (5.5)***	9.3 (7.5)***	81	133
Muslim								
Over all	7835	10572	1.25	1.4	10.3 (5.2)***	4.0 (4.0)***	157	275
Male	10020	12482	1.76	2	9.4 (4.0)***	3.4 (1.1)	110	194
Female	2724	5999	0.06	1	-2.8 (0.3)***	-1.7 (2.8)***	47	81
Other								
Over all	9146	13362	2.66	2.6	8.1 (3.4)***	11.5 (7.8)***	59	186
Male	11077	18437	3.79	3.2	6.0 (1.9)****	11.2 (6.1)***	39	113
Female	5381	5507	0.45	1.8	6.8 (1.2)***	4.8 (2.0)****	20	73

Note: t-statistics are in parentheses; p<0.05 (*); p<0.01 (**); p< 0.001 (***)
Source: NLSS I and NLSS II

Figure 4.2: Rate of Return by Religion, Economic Sectors, and Income Quintiles (2003/04)
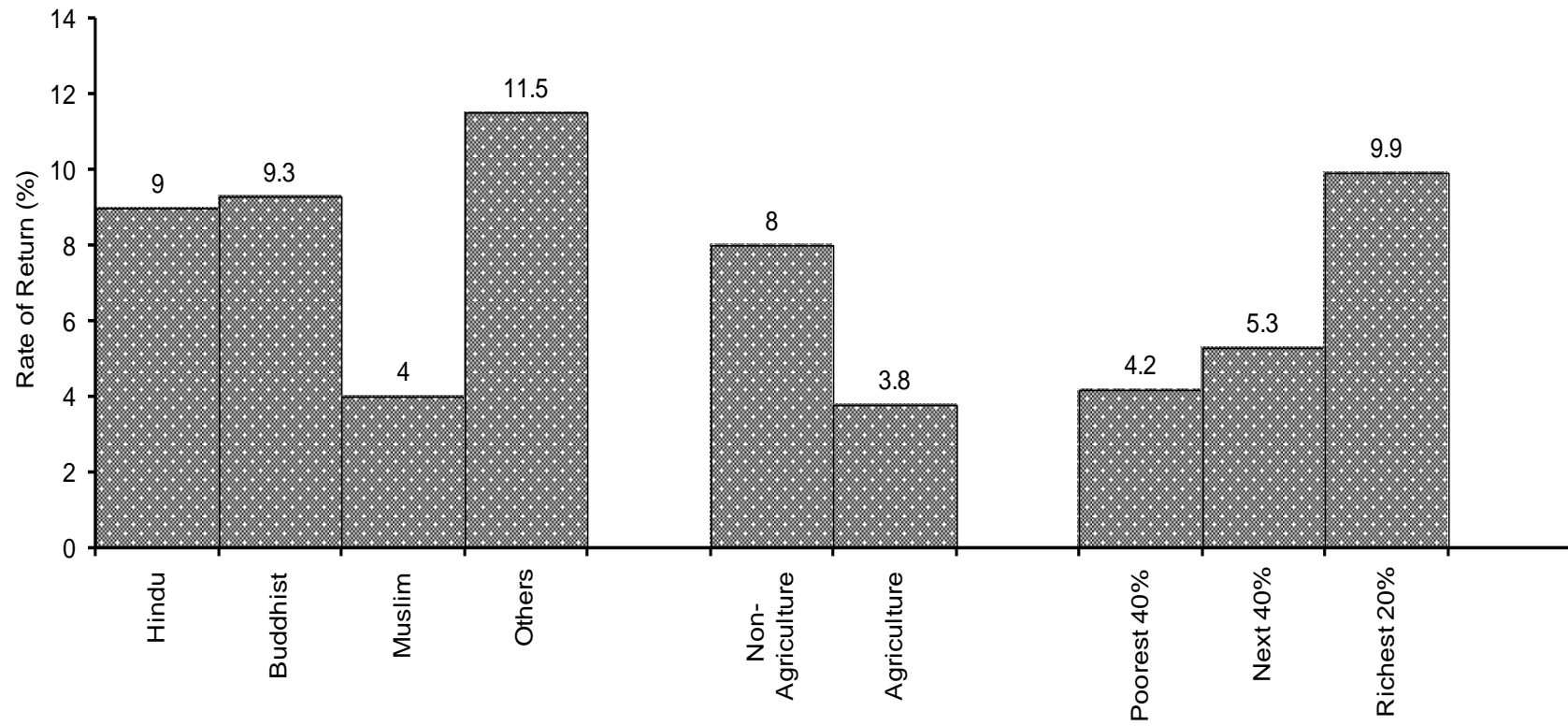
The private rate of return to years of schooling across economic sectors. The return in non-agricultural sector (8 percent) is higher than in agriculture sector (3.8 percent) in Nepal. In non agricultural sector, the returns for females are higher than that for males. On the other hand, in rate of return for females is lower than males in agriculture sector. In 1995/96, the returns to female education is higher in both agriculture and non-agriculture sector than males education. The rates of return to schooling have increased in 2003/04 as compared to 1995/96.

This suggests that the labor-market is far from equilibrium regarding the productivity-enhancing role or education. Agriculture wage-sector does not seem to value years of schooling in the same way as the other sector. A reasonable explanation for this is two-fold. First, it could be that farm activities require a far smaller range of skills set relative to non-farm activities. In other words, going to an extra year in school does not significantly improve skills required in farm-activates. Second, there could be a strong signaling effect in non-agriculture labor market, i.e. educated non-agricultural workers earn more not because they have better skills but because they have better credentials.

Table 4.5
The Coefficient on Years of Schooling and F Statistics by Gender & Economic Sector in Nepal (%), Dependent Variable = In Y

	Mean annual income (Rs.)		Mean years of schooling		Coefficient (Percent)		No. of observation	
	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004	1995/96	2003/004
Non agriculture								
Over all	18204	45123	5	5.8	5.8 (15.5)***	8.0 (23.6)***	1539	2072
Male	18329	47372	5	5.8	5.4 (13.6)***	7.4 (21.1)***	1341	1760
Female	17358	32435	5	5.9	7.4 (6.5)***	10.1 (10.6)***	198	312
Agriculture								
Over all	3956	5222	1	1.5	2.2 (4.1)***	3.8 (9.2)***	2157	2259
Male	4626	6273	1.5	2	0.8 (1.4)***	3.0 (5.1)***	1186	1131
Female	3138	4168	0.33	.9	2.1 (1.7)****	1.5 (2.5)*	971	1128

Note: t-statistics are in parentheses; $p<0.05$ (*); $p<0.01$ (**); $p< 0.001$ (***)
Source: NLSS I and NLSS II

The private rate of return to years of schooling across income quintiles.
Poorest 40 percent group receives 4.2 percent return while the richest 20 percent group receives 9.9 percent return. The middle group's return is 5.3 percent

Table 4.6

The Coefficient on Years of Schooling and F Statistics by Income Quintiles in Nepal (%), Dependent Variable = In Y

	Mean annual income (Rs.)		Mean years of schooling		Coefficient (Percent)		No. of observation	
	1995/96	2003/04	1995/96	2003/04	1995/96	2003/04	1995/96	2003/04
Poorest 40%	4131	6221	1.3	1.5	4.3 (6.8)***	4.2 (8.8)***	1402	1738
Next 40%	6862	13288	1.8	3.1	4.8 (9.6)***	5.3 (12.6)***	1505	1709
Richest 20%	25897	81191	6.2	8.2	7.1 (12.5)***	9.9 (17.5)***	189	884

Note: t-statistics are in parentheses; p<0.05 (*); p<0.01 (**); p< 0.001 (***)
Source: NLSS I and NLSS II

These differentials imply that poor students get low – quality education and therefore learn fewer skills compared to a rich student with same level of education. Or if we accept there is a signaling effect in the labor market, it seems that graduates from upper quintiles get better–paying jobs simply because they have better connections.

Research Question 2

To what extent have formal education in the primary, secondary and Tertiary level contributed to individual's earning in Nepal by national level, gender,

urban/rural areas, ecological belt, religion, types of school, economic sectors and income quintiles in the wage sector ?

The Private Rates of Return across Educational Levels

This section presents private rates of return across educational levels in Nepal by urban/rural, religion, ecological belt, types of school, economic sector, and income quintile.

The private rate of return to level of education in rural and urban Nepal. Results from the alternative dummy variable specification, as seen in table 4.7 allow us to study rate of return to each successive level of education, rather than to each extra year of school. These levels, primary, secondary and tertiary refer to the highest levels completed. The coefficient on levels of education is significant in each level and rises with the successive level, as expected.

This study estimated the earnings premium associated with each level of education by taking the difference between coefficients of the successive educational variables, while controlling for experience and weeks worked. The premiums are reported in appendix O. They indicate that primary and secondary levels have similar premiums but higher education has much higher premium. By gender, premium increase with level but the rate of increase is much faster for males. By quintile groups, premiums are higher at university level for poor groups. Richest quintile premiums are highest for primary education.

The economic rates of return to different levels of education are shown in Table 4.7 and appendix B for gender in nationwide as well as rural/urban areas. The result shows that primary education has 19.4 percent, secondary education has 7.8 percent and higher education has 19.2 percent returns. Rate of return to primary

education is largest investment followed by tertiary education and secondary education. The returns to secondary education are very low in overall Nepal.

By looking at gender, female education is more profitable at primary and Tertiary levels than male education. The explanation of this finding is that earnings for skilled women relative to unskilled women are higher than the equivalent ratio for men. Moreover, rates of return to education by gender are partly determined by the fact that women often experience discrimination in the labor market. If women suffer from greater discrimination in jobs which require no education, the rates of return to education for women is higher than men's.

In rural areas, the rate of return to primary education is highest followed by tertiary and secondary education. The rates of return to primary, secondary and tertiary education for males are higher than females in rural areas. On the other hand, in urban areas, the rate of returns to primary education is highest followed by tertiary and secondary education. The rates of return to primary and secondary education for females are higher than males in urban areas. In addition, the return to primary education in urban areas are higher than in rural areas, but the returns to secondary and tertiary education in urban area are higher than in rural areas.

The result shows that primary education has 19.7 percent, secondary education has 8.6 percent and higher education has 13.3 percent returns in 1995/96. Rate of return to primary education is largest investment followed by tertiary education and secondary education. The return to secondary education is very low in overall Nepal. The rate of return to primary and secondary education has decreased in 2003/04 as compared to 1995/96. On the other hand rate of return to tertiary education has increased in 2003/04 as compared to 1995/96.

Table 4.7
Private Rates of Return to Education by Gender & Rural/Urban Areas in Nepal (%),
Dependent Variable = ln Y

Level	Nepal					
	1995/96			2003/04		
	A	M	F	A	M	F
Primary level	19.7***	14.1***	20.7***	19.4***	13.7***	15.6***
Secondary level	8.6***	8.7***	10.2***	7.8***	10.8***	7.7***
Tertiary level	13.3***	12.8***	15.3***	19.2***	16.1***	19.5***

Continuous……………

Level	Rural Nepal						Urban Nepal					
	1996/95			2003/04			1995/96			2003/04		
	A	M	F	A	M	F	A	M	F	A	M	F
Primary level	13.8***	8.1***	11.7***	16.9***	12***	8.2***	25.2***	20***	22.1***	20.4***	9.9***	31.6***
Secondary level	8***	7.5***	12.3***	6.2***	6.6***	5.5***	4***	4.4***	5***	8.5***	8.3***	11.7***
Tertiary level	11***	11***	Drop	14.1***	12.7***	Drop	11.7***	10.7***	13.6***	16.5***	17.4***	10.7***

Note: $p<0.05$ (*); $p<0.01$ (**); $p< 0.001$ (***)
A = Aggregate; M = Male; F = Female;
Source: NLSS I and NLSS II

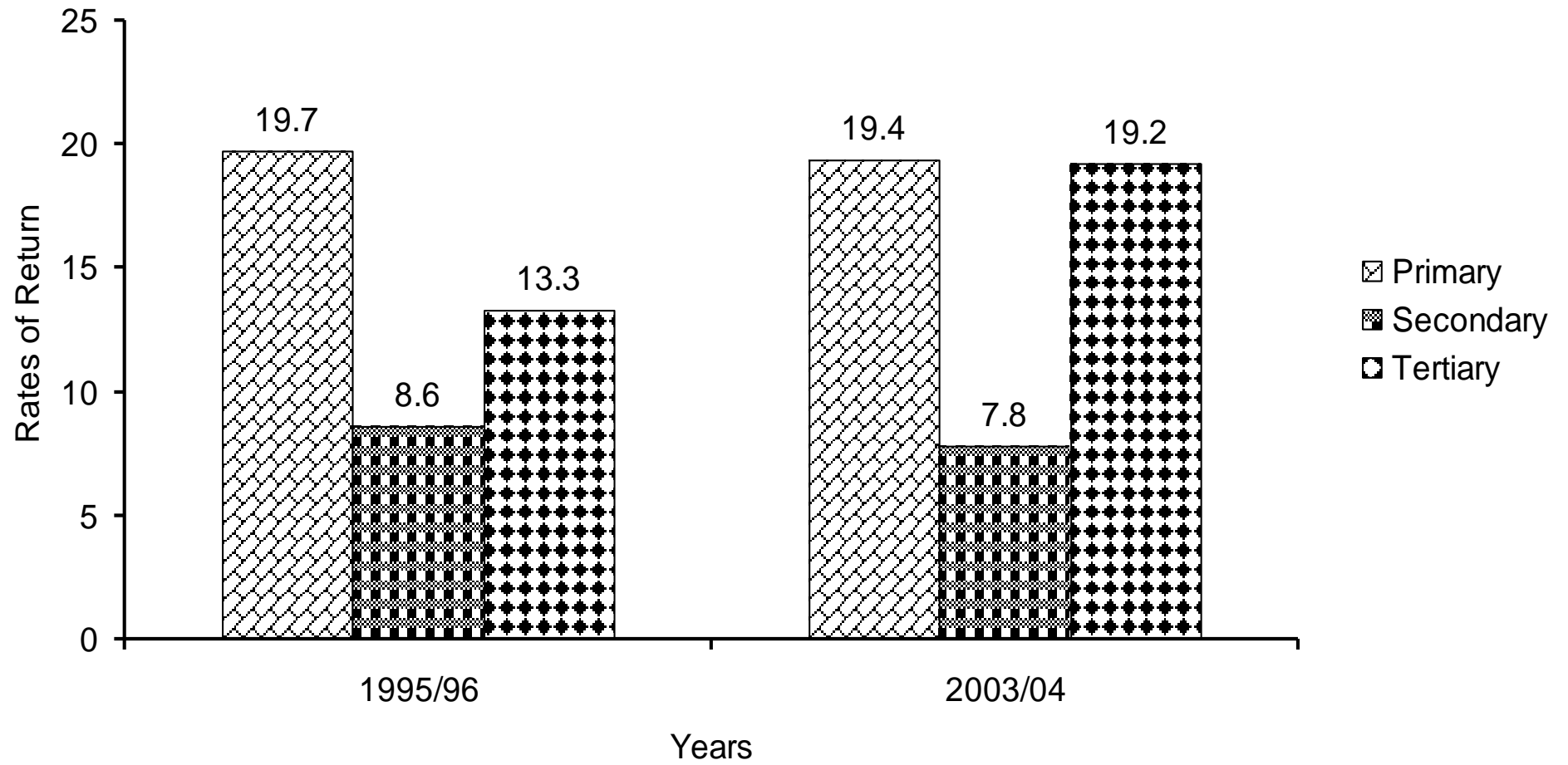Figure 4.3: Private Rates of Retun to Education at the National Level

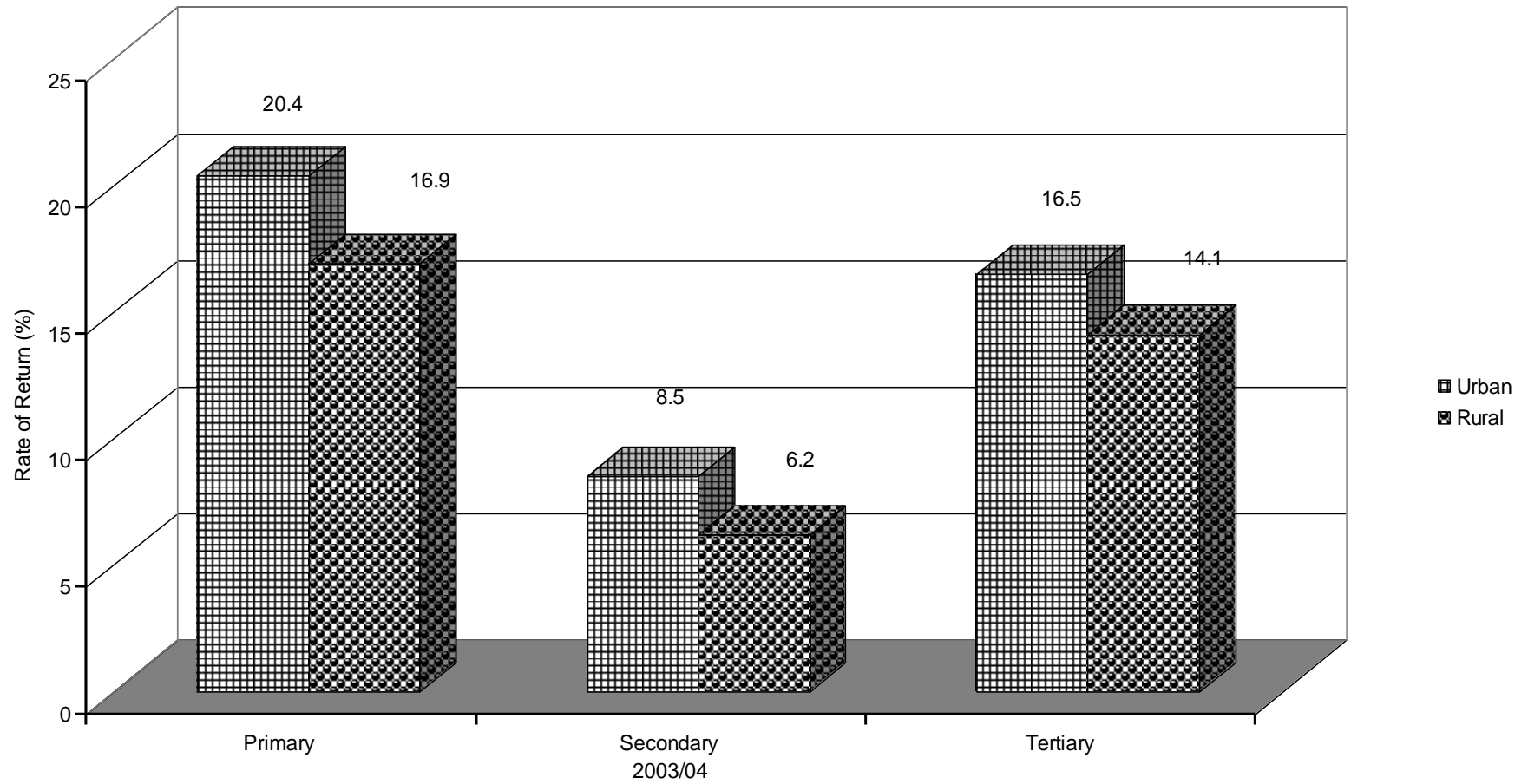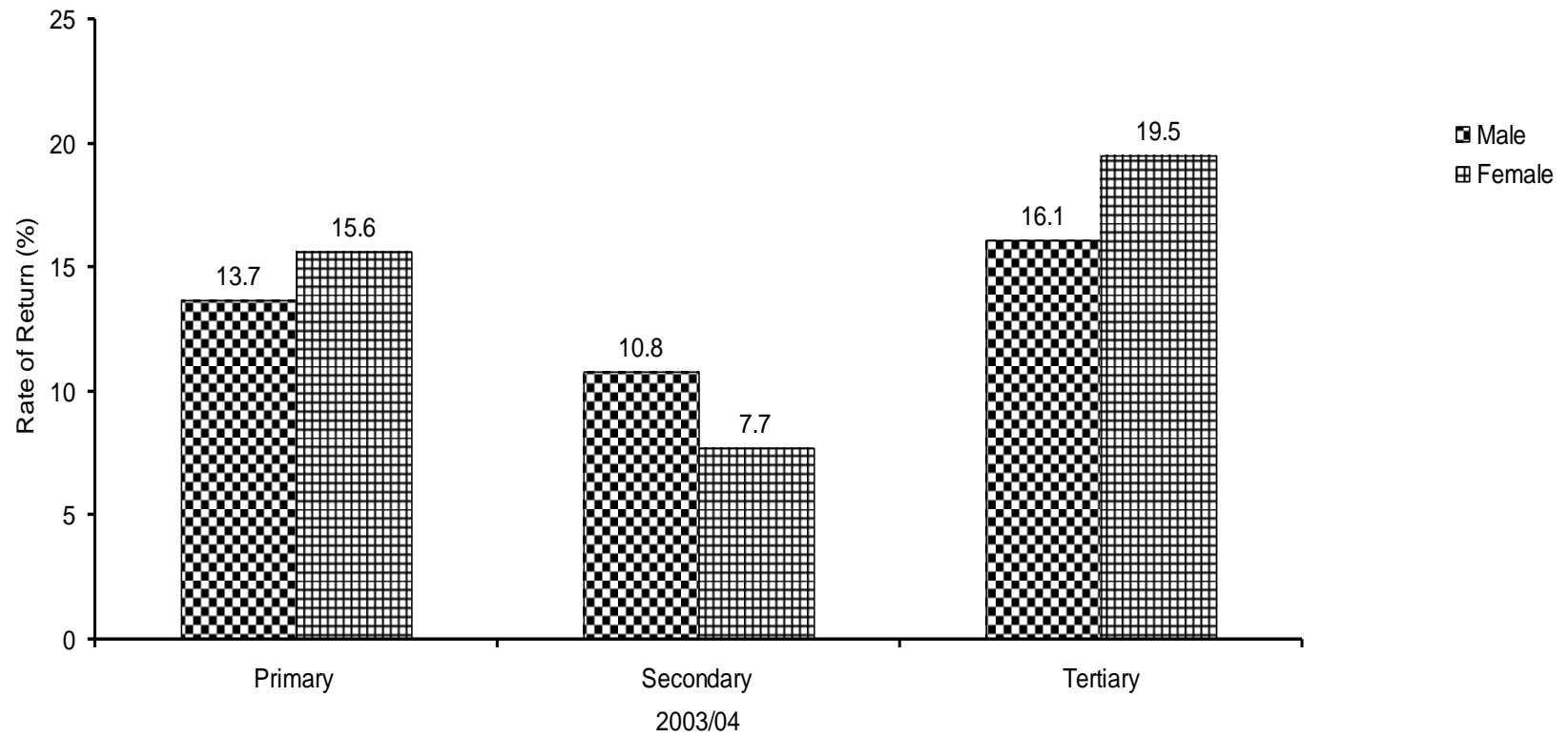Figure 4.4: Rates of Return to Education by Location

Figure 4.5: Rates of Return to Education by Level of Education & Gender

The private rate of return to education by religion. The results of rates of return to education by religion are shown in Table 4.8. Among the Hindus, primary education is the most profitable investment followed by tertiary and secondary education. Among the Buddhist, primary education is the most profitable investment followed by tertiary and secondary education. Among the Muslim, primary education is the most profitable investment followed by secondary. The tertiary education has no rate of returns among the Muslim.

The rates of return to primary, secondary, and tertiary education have decreased in 2003/04 among Hindus. The rates of return to primary and tertiary education have increased in 2003/04 and the rate of return to secondary education has decreased in 2003/04 among the Buddhist. The rates of return to primary and secondary education have decreased in 2003/04 among the Muslim.

Table 4.8
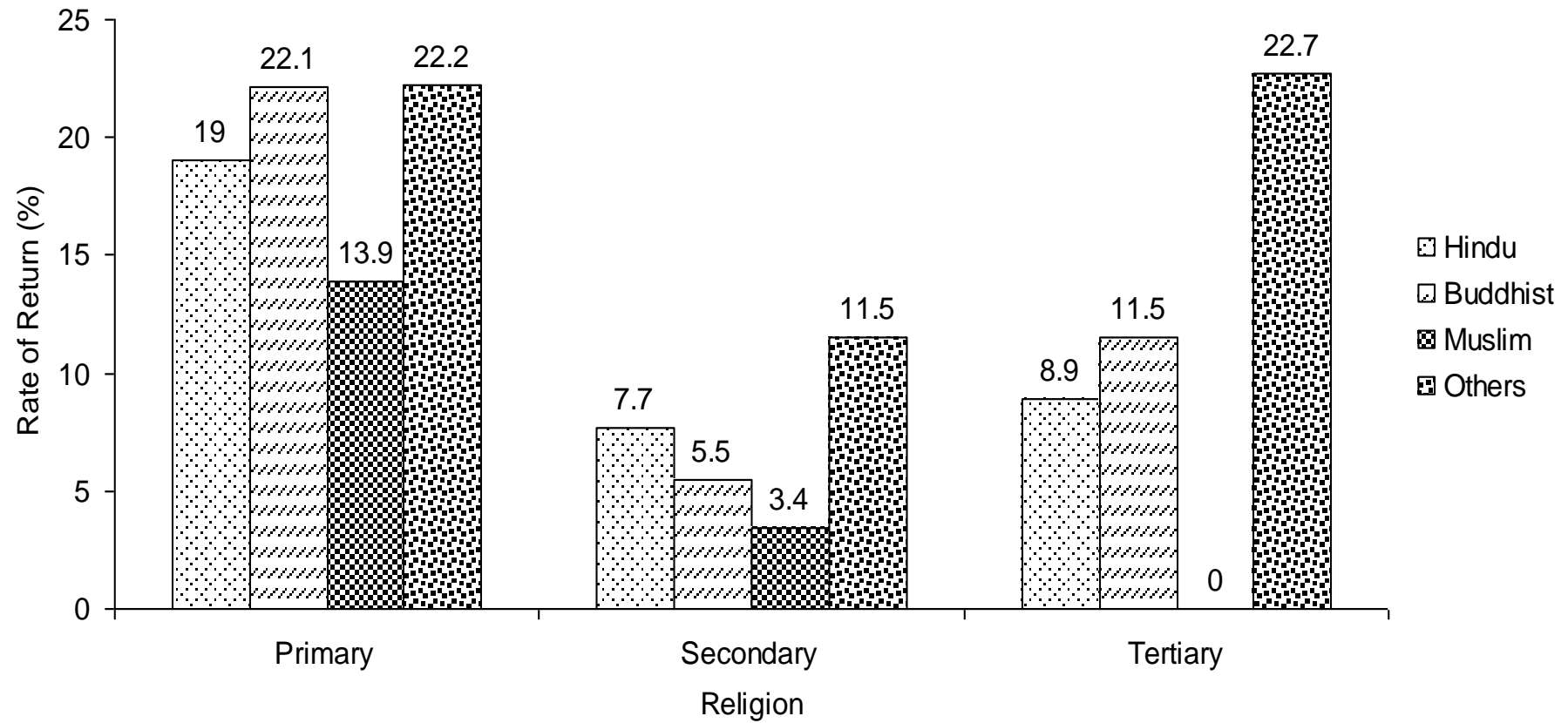Private Rates of Return to Education by Religion in Nepal (%), Dependent Variable = In Y

Level	Hindu						Buddhist					
	1995/96			2003/04			1995/96			2003/04		
	A	M	F	A	M	F	A	M	F	A	M	F
Primary level	19.4***	13.8***	20.7***	19***	13.7***	14.1***	16.7***	10.6***	8.8***	22.1***	14.3**	25.7***
Secondary level	7.8***	7.5***	11***	7.7***	7.5***	11***	9.4***	11.9***	12***	5.5***	7.6***	6***
Tertiary level	15.5***	15.4***	15.8***	8.9***	6.3***	3***	2.1***	-3**	12.7***	11.5***	15.4***	19.8***

Level	Muslim						Others					
	1995/96			2003/04			1995/96			2003/04		
	A	M	F	A	M	F	A	M	F	A	M	F
Primary level	33.1***	30.3***	Drop	13.9**	8.6	Drop	21*	12.3	30.5	22.2***	15.6***	7.3
Secondary level	17.8**	17.6**	Drop	3.4**	3.5*	Drop	13.4**	12.4*	Drop	11.5***	15.4***	-1.8
Tertiary level	Drop	Drop	Drop	Drop	Drop	Drop	1.2**	1.5	Drop	22.7***	26***	26.4

Note: $p<0.05$ (*); $p<0.01$ (**); $p<0.001$ (***), A = Aggregate; M = Male; F = Female;
Source: NLSS I and NLSS II

Figure 4.6: Rate of Return to Education by Level of Education & Religion (2003/04)

The private rate of return to education by ecological belt. Primary level has 13.6 percent, Secondary level has 5.5 percent and tertiary has 10 percent returns in mountain. In hill, primary education has highest return followed by tertiary and secondary education. Tertiary education is also most profitable investment followed by primary and secondary education in Terai. The rate of return to level of education have increased in 2003/04 in Mountain and Hill belt whereas the rate of return to level of education has decreased in 2003/04 in Terai.

Table 4.9
Private Rates of Return to Education by Ecological Belt in Nepal (%), Dependent Variable = In Y

| | Mountain belt | | | | | |
| | 1995/96 | | | 2003/04 | | |
	A	M	F	A	M	F
Primary level	1.0	-7.4	-2.5	13.6***	3.1	16.6**
Secondary level	4	2	Drop	5.5***	4.9*	9.5***
Tertiary level	11.8	13.2	Drop	10***	10.5**	Drop

| | Hill belt | | | | | |
| | 1995/96 | | | 2003/04 | | |
	A	M	F	A	M	F
Primary level	17.0***	9.0***	18.6***	19.8***	11.2***	18.1***
Secondary level	5.3***	5.5***	7.4***	7.5***	6.7***	12.2***
Tertiary level	13.2***	12.3***	15.3***	18.8***	19.3***	16.4***

| | Terai belt | | | | | |
| | 1995/96 | | | 2003/04 | | |
	A	M	F	A	M	F
Primary level	16.9***	12.3***	21.4***	16.7***	12.8***	10.3***
Secondary level	11.2***	11***	14.4*	7.1***	7.7***	6***
Tertiary level	9.2***	9.7***	Drop	17.7***	18***	9.2***

Note: $p<0.05$ (*); $p<0.01$ (**); $p< 0.001$ (***), A = Aggregate; M = Male; F = Female;
Source: NLSS I and NLSS II

Figure 4.7: Private Rates of Return to Education by Betl (2003/04)
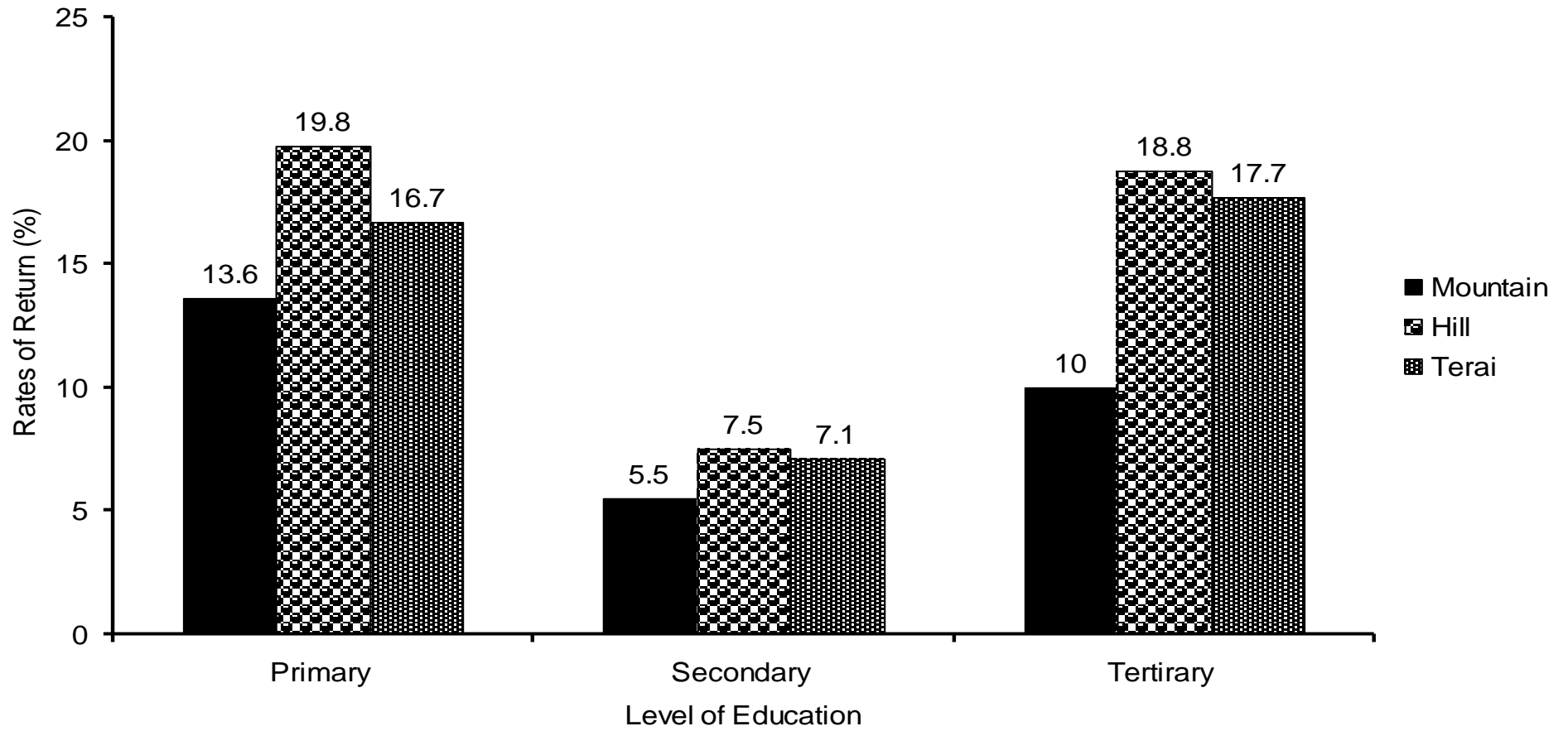
The private rate of return to level of education by types of school. The results show that economic rates of return to secondary and tertiary education in Private schools are higher than in Public schools. Therefore, from the individual point of view, private education at secondary and Tertiary levels is a more profitable investment. Public education at primary and tertiary levels is also profitable investment.
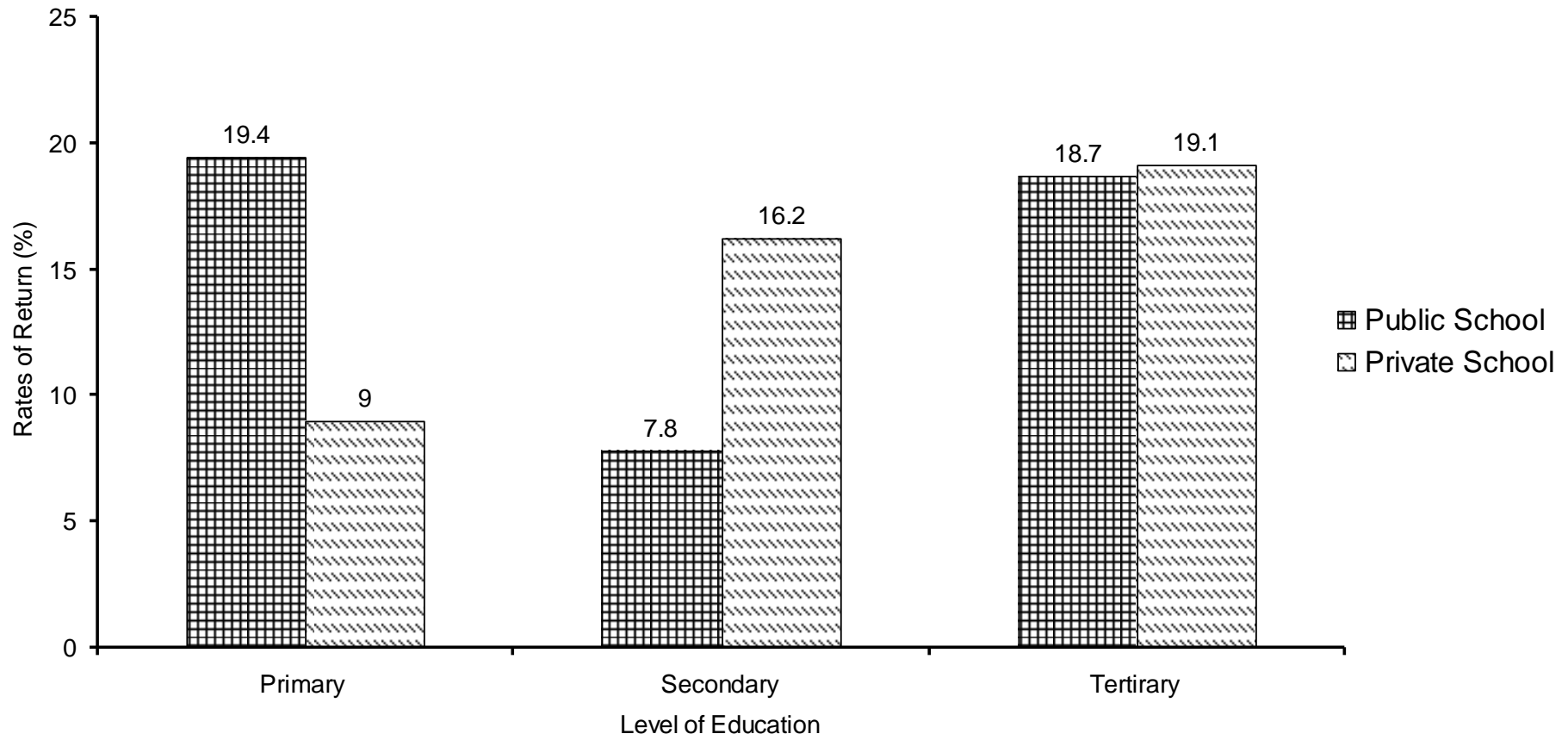
Table 4.10
Private Rates of Return to Education by Types of School in Nepal (%), Dependent Variable = In Y

Level	Public school		Private school	
	1995/96	2003/04	1995/96	2003/04
Primary level	20.0***	19.4***	-15.7	9.0
Secondary level	8.1***	7.8***	13.3	16.2***
Tertiary level	13.0***	18.7***	27.2*	19.1***

Note: p<0.05 (*); p<0.01 (**); p< 0.001 (***)
Source: NLSS I and NLSS II

Figure 4.8: Priave Rates of Return by School Types (2003/04)

The private rate of return to level of education by economic sectors. The results show that economic rates of return to primary, secondary and tertiary education in non – agricultural sector are higher than in agricultural sector. Tertiary education is the most profitable investment followed by primary and secondary education in non- agricultural sector. On the other hand, secondary and tertiary educations have no return in agricultural sector.

Table 4.11
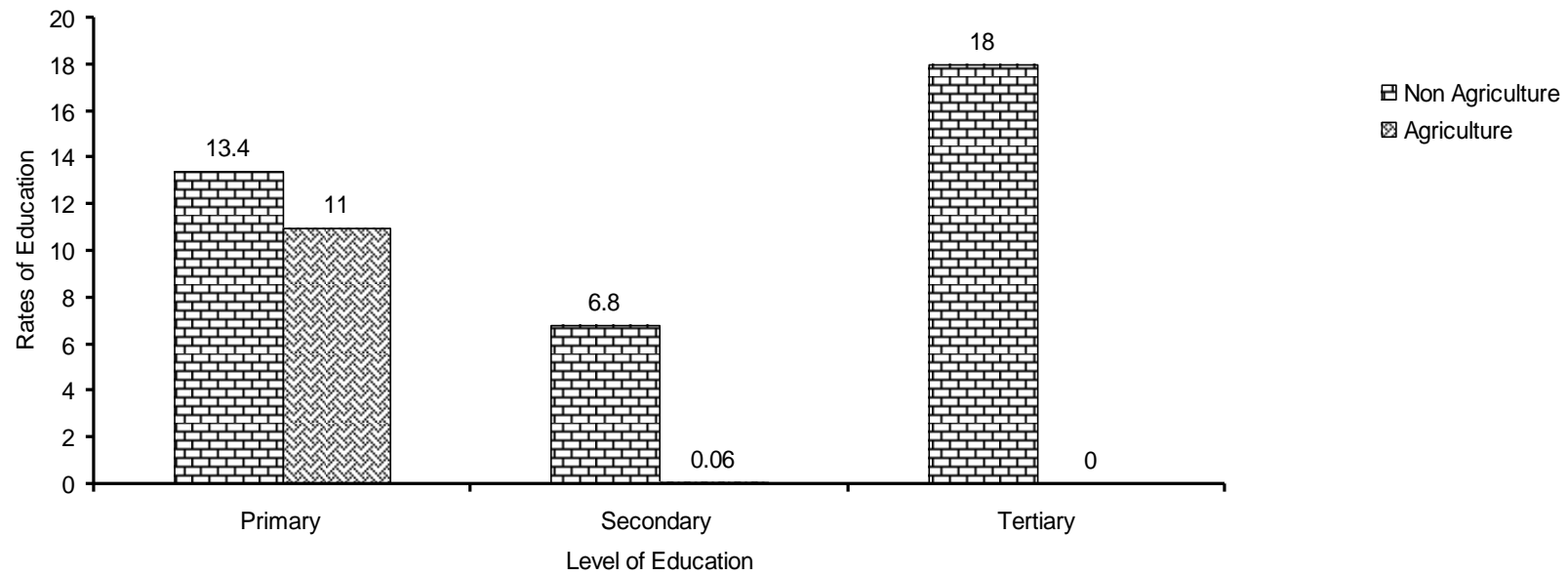Private Rates of Return to Education by Economic Sector in Nepal (%), Dependent Variable = In Y

Level	Non agriculture						Agriculture					
	1995/96			2003/04			1995/96			2003/04		
	A	M	F	A	M	F	A	M	F	A	M	F
Primary level	11.0***	9.3***	15.7*	13.4***	9.8***	27.8***	3.8*	-0.0	4.1	11.0***	8.6***	4.7*
Secondary level	5.7***	5.7***	6.3***	6.8***	6.7***	8.7***	-4.6	-4.4	Drop	.06 *	-0.5	-0.8
Tertiary level	12.4***	12***	13.6***	18***	18.4***	13.6***	Drop	Drop	Drop	Drop	Drop	Drop

Note: p<0.05 (*); p<0.01 (**); p< 0.001 (***)
A = Aggregate; M = Male; F = Female;
Source: NLSS I and NLSS II

Figure 4.9: Private Rates of Return by Economic Sector (2003/04)

The private rate of return to level of education by income quintiles. Primary education rate of return in the highest quintile is almost 4.5 percentage points higher than in first four quintiles. On the other hand, Tertiary level rate of return in poorest 80 percent group is 2.7 percentage points lower than in richest quintile group. Secondary level return also favors the richest quintile by 3 percentage point.

Table 4.12
Private Rates of Return to Education by Income Quintiles in Nepal (%), Dependent Variable = In Y

Level	Poorest 80%		Richest 20%	
	1995/96	2003/04	1995/96	2003/04
Primary level	13.1***	15.2***	17.7***	19.7***
Secondary level	7***	4***	3.2***	6.9***
Tertiary level	12***	12.8***	12***	15.5***

Note: $p<0.05$ (*); $p<0.01$ (**); $p< 0.001$ (***)
Source: NLSS I and NLSS II

One reason for these discrepancies is that rich students get better paying jobs once they have some education (primary) because they have better connections with the job-market. On the other hand, a student from a poor quintile needs a university – certificate (credential effect) to get a better paying job. In fact, "a university degree is considered a license to reach the top of the social hierarchy in Nepal" (Bista, 1991) and therefore, lower-class students use these credentials to gain social and economic status. Also, we could reason that the richest quintile wage earners come mostly from urban areas and some form of education (even primary relative to less-than-primary) makes them easier to find good paying jobs.

Figure 4.10: Rate of Return to Education by Quintile Groups (2003/04)
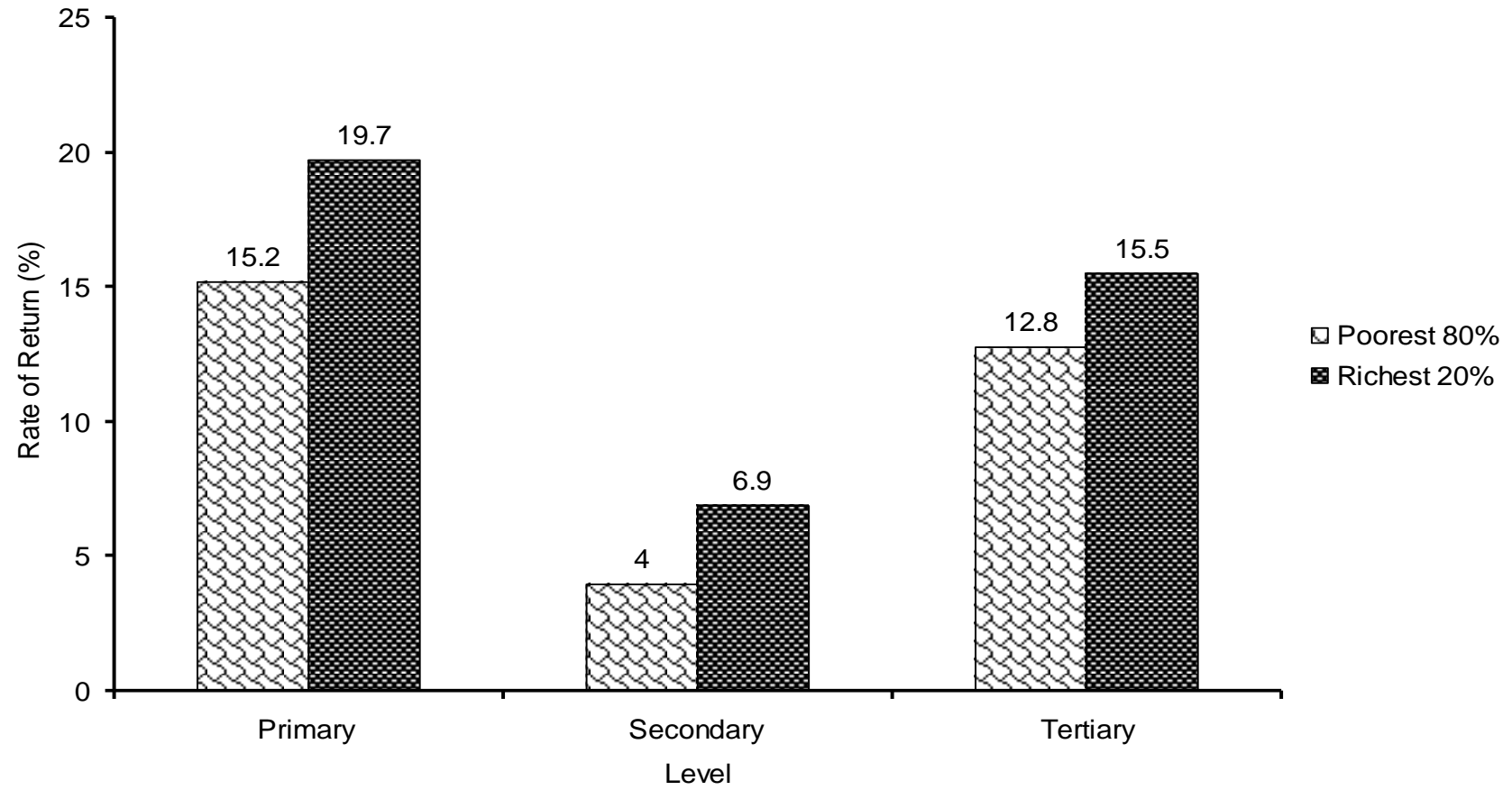
Does schooling matter in the determination of household incomes from farm enterprises holding: if so, to what extent?

Regression results for this section are presented in 4.13, 4.14 and appendix C.

Household Value Added Production in Agriculture

The extended Mincerian function explains 29% of the variation in household agricultural net income. Controlling for capital, labor, and technological inputs, rate of return to years in school is 1.7% in 2003/04 and 6% in 1995/96 (table 4.13).

There are three sets of years in school variable: mean schooling of household members involved in agricultural production, schooling of the household member with highest education and schooling of the household head. The first and second variable seems to give the highest return among the three (table 4.13 and 4.14). This implies the decision making process and management role in the crop and live-stock production is played by all members of the household involved in the process. In the present and changing socio-economic setting of agricultural households in Nepal, it is reasonable to find a relatively greater economic value of average household education (compared to education of a single person). It is interesting to note that average return to schooling in farm- production in Nepal is somewhat lower than estimates for other countries, especially than those of south-east Asia (World Bank, Education and Development -Table 1, 1990). One reason is that majority of agricultural activities in Nepal still follow traditional methods of farming, making education a not that important variable.

However, our estimation method and results are significant for three important reasons:

1) We work with value-added production (not total production) which gives a better insight into how education might affect farm production. The "Worker effect" which improves the quality of labor controlling for non-labor inputs, the "allocative effect" which improves farmer's ability to process information and allocate inputs across competing uses, and "input selection effect" which allows the farmer to selectively purchase inputs in the short run and operate in the long run are all captured in the process (Phillips, 1987).

2) Inputs included in function are land value, costs related to technological use, and hired plus in house labor hours. This controls for non educational capital and thus gives a better estimate of the explanatory power of education.

3) Use of three different education variables (that of household head, the person with highest education and that of all household members involved in the production process) enables use to separate the effects of single person role and aggregate role of the household in the management process.

Regression results for this section are presented in table 4.22. We observe that the extended Mincerian function explains 23.3 % of the variation in household agricultural net income, a notable estimation power of the model.

To evaluate the "allocative effect" of education, we need to compare the result of table 4.13 and appendix C. The coefficient with education alone in the equation gives 8 percent return, considerably larger than 1.7 percent. In mountain, rate of return to education is 4.4 percent and 4.3 percent in Terai. However, rate of return to education in hill is negative.

Among the development regions rate of returns to education is highest in EDR followed by MWDR, CDR, and WDR. Rate of return to FWDR is negative. Rate of return to education is higher in rural area as compared to urban area.

Out of three sates of years in school variable, the variable Highest schooling in the household seems to give the highest return among three.
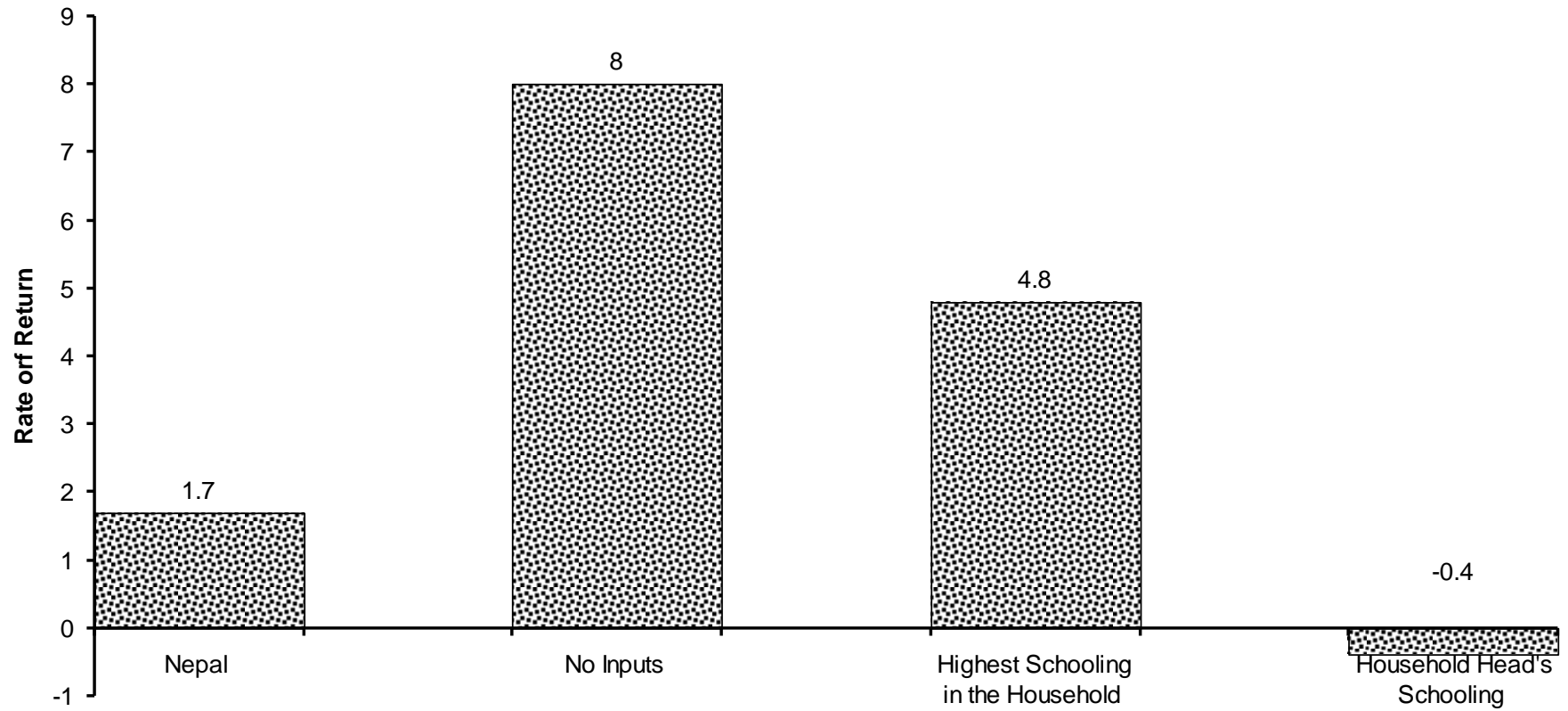
Table 4.13
Selected Regression Results in Households Farm Production, Dependent Variable: Net Revenues = In Y

Independent variable	Mean schooling of households members		Highest schooling in the household		Household head's schooling	
	1995/96	2003/04	1995/96	2003/04	1995/96	2003/04
Education	.060	.017	.059	.048	.019	-0.004
	(6.51)***	(2.32)*	(10.54)***	(9.37)***	(3.10)***	(0.99)
Experience	.048	.033	.048	.034	. 039	.029
	(6.80)***	(5.71)***	(7.09)***	(6.13)***	(5.63)***	(5.04)***
Experience-squared	-.000	.000	.000	-.000	.000	-.000
	(6.83)***	(7.16)***	(6.70)***	(6.78)***	(5.98)***	(6.74)***
Plot value (In)	.143	.100	.135	.089	.149	.104
	(18.64)***	(17.23)***	(17.8)***	(15.39)***	(19.54)***	(18.13)***
Technology use cost (In)	.087	.081	.080	.072	.091	.084
	(13.26)***	(13.12)***	(12.41)***	(11.94)***	(13.78)***	(13.70)***
Total Labor cost (In)	.034	.031	.030	.025	.035	.032
	(6.55)***	(5.85)***	(5.9)***	(4.8)***	(6.74)***	(6.06)***
Constant	6.169	7.158	6.160	7.1	6.309	7.22
	(43.87)***	(62.54)***	(45.14)***	(63.93)***	(45.16)***	(63.82)***
No. of observation	2519	2841	2519	2841	2519	2841
R-squared	.288	.233	.307	.255	.279	.23

Note: t-statistics are in parentheses; <0.05 (*); p<0.01 (**); p< 0.001 (***)
Source: NLSS I and NLSS II

Figure 4.11: Contribution of an Extra year of Household Education To Percent Increase in Agriculturre Net Income by Sets of Schooling (2003/04)


Source: NLSS I and NLSS II

Table 4.14
Contribution of Education to Farm Productivity in Different Scenarios

Scenarios	Increase in value added production (%)	
	1995/96	2003/04
An extra year of average household schooling	6	1.7
An extra year of household head's schooling	2	-0.4
An extra year of most educated member's schooling	6	4.8

Source: NLSS I and NLSS II

Figure 4.12: Contribution of an Extra Year of Household Education to Percent Increase in Agriculture Net Income by Ecological Belt, Location, and Development (2003/04)
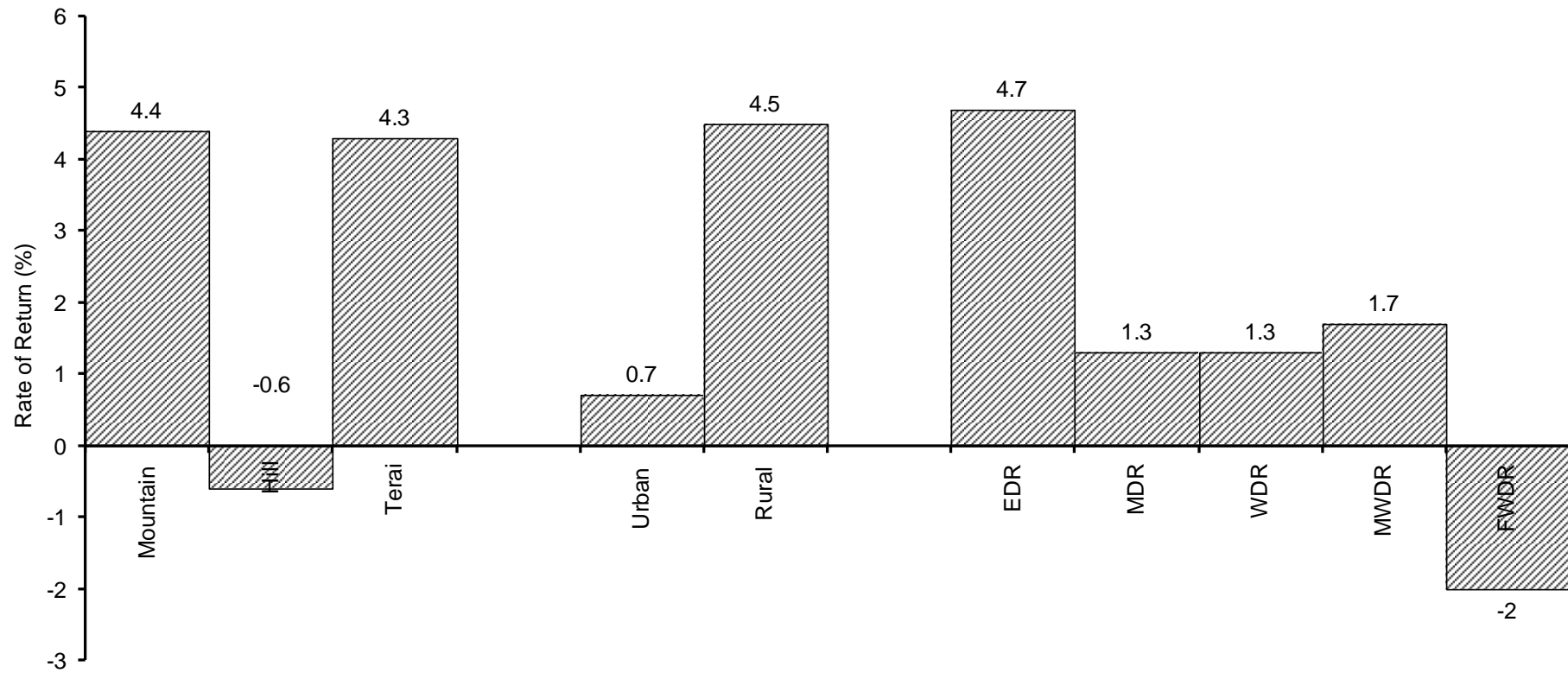
Does schooling matter in the determination of household incomes from non-farm enterprises holding: if so, to what extent?

Regression results for this section are presented in 4.15, 4.16 and appendix D.

Household Value Added Production in Non-Agriculture Enterprise

Our specification for non-farm enterprises explains 55% of the variation in net income across households. Regression results are shown in tables 4.15 and appendix D. The regression results, summarized in table 4.15 in indicate that, once again, mean education of household members involved in the enterprise activities gives a better measure of the contribution of education than the education of a single person does.

Overall, rate of return to years in school is 8.8% - a figure larger than that for farm income. Comparison of coefficients in table 4.24 clearly shows that there is a huge difference between direct and indirect effect of education. The difference between the two (19.2% and 8.8%) gives an estimate of the "allocative effect" which overwhelmingly dominates the "worker effect". This implies that non farm enterprise value the ability of non farm operators to efficiently allocate inputs across competing uses more strongly than they value their constant input labor quality. Elasticity of net income with respect to capital value is 5.5%, to operating cost is 16% and that to in-house labor supply is 43%. These indicate the relative strength of contribution of each input in the value added production process.

Table 4.15
Selected Regression Results in Households Non Farm Production

Independent variable	Mean schooling of households members		Highest schooling in the household		Household head's schooling	
	1995/96	2003/04	1995/96	2003/04	1995/96	2003/04
Education	.103	.088	.075	.084	.045	.047
	(9.22)***	(9.23)***	(7.24)***	(9.61)***	(5.05)***	(6.28)***
Experience	.049	.037	.034	.032	.018	.015
	(4.74)***	(4.32)***	(3.36)***	(3.83)***	(1.83)***	(1.86)****
Experience-squared	.000	-.000	-.000	-.000	-.000	-.000
	(-4.07)***	(4.6)***	(-2.94)***	(4.01)***	(-1.90)***	(2.94)***
Market value of enterprise (In)(In)	.043	.055	.045	.054	.048	.062
	(4.36)***	(5.49)***	(4.48)***	(5.31)***	(4.73)***	(6.06)***
Operating cost (In)	.165	.161	.171	.158	.184	.173
	(13.23)***	(13.62)***	(13.45)***	(13.34)***	(14.58)***	(14.5)***
In House labor days (In)	.600	.430	.539	.399	.613	.434
	(13.19)***	(8.58)***	(11.36)***	(7.96)***	(13.02)***	(8.49)***
Constant	3.00	4.01	3.58	4.27	3.50	4.43
	(10.46)***	(11.32)***	(12.73)***	(12.19)***	(12.13)***	(12.38)***
No. of observation	802	1085	802	1085	802	1085
R-squared	.631	.55	.617	.55	.604	.53

Note: t-statistics are in parentheses; p<0.05 (*); p<0.01 (**); p< 0.001 (***)
Source: NLSS I and NLSS II

Table 4.16
Contribution of Education to Non Farm Productivity in Different Scenarios

Scenarios	Increase in value added production (%)	
	1995/96	2003/04
An extra year of average household schooling	10.3	8.8
An extra year of household head's schooling	4.5	4.7
An extra year of most educated member's schooling	7.5	8.4

Source: NLSS I and NLSS II

Figure 4.13: Contribution of an Extra Year of Household Education to Percent Increase in Non-Farm Net Income by Sector and Location (2003/04)
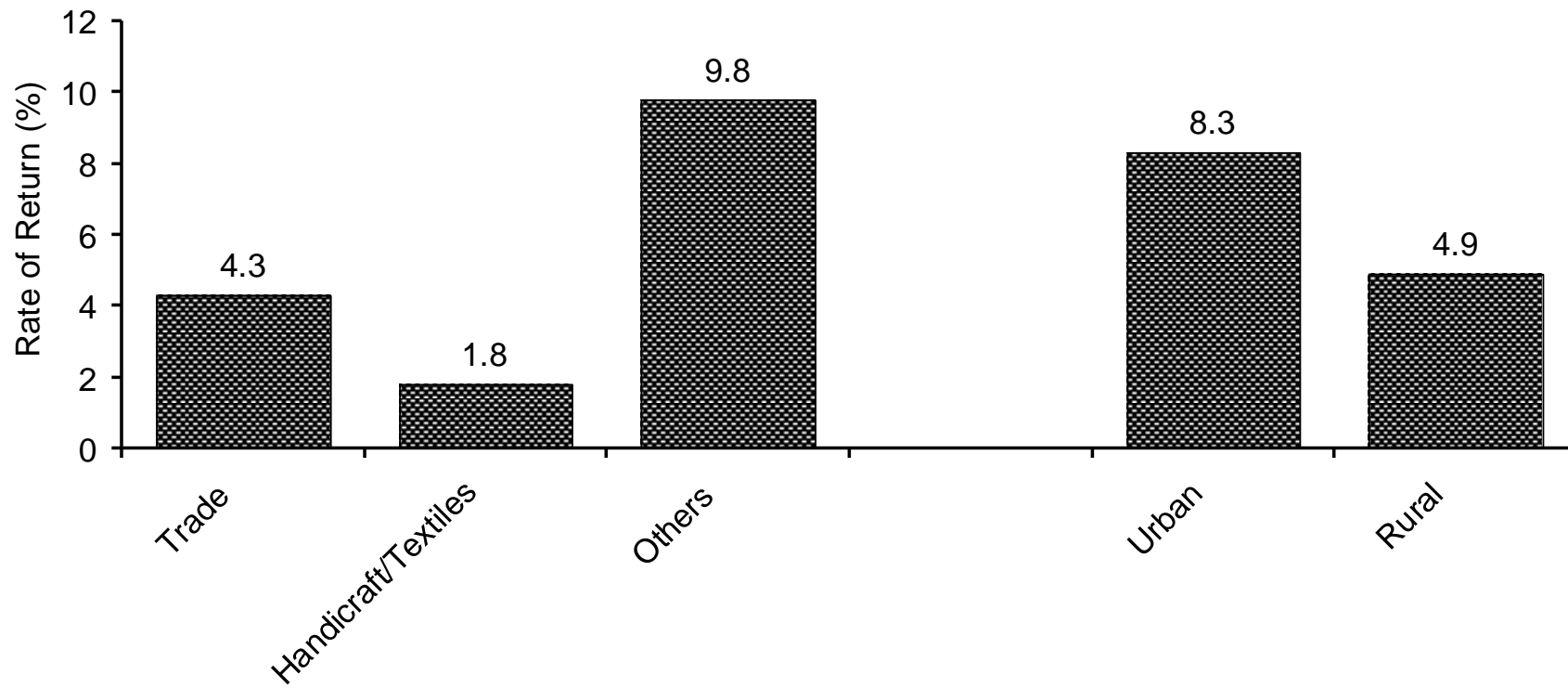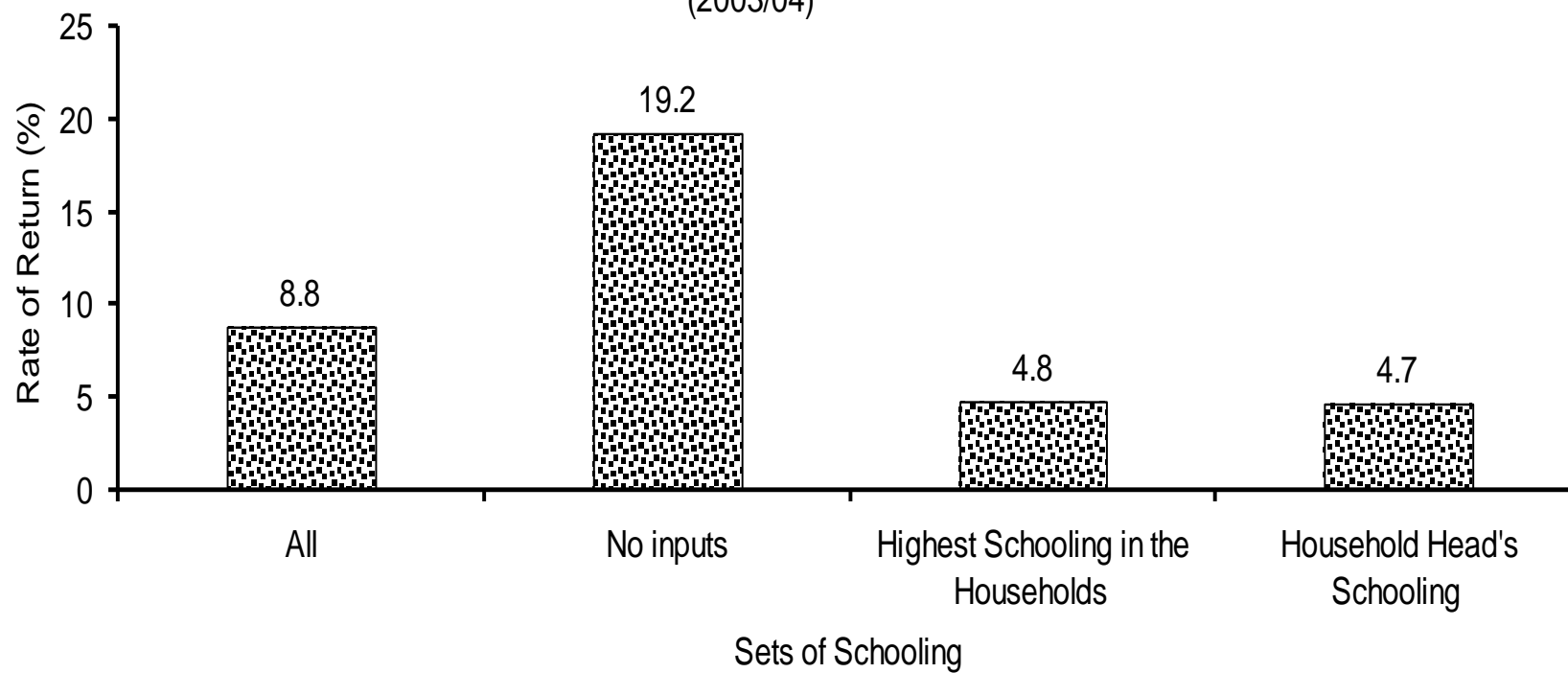
Figure 4.14: Contribution of an Extra Year of Education to Percent Increase in Non-Agricultural Net Income (2003/04)

Non trade and non handicraft sectors tend to give high returns to education (Appendix C). There possible reasons are a) Handicraft and textiles use relatively traditional methods of production, such as weaving. This requires more of a training experience and dexterity rather formal schooling. B) Trade (retail, wholesale and restaurants) is usually practiced by those people who either "flunk" out of school at early age or take up a family retail business (especially true for clothing shops) at an early age c) The "rest" category includes finance, informal tourism and personal services. They require a good amount formal school training for a successful management/operation of the enterprise. In house labor supply has the highest elasticity in handicraft/textiles sector, as expected.

By regions, rate of return to years of schooling is higher in urban. One reason for this might be that rural enterprises tend to follow more traditional practices that require less of might be that rural enterprises tend to follow more traditional practices that require less of formal education. In house labor supply has a greater contribution in rural areas, consistent with fact that rural households tend to involve more of their members to the production process.

Research Question 5

What might be the rough estimate of social return by level of education as opposed to private return?

This section presents social rates of return to levels of education in the wage sector in Nepal. Social costs are easier to measure since government keeps track of public expenditure. Per student cost at a certain level of education can be easily obtained from total expenditure and total enrollment at that level of education.

Benefits other than wage earnings are difficult to measure. Short cut method has used to calculate social rates of return to levels of education.

Social Rates of Return to Education

In order to provide insight on the issues of resource allocation among different levels of education we present the social rates of return by educational level. Table 4.17 and appendix E report social returns at different levels of education. They give us some insight into the profitability of different levels of educational investment from society's perspective as whole.

There is a wide range of social returns across different levels of education (7.2% - 16.3%). Primary education has the highest social returns (16.3%) followed by tertiary education (15.5%) and secondary education (7.2%) at the national level.

The social returns to primary, secondary and tertiary education are higher in urban than in rural areas. Social return to female education is higher in tertiary education as compared to male education. The social returns to male and female education are equal in primary education where as social return to male secondary education is higher than female education. Social returns in non agricultural sector are higher than in agricultural sector. Social returns to agricultural sector in all levels are very low. By quintile groups, the richest quintile seems to have a very high social rate of return at primary and Tertiary level. Bottom four quintiles combined seem to have low social rate of return at tertiary and secondary levels of education.

Table 4.17
Returns to Investment in Education by Level (%)

Categories	Private						Social					
	1995/96			2003/04			1995/96			2003/04		
	P	S	T	P	S	T	P	S	T	P	S	T
Nepal	19.7	8.6	13.3	19.4	7.8	19.2	17.2	8	11	16.3	7.2	15.5
Rural	13.8	7.8	11	16.9	6.2	14.1	11.8	7	8.5	13.8	5.6	10.9
Urban	25.2	4	11.7	20.4	8.5	16.5	23.9	4	9.8	16.7	8	13.7
Male	14.1	8.7	12.8	15.7	10.8	16.1	12.6	8	10.6	12.0	10	13
Female	20.7	10	15.3	15.6	7.7	19.5	17.1	9.2	12	11.7	6.7	15.4
Agriculture	3.8	-4.6	Drop	11.0	0.06	Drop	3.2	-3.6	Drop	8.4	0.04	Drop
Non agriculture	11	5.7	12.3	13.4	6.8	18	10.2	5.4	10.1	12.2	6.5	14.7
Poorest 80%	13.1	7	12	15.2	4.1	12.8	11.2	6.2	2.6	12.5	3.7	9.2
Richest 20%	17.7	3.2	12	19.7	6.9	15.5	16.7	6.3	10	18.5	6.6	13

Source: NLSS I and NLSS II

Tertiary education social return is below the private return because of high public subsidy. Public subsidy index is the percent by which private return exceeds social return is about 22.1 percent for tertiary education indication that there is high degree of reliance on public sector at this level. Secondary education, with lowest private returns, relies on the public sector least (see appendix E).

Figure 4.15" Private & Social Rate of Return by Level of Education (2003/04)
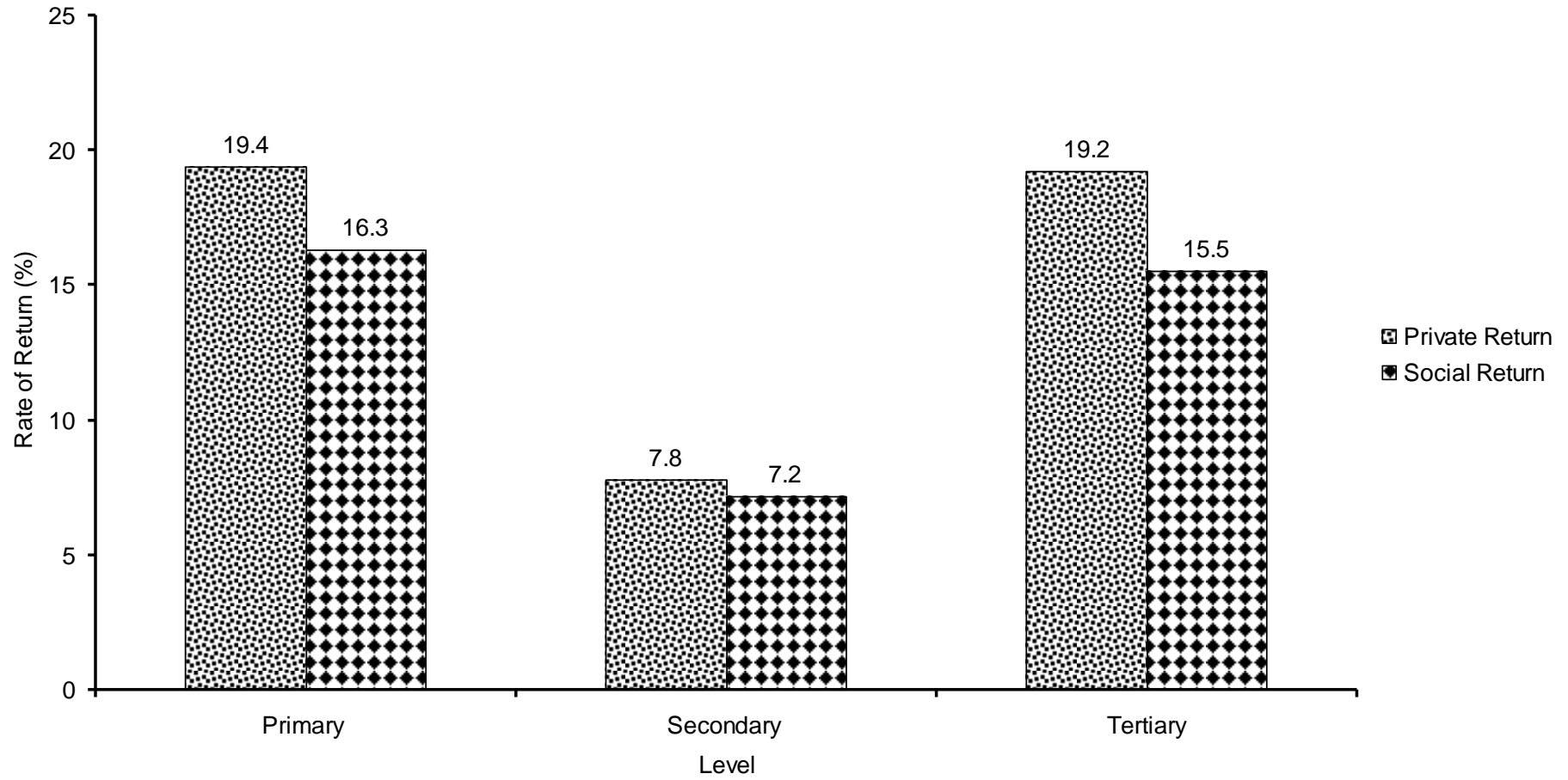
Do returns in the wage sector and non-wage sector vary over 1995/96 and 2003/04?

This section presents changes in rates of return in the wage sector and non wage sector over 1995/96 and 2003/04.

Change in Rates of Return over Time

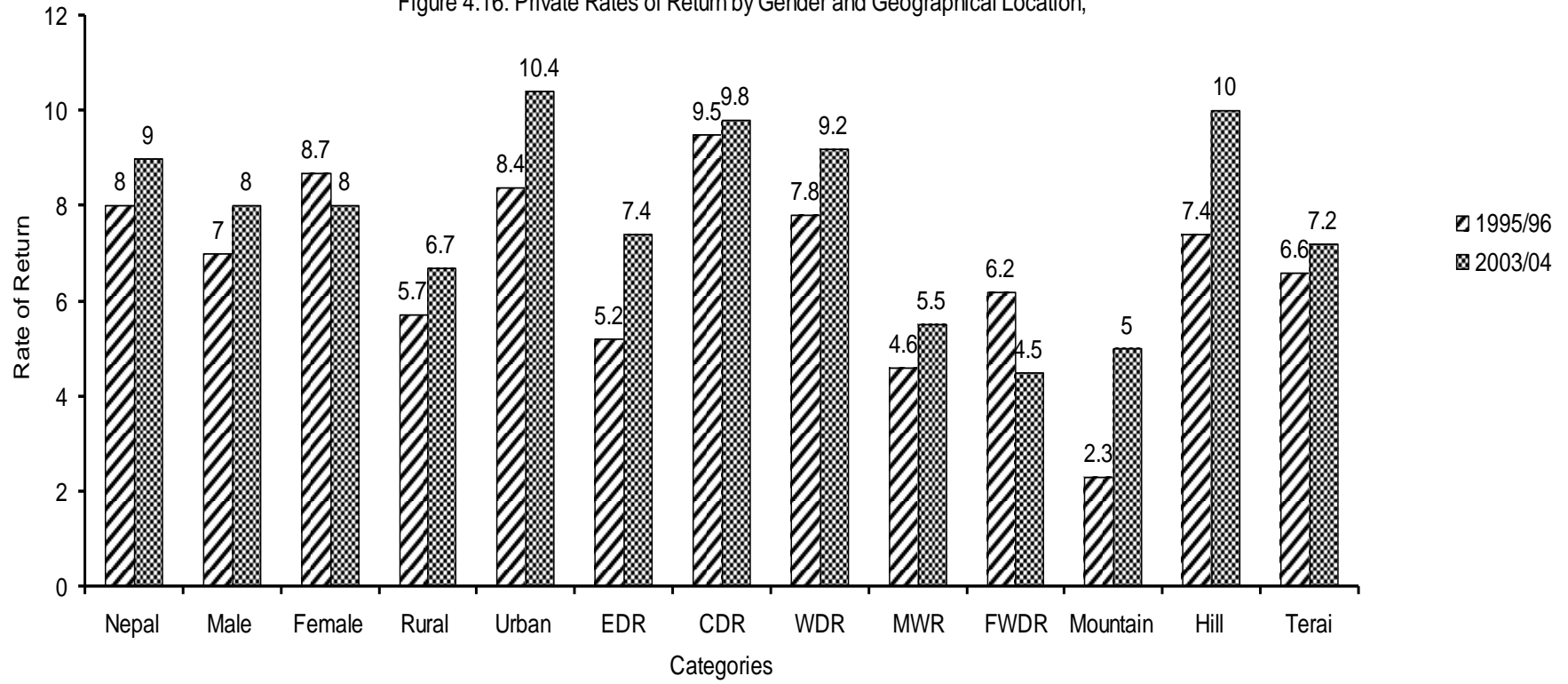*Change in Private Rates of Returns to Years of Schooling Over Eight Years of Time*

Table 4.18 shows changes in returns to years of schooling over eight years of time. The increasing pattern of the private rate of returns to years of schooling is observed over eight years of time at the aggregate (national) level and disaggregate level except in four categories (Muslim, Private school). The increase rate of returns range from .5% to 4.2% at the disaggregate level.

Table 4.18
Change in Private Returns to Years of Schooling over Eight Years of Time

Categories	1995/96	2003/04	Change
Nepal	8	9	1
Males	6	8	2
Females	8	8	0
Poorest 40 %	4.2	4.2	0
Middle 40%	4.8	5.3	.5
Richest 20 %	7	9.9	2.9
Urban	8	10.4	2.4
Rural	5	6.7	1.7
Agriculture	2	3.8	1.8
Non-agricultural	5	8	3
Mountain	2	5	3
Hill	7	10	3
Terai	6	7.2	1.2
Hindu	8	9	1
Buddhist	7.5	9.3	1.8
Muslim	10	4	-6
Public school	8.0	8.9	.9
Private school	11.1	13.2	2.1

Source: NLSS I and NLSS II

Figure 4.16: Private Rates of Return by Gender and Geographical Location,

Change in the Private Rate of Returns to Education over an 8 Years Period

Table 4.19 shows changes in returns to education over eight years of time. At the national level, returns to primary and secondary education have decreased by 0.3% and 0.8% respectively. On the other hand, returns to tertiary education have increased by 6%.

Table 4.19

Change in the Private Returns to Education over an 8 Years Period

Categories	1995/96			2003/04		
	P	S	T	P	S	T
Nepal	19.7	8.6	13.3	19.4	7.8	19.2
Males	14.1	8.7	12.8	13.7	10.8	16.1
Females	20.7	10.2	15.3	15.6	7.7	19.5
Poorest 80%	13.1	7	12	15.2	4.1	12.8
Richest 20%	17.7	3.2	12	19.7	6.9	15.5
Urban	25.2	4	11.7	20.4	8.5	16.5
Rural	13.8	8	11	16.9	6.2	14.1
Agriculture	3.8	-4.6	Na	11	.06	Drop
Non-agricul	11	5.7	12.4	13.4	6.8	18
Mountain	1	4	11.8	13.6	5.5	10
Hill	17.0	5.3	13.2	19.8	7.5	18.8
Terai	16.9	11.2	9.2	16.7	7.1	17.7
Hindu	19.4	7.8	15.5	19	7.7	8.9
Buddist	16.7	9.4	2.1	22.1	5.5	11.5
Muslim	33.1	17.8	Na	13.9	3.4	Na
Public school	20.0	8.1	13.0	19.4	7.8	18.7
Private school	-15.7	13.3	27.2	9.0	16.2	19.1

Source: NLSS I and NLSS II

Change in Returns to Household Farm Production over an 8 Years Period

Table 4.20 shows the changes in rate of returns to households farm production over eight years period. In all schooling variables, returns to households farm production decreased by 4.3% in average household education, 1.2% in highest schooling in the household and 2.3% in household head's schooling.
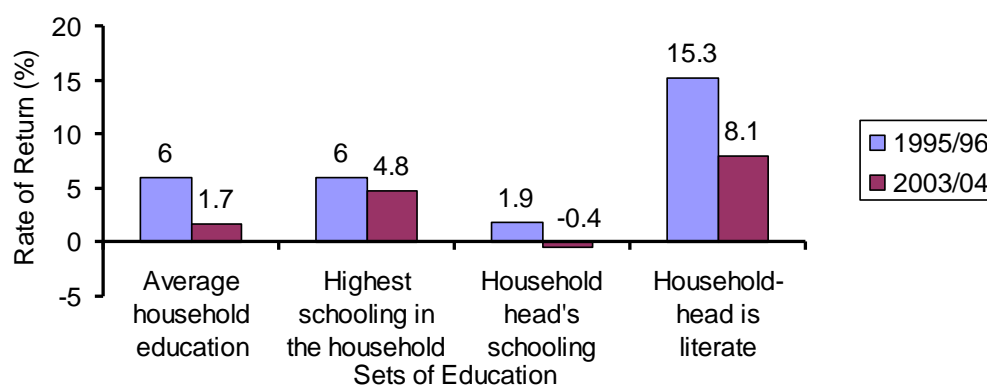
Table 4.20

Change in Returns to Household Farm Production over an 8 Years Period

Survey year	Average household education	Highest schooling in the household	Household head's schooling	Household-head is literate
1995/96	6	6	1.9	15.3
2003/04	1.7	4.8	-.4	8.1

Source: NLSS I and NLSS II

Figure 17 Change in Countribution of Education to Farm Productivity over Time

Change in Returns to Household Non-Farm Production over an 8 Years Period

Table 4.21 shows changes in returns to household non-farm production over an eight years period. The returns to households non-farm production in average households education decreased by 1.5% where as returns to households non-farm

production in Highest schooling in the household and Household head's schooling has

increased by 0.9% and 0.2% respectively.

Table 4.21

Change in Returns to Household Non-Farm Production over an 8 Years Period

Survey year	Average household education	Highest schooling in the household	Household head's schooling	Household-head is literate
1995/96	10.3	7.5	4.5	26.8
2003/04	8.8	8.4	4.7	38.5

Source: NLSS I and NLSS II

Figure 18 Change in Countribution of Education to Non-Farm Productivity over Time
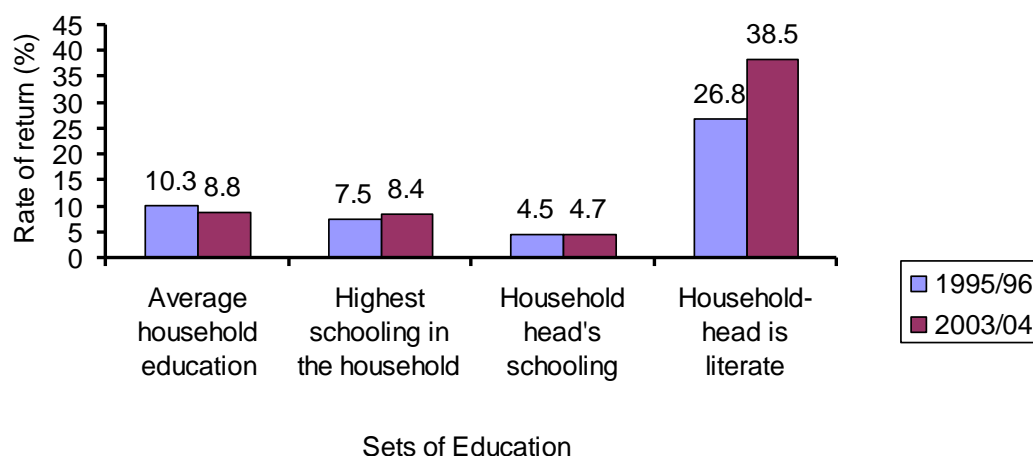
Change in the Social Returns to Education over an 8 Years Period

Table 4.22 shows change in the social returns to education over an eight years

period. At the national level, social returns to primary and secondary education

decreased by 0.9% and 0.8% respectively. On the other hand social returns to tertiary

education increased by 4.5%.

At the disaggregate level, social returns to tertiary education are increased in

all categories. Social returns to primary education are decreased in males, females,

agriculture and urban categories where as social returns to primary education are increased in poorest 80%, richest 20%, and non-agriculture categories.

Social returns to secondary education increased in male, richest 20% are urban agriculture and non-agriculture categories where as social returns to secondary education decreased in female, poorest 80% and rural categories.

Table 4.22

Change in the Social Returns to Education over an 8 Years Period

Categories	1995/96			2003/04		
	P	S	T	P	S	T
Nepal	17.2	8	11	16.3	7.2	15.5
Males	12.6	8	10.6	12.0	10	13
Females	17.1	9.2	12	11.7	6.7	15.4
Poorest 80%	11.2	6.2	2.6	12.5	3.7	9.2
Richest 20%	16.7	3.0	10.0	18.5	6.6	13
Urban	23.9	4	9.8	18.7	8	13.7
Rural	11.8	7	8.5	13.8	5.6	10.9
Agriculture	3.2	-3.6	Drop	1.4	.04	Drop
Non-agriculture	10.2	5.4	10.1	12.2	6.5	14.7

Source: NLSS I and NLSS II

Discussion on Some Key Issues

This section presents discussion on omitted variables, sensitivity analysis, Multiple Coefficient of Determination (R^2), multicollinearity, residuals, normality, heteroscedasticity, low rates of return, public sector wages, normalizing costs and earnings, possible cost and benefits which have not captured, static model, and distributions of predictors checked for normality.

A Note on Omitted Variables

One of the methodological controversies surrounding the human capital earnings function is that of omitted variables. The proponents of the controversy point

out that omission of other variables such as ability, socioeconomic and/ or parental background and school quality leads to biases in the estimation of rates of returns (Parajuli, 1995). Nepal living standard surveys data does not permit the researcher to measure ability and school quality directly. So the researcher includes parental background (education of father and mother) and total household expenditure on education to check the robustness of the results from regression analysis (see appendix table 136,137, and 138.). The researcher believe that these variables capture some aspects of individual ability, socioeconomic background, motivational differences in sending kids to school, and kinds of school they are sent to (public or private). The estimated rate of return to schooling in this framework is 11.9%; the difference (with respect to our basic result = 9.0%) is slightly different. This suggests that such alleged omissions, in general, do not seem to affect our results.

A note on sensitivity analysis

The estimated rate of return to additional years of schooling without outliers is 8.6% whereas rate of return to schooling with outliers is 8.9% in 2003/04. The difference is slightly different. This suggests that avoiding outliers in general do not seem to affect our results (appendix table 134, 135, and 136).

A Note on Multiple Coefficient of Determination (R^2)

R^2 is the proportion of the variation in dependent variable explained by the Independent variables jointly (Gujarati, 2006 and Allison, 1999). An important property of R^2 is that it is a non-decreasing function of the number of explanatory variables or regressors present in the model; as the number of regressors increases, R^2 almost invariably increases and never decreases. Stated differently, an additional X variable will not decrease R^2.

A frequently asked question about the overall goodness of fit is, "How do you decide whether the computed R^2 is high or low?" There is no hard and fast rule about what a high or low value of R^2 is. With time series data, one often finds high R^2 because many time series variables have underlying trends that are highly correlated. It is therefore, common to observe R^2 values above 0.9. A value of 0.6 or 0.7 will then be considered low. Cross-section data, however, represent the behavior of varied agents at a single point in time and typically have low R^2. In such cases, 0.6 or 0.7 may not be that bad. The general advice is not to rely too much on the value of R^2. It is simply one measure of the adequacy of a model. It is more important to judge a model by whether the signs of the regression coefficients agree with economic theory, intuitions, and the past experience of the investigator (Ramanathan, 2002).

In this study, the value of R^2 is in the range of 80-90% for each case more or less. One reason for this high R^2 is natural logarithm of income rather than income only. If we run the regression considering income as dependent variable rather than Inincome, the R^2 would be smaller. Moreover, if we take number of weeks worked in a year as an Independent variable without log, the R^2 would be smaller. If we drop number of weeks worked in a year (In) from the model. Then the value of R^2 decreased to 27% from the 85%. This is also robustness of value of R^2.

The value of R^2 calculated in this study is from In Y model also. When dependent variable Y transforms, the value of R^2 becomes very high as reported in this study. This researcher was interested to see R^2 not from In Y, but from Y. For this purpose, Y hat is calculated from In Y hat using exponential function (taking antilogarithm to both sides). Then TSS and SSR were calculated using the following formula.

TSS = $\sum$ (wage income – mean of wage income)^2 and

SSR = $\sum$ (Y hat – mean of wage income)^2. Then R^2 was calculated using formula.

R^2 = SSR / TSS = $\sum$ (Y hat – mean of wage income)^2./ $\sum$ (wage income – mean of wage income)^2. Using these steps, R^2 was found 0.04% which is very low.

A Note on Multicollinearity

Multicollinearity problem was diagnosed using correlation matrix, variance inflation factor (VIF) and tolerance (1/VIF). The correlation coefficients, VIF, and tolerance do not suggest that the multicolinearity problem is present in our specification (Appendix H).

A Note on Residuals and Normality

Linear regression model (least squares) is a robust method because it yields unbiased and consistent estimates even when the standard assumptions of homoscedasticity break down. Nevertheless, we check for normal distribution of residuals by plotting error term with fitted dependent variable. Appendix G shows that error terms are fairly symmetrical about zero value of dependent variable, strengthening the use of our functional form (appendix G).

A Note on Heteroscedasticity

One problem in regression analysis is heteroscedasticity that can be corrected. In this study, this problem is diagnosed only. This study used Breuech - Pagan/Cook-weisberg test to diagnose heteroskedasticity problem. Heteroskedasticity problem is present in our specification (Appendix I). Correcting heteroskedasticity problem is limitation of this study.

A Note on Low Rates of Return

Ogawa (1999) calculated private rates of return to years of schooling for Indonesia using Mincerian basic methods. He excluded one Independent variable (Inweek worked in a year) from both basic and extended model. Because of this exclusion, he reported high private rates of return to years of schooling and level of schooling. According to Psacharopolous (1994), the rate of return to additional years of schooling in low income countries is 11.2%. World Bank (1997) conducted studies in Vietnam to estimates rates of return for wage workers using Mincerian methods. In this study, number of weeks worked in a year (In) has included in both basic and extended method. The private rate of return to additional years of schooling in overall Vietnam is about 5% which is also very low rate of return.

In this study, basic model was run with number of weeks worked in a year (In) and without number of weeks worked in a year (In). The private rates of return to an additional year of schooling is 9 % with number of weeks worked in a year (In) whereas the private rates of return to an additional year of schooling is 21.2 % without number of weeks worked in a year (In). High rates of return are reported in above and most of the literatures due to omission of this variable from the model. Therefore, our findings of basic analysis are true including this variable in model.

Ogawa (1999) calculated private rates of return to levels of education for Indonesia using extended methods. He excluded one independent variable (Inweek worked in a year) from extended model. Because of this exclusion, he reported high private rates of return to level of schooling. World Bank (1997) conducted studies in Vietnam to estimates rates of return for wage workers using Mincerian methods. In this study, number of weeks worked in a year (log) has included in extended method. The private rates of return to primary, secondary, and tertiary education in Vietnam

are 13%, 5%, and 11% respectively which are also low rates of return (World Bank, 1997).

In this study, basic model was run with number of weeks worked in a year (log) and without number of weeks worked in a year (log). High rates of return are reported in most of the literatures due to omission of this variable from the model and interpretations are made based on premiums rather than actual rates of returns. Therefore, our findings of basic analysis are true based on model.

Comparing results of this study with other countries, rates of return of this study is not low. If we compare premium, returns to education level seem higher.

4.23 Table

Rates of return by levels of education %

	Low income countries	Nepal	Vietnam	India	Thailand	Philippines	Ethiopia
Primary level	35.2	19.4	13	17.3	56	9	35
Secondary level	19.3	7.8	5	18.8	14.5	6.5	22.8
Tertiary level	23.5	19.2	11	16.2	14.0	9.5	27.4

Source: Psacharopoulos, 1994

A Note on Public Sector Wages

Nepal is a market economic country. There is free labor market dynamics in Nepal. Since, this study is based on secondary data collected by CBS. CBS collected data of private sectors only. This exercise did not adjust the data based on the public sector wage argument as the data used was provided by CBS. The researcher did not do anything for this. The researcher however is aware of the issues.

A Note on Normalizing Costs and Earnings

It is not necessary to normalize costs and earnings because this study used cross section data. Model cannot handle unemployment rate. Nepal is a market economic country. Therefore there is no problem of compressed wage. Since, data was collected in insurgency period. Therefore, rates of return to education become low. The earning is gross earning. CBS collected data without deducting tax. The effect of insurgency on rates of return is to be researched.

This exercise did not adjust the data based on the public sector wage argument as the data used was provided by CBS. The researcher did not do anything for this. The researcher however is aware of the issues.

A Note on Possible Cost and Benefits which have not captured

The cost of the investment comprises: (1) the direct costs for the individual, these include all expenditures related to school attendance, and for society, the full resource costs of providing the educational service, including any subsidized costs not borne by the individual or the individual's family, plus (2) the average earnings foregone as a result of the investment.

Theoretically the social rate of return should also include any external benefits not captured by the individual student or, if education is treated as a family investment, by the individual and his or her family. Unfortunately, not only is the size of education's external benefits nearly impossible to determine, but some policymakers and researchers question even their existence, rendering the rate of return literature the subject of some debate even 40 years after the re-birth of this methodology around 1960 (Schultz 1961). Of course, the same uncertainty as to precise social rates of return applies equally to investments in most other sectors.

Some education economists have argued that adding external benefits to estimates of social rates of return would result in estimates about twice as large as those measured according to standard methods (Haveman and Wolfe 1984; Wolfe 1995).

In this study, only foregone cost and monetary benefits were used. Private cost, non monetary and monetary costs and benefits are not included. Cost of society has not included while calculating private rates of return. Non monetary benefits to the individual household have not also included.

The researcher has not adjusted earning data provided by CBS. The definitions of earnings given by CBS are as follows. Annual earnings from wage employment are a sum of cash and in-kind earnings per year (including daily, piece-rate and long-term labor) for every individual with positive earnings. Net earnings of agricultural activities are total output minus the expenditure involved in the production process. Net earnings of the non-agricultural enterprise activity are total production minus the expenditure involved in the production process. The mincerian earnings function model does not capture the non-monetary costs and benefits. For detail information, see NLSS II Report, p. 34.

A Note on the use of Mincerian Earning Function

The following advantages of the semi log specification include:

1. It is not ad-hoc and the coefficients of the equation have economic interpretations. In other words, the intuition behind the coefficients is not difficult to grasp.

2. Using the natural logarithm of earnings makes the residual variance less heteroskedastic and inequality in earnings rise with the level of schooling.

3. It uses data efficiently by converting "a relationship between earnings and dollar investments in human capital to one between the natural logarithm of earnings and years of investment in schooling and training."

4. It allows for easy incorporation of additional variables.

5. The coefficients are unit free, thus allowing comparisons across time and space. This means that the estimated rates of return can be compared with the rates of return estimated for other countries and also with estimates made at different periods of time.

Age earning profile is not available in development countries. Therefore, full cost method is impossible to use. Therefore, this method is widely used. The dependent variable in the Mincerian function is given by the model itself. Log Y is derived from the economic formulation. Transforming dependent variable Y into log Y help to increase normality. Coefficient gives rate of return directly. This model cannot analyze unemployment problem and loan borrowed by the person.

It not possible to have accurate data on age earnings profile in developing countries like Nepal. Hence the mincerian function has been popular. The log of dependent variable is due to the model requirement.

A Note on Static Model

Since our data is cross section data. Time has a no value in cross section data. Regressions were run separately for 1995/96 and 2003/04 data. There is no effect of inter-temporal in the findings. There is no caution in the interpretation of findings.

The model carries limitations of cross section data which include hetroscedaticty problem. The researcher is aware of this problem.

A Note on Accuracy of Data

Since, this study used secondary data collected by CBS and World Bank. The ownership of data is on CBS.

A Note on Distributions of Predictors Checked for Normality

Before doing regression analysis, much time was spent to get familiarity with the data. Means, Standard deviations, maximums, minimums, skewness, and kurtosis of earnings and years of schooling were examined. Particular attention to the number of valid (nonmissing) cases was given. Histograms (bar charts of the frequency distribution) were drawn to give a good idea of how the data are distributed across different possible values of the variables (appendix L and R). Descriptive statistics and histograms for transformed variable In Y is also presented (appendix L and R).

Sensitivity analysis carried out (with and without outliers (if any) to check the robustness of the results from regression analysis.

0.5 percent each of the both ends of the per capita income distribution are defined as outliers and excluded from the analysis. There were 4346 individuals in the wage sector in the age bracket 10-65. In this study, 13-65 age groups were only taken. Excluding 10-12 age group individual, 13-65 age group individuals are 4331. Deducting outlier households from 2841 and 1095, remaining households are 2826 and 1080.

The estimated rate of return to an additional year of schooling without outliers is 8.6% whereas rate of return to schooling with outliers is 8.9% in 2003/04. The difference is slightly different. This suggests that avoiding outliers in general do not seem to affect our results (Table 133).

The differences of estimated rate of return to an additional year of schooling with and without outliers by urban/rural and male/female in 1995/96 and 2003/04 are slightly different. This suggests that avoiding outliers in general do not seem to affect our results significantly (Table 133).

The differences of estimated rate of return to levels of education with and without outliers in Nepal by urban/rural and male/female in 1995/96 and 2003/04 are slightly different. This suggests that avoiding outliers in general do not seem to affect our results.

The differences of estimated rate of return to additional average household schooling, highest schooling in the household and household head's schooling with and without outliers in Nepal in 1995/96 and 2003/04 are slightly different. This suggests that avoiding outliers in general do not seem to affect our results.

In an effort to reach robust findings, alternative methods are not used due to time constraint. Sensitivity analysis was carried out using regression analysis. Independent variable was dropped (weeks worked in a year) from the model and compared the result after dropping the variable. In addition to this, additional independent variables such as father's education, mother's education, and household expenditure on education were added to model and compared the new result with the basic result (Table 136).

Concluding Remarks

This chapter reported the rates of return to each additional years of schooling and levels of education by gender, location, types of school, religion, ecological belt, economic sector, and income quintiles in the wage sector and self employed sector. The overall finding is that education is a rewarding investment from the individual and social point of view. The study also finds that the rate of return to investment in primary education is highest followed by tertiary education and secondary education. Based on the premiums, tertiary education is most profitable investment from individual point of view. More details of the summary of this study are discussed in the next chapter with each research questions and descriptive hypotheses being stated.

CHAPTER 5

SUMMARY, FINDINGS, POLICY IMPLICATIONS, CONCLUSIONS AND
AGENDA FOR FUTURE RESEARCH

This chapter presents the summary of the study, findings, policy implications, conclusions and agenda for future research of the study. It presents a summary of the purpose of the study, statement of the problem, research questions, hypotheses, significance of the study, findings of the study. The chapter also provides the theoretical and practical implications for future educational development policies in Nepal. Based on the findings, conclusions are drawn and discussed and an agenda for future research is also discussed here.

Summary

Purpose of the Study

The first purpose was to investigate the extent to which additional years of schooling have contributed to economic development in Nepal by gender, regional geography (rural/urban and ecological belt), religion, income quintiles, and types of school, level of schooling, and economic sector.

The second purpose was to examine the controversy over which would be the most profitable level of education in economic development in Nepal by analyzing the private returns to investments in education at individual level in Nepal by gender, regional geography (rural/urban and ecological belt), religion, income quintiles, types of school, and economic sector. This study not only investigates which level of education is the most rewarding investment, but also why it is so.

The third purpose was to examine the returns to investment in education at household level. The fourth purpose was to examine changes in return to education over 1995/96 and 2003/004 in Nepal. The fifth purpose was to examine the controversy over which would be the most profitable level of education in economic development in Nepal by analyzing the social returns to investments in education at individual level in Nepal by gender, regional geography (rural/urban, and ecological belt), religion, income quintiles, and types of school, and economic sector. This study not only investigates which level of education is the most rewarding investment, but also why it is so.

The sixth purpose was to provide a set of recommendations regarding education policies as well as their efficiency and effectiveness in relation to economic development in Nepal; this research also has further implications for other lower income countries.

Problem Statement

What are the private rates of returns to additional years of schooling as well as formal education in the primary, secondary and tertiary levels at individual and household levels in Nepal? What are the social rates of return to formal education in the primary, secondary and tertiary levels at individual level in Nepal?

Research Questions

The purpose of this study was to analyze the rates of return to investment in education in Nepal. Specifically, the study attempted to answer the questions that follow.

1. To what extent have additional years of schooling contributed to individual's earning in Nepal by National level, Urban/Rural areas, Ecological belt, gender,

religion, types of school, economic sector, and income quintiles in the wage sector?

2. To what extents have formal education in the primary, secondary, and tertiary level contributed to individual's earning in Nepal by National level, gender, Urban/Rural areas, Ecological belt, religion, types of school, economic sector and income quintiles in the wage sector?

3. Does schooling matter in the determination of household incomes from farm enterprises holding; if so, to what extent?

4. Does schooling matter in the determination of household incomes from non-farm enterprises holding; if so, to what extent?

5. What might be the rough estimate of social return by level of education as opposed to private return?

6. Do returns in the wage sector and non - wage sector vary over 1995/96 and 2003/004?

Statistical Hypotheses

The following statistical hypotheses have been formulated for the testing purpose.

1. The additional years of schooling contributes to enhance wage earnings of the individuals.

2. Primary education contributes to enhance wage earnings of the individuals.

3. The additional years of average household schooling contributes to enhance net earnings of the farm households.

4. The additional years of highest schooling in the household contributes to enhance net earnings of the farm households.

5. The additional years of household head's schooling contributes to enhance net earnings of the farm households.

6. The additional years of average household schooling contributes to enhance net earnings of the non -farm households.

7. The additional years of highest schooling in the household contributes to enhance net earnings of the non- farm households.

8. The additional years of household head's schooling contributes to enhance net earnings of the non-farm households.

Descriptive Hypotheses

The following descriptive hypotheses have been formulated for the quantitative analysis.

1. The private rate of return to years of schooling is higher for urban areas compared to rural areas.

2. The private rate of return to women's education is higher compared to men's educational in Nepal.

3. The private rate of return to years of schooling varies across ecological belt in Nepal.

4. The private rates of return to years of schooling vary based on the religion of individuals.

5. The private rates of return to private schooling vary based on the types of school in Nepal.

6. The private rate of returns to years of schooling vary based on the economic sectors in Nepal.

7. The private rates of return to years of schooling vary across income quintile groups in Nepal.

8. The private rate of return to primary education is the most rewarding level of education compared to secondary and tertiary education in Nepal by gender, urban/rural areas, ecological belt, religion, types of school, economic sectors and income quintile groups in Nepal.

9. The increase in value added production varies among three sets of years in school variable in farm household holdings.

10. The increase in value added production varies among three sets of years in school variable in non farm household enterprises.

Significance of the Study

Until recently, no comprehensive cost-benefit studies covering all relevant issues seem to have been made in Nepal. This study looked at both private and social rates of return to educational investment at individual and household level in Nepal by focusing on gender, rural/urban areas, ecological belts, religions, income quintile groups, types of school, and economic sector. This type of analysis is highly important in a country such as Nepal with a multi ethnicity, diverse geographical region, and ethnically/religiously diverse society.

From the individual's point of view, this study enables students and their parents to learn which level and types of school-namely private and public schools will provide higher returns. This study also provides basic guidelines as to types of

employment (self or dependent as well as agricultural and non - agricultural sector) that will be more profitable in the labor market in the long run.

Parajuli (1998, 1999) conducted study using NLSS I, 1996, and NLFS, 1999 data to investigate the linkage between educations and earning in Nepal. This study used NLSS II (2003/04) household survey data that was professionally collected by CBS. It is hope that this study contributes to the economics of education in Nepal.

Findings

Findings for this study are presented relative to the six research questions.

Research Question 1:

To what extent have additional years of schooling contributed to individual's earning in Nepal by geographical location (National level, Urban/Rural areas, Ecological belt), gender, religion, types of schools, economic sector, and income quintiles in the wage sector?

The rates of return to years of schooling in rural and urban Nepal. The rates of return to additional years of schooling are very profitable, especially for females and urban areas. The overall rates of return to years of schooling in Nepal are 9 percent. The return for male and female is almost equal (8 percent) and the return in urban areas (10.4 percent) is higher than that in rural areas (6.7 percent). In both rural and urban areas, the rates of returns for females are higher than that for males.

The rates of return to years of schooling by gender at the ecological belt in Nepal. This study also breaks down the rates of returns to years of schooling into gender at the ecological belt in Nepal. The returns of mountain, hill, and Terai regions are 5 percent, 10 percent, and 7.2 percent respectively. The rate of return in hill is highest among the ecological belt. The rates of return for females are higher in hill and mountain region where as the rates of return for male is higher in Terai region. The rates of returns for male and female are equal in Terai region.

The rates of return to years of schooling by type of school in Nepal. This study finds that the rates of return to years of schooling in private education are higher than those in public education. The return in public education is 8.9 percent, while it is 13.1 percent in private education. The return for females is higher than that for males in public education where as the return for male is higher in private education. The returns in private education are higher because quality of private education is better than public education Nepal. Therefore, the rates of returns to public education are lower.

The rates of return to years of schooling by religion in Nepal. The study finds that returns for the Buddhist religions are highest (9.3 percent) followed by Hindu (9 percent) and Muslim (4 percent). The returns for Buddhist females are higher than for males. The returns for Muslim females are negative. The returns for Hindu male and female are equal.

The rates of return to years of schooling by economic sector in Nepal. The return in non-agricultural sector (8 percent) is higher than in agriculture sector (3.8 percent) in Nepal. In both non agricultural and agricultural sectors, the returns for females are higher than that for males.

The rates of return to years of schooling by income quintiles in Nepal. Poorest 40 percent group receives 4.2 percent return while the richest 20 percent group receives 9.9 percent return. The middle group's return is 5.3 percent.

Research Question 2

To what extent have formal education in the primary, secondary and tertiary level contributed to individual's earning in Nepal by national level, gender, urban/rural areas, ecological belt, religion, types of schools, economic sectors and income quintiles in the wage sector ?

The rates of return to education by gender and rural/urban areas in Nepal. The result shows that primary education has 19.4 percent, secondary education has 7.8 percent and higher education has 19.2 percent returns. Rate of return to primary education is the largest investment followed by tertiary education and secondary education. The return to secondary education is very low in Nepal. By looking at gender, female education is more profitable at primary and tertiary levels than male education.

In rural areas, the rates of return to primary education is highest followed by tertiary and secondary education. The rates of return to primary, secondary and tertiary education for males are higher than females in rural areas. On the other hand, in urban areas, the rates of returns to primary education is highest followed by tertiary and secondary education. The rates of return to primary and secondary education for females are higher than males in urban areas. In addition, the return to primary education in urban areas are higher than in rural areas, but the returns to secondary and tertiary education in urban area are higher than in rural areas.

The rates of return to education by religion. Among the Hindus, tertiary education is the most profitable investment followed by secondary and primary education. Among the Buddhist, tertiary education is the most profitable investment followed by primary and secondary education. Among the Muslim, primary education is the most profitable investment followed by secondary. The tertiary education has no rates of returns among the Muslim.

The private rates of return to years of schooling by types of school. This study finds that the rates of return to years of schooling in private education are higher than those in public education. The return in public education is 8.9 percent, while it is 13.1 percent in private education. The rates of return to additional years of schooling for both public and private schooling have increased in 2003/04 as compared to 1995/96.

The returns in private education are higher because quality of private education is better than public education Nepal. Therefore, the rates of returns to public education are lower. In addition, students at Private schools are usually from families with higher social backgrounds. Therefore, Private school graduates will have greater opportunity to obtain highly paid jobs.

The rates of return to education by ecological belt. Primary level has 13.6 percent, secondary level has 5.5 percent and tertiary has 10 percent returns in mountain. In hill, primary education has highest return followed by tertiary and secondary education. Tertiary education is also most profitable investment followed by secondary and primary education in Terai.

The rates of return to education by economic sector. The results show that economic rates of return to primary, secondary and tertiary education in non –

agricultural sector are higher than in agricultural sector. Tertiary education is the most profitable investment followed by secondary and primary education in non-agricultural sector. On the other hand secondary and tertiary educations have no return.

The rates of return to education by income quintiles. Primary education rates of return in the richest quintile are almost 4.5 percentage points higher than in first four quintiles. On the other hand, collage level rates of return in poorest 80 percent group are 2.7 percentage points lower than in 20 percent richest group. Secondary level return favors the richest quintile by 3.0 percentage point.

Research Question 3

Does schooling matter in the determination of household incomes from farm enterprises holding: if so, to what extent?

The coefficient with education alone in the equation gives 8 percent return, considerably larger than 1.7 percent. In mountain, rate of return to education is 4.4 percent and 4.3 percent in Terai. However, rate of return to education in hill is negative. Among the development regions rate of returns to education is highest in EDR followed by MWDR, CDR, and WDR. Rate of return to FWDR is negative. Rate of return to education is higher in rural area as compared to urban area. Out of three sates of years in school variable, the variable highest schooling in the household seems to give the highest return among three.

Research Question 4

Does schooling matter in the determination of non-farm enterprises holding; if so, to what extent?

Household value added production in non-agriculture enterprise. Non trade and non handicraft sectors tend to give high returns to education. There possible reasons are a) Handicraft and textiles use relatively traditional methods of production, such as weaving. This requires more of a training experience and dexterity rather formal schooling. B) Trade (retail, wholesale and restaurants) is usually practiced by those people who either "flunk" out of school at early age or take up a family retail business (especially true for clothing shops) at an early age c) The "rest" category includes finance, informal tourism and personal services. They require a good amount formal school training for a successful management/operation of the enterprise. In house labor supply has the highest elasticity in handicraft/textiles sector, as expected.

By regions, rates of return to years of schooling is slightly higher in urban. One reason for this might be that rural enterprises tend to follow more traditional practices that require less of might be that rural enterprises tend to follow more traditional practices that require less of formal education. In house labor supply has a greater contribution in rural areas, consistent with fact that rural households tend to involve more of their members to the production process.

Research Question 5

What might be the rough estimate of social return by level of education as opposed to private return?

Social return to education. There is a wide range of social returns across different levels of education (6.6% - 15.5%). Tertiary education has the highest social returns (15.5%) followed by secondary education (7.2%) and primary education (6.6%) at the national level.

The social returns to primary, secondary and tertiary education are higher in urban than in rural areas. Social return to female education is higher in tertiary education as compared to male education. The social returns to male and female education are equal in primary education where as social return to male education is higher than female education. Social returns in non agricultural sector are higher than in agricultural sector. Social returns to agricultural sector in all levels are very low. By quintile groups, the richest quintile seems to have a very high social rate of return at tertiary level. Bottom four quintiles combined seem to have low social rate of return at primary and secondary levels of education.

Research Question 6

Do returns in the wage sector and non-wage sector vary over 1995/96 and 2003/04?

The increasing pattern of the private rate of returns to years of schooling is observed over eight years of time at the aggregate (national) level and disaggregate level except in four categories (Muslim, private school). The increase rate of returns range from .5% to 4.2% at the disaggregate level.

At the national level, returns to primary and secondary education have decreased by 0.3% and 0.8% respectively. On the other hand, returns to tertiary education have increased by 6%.

In all schooling variables, returns to households farm production decreased by 4.3% in average household education, 1.2% in highest schooling in the household and 2.3% in household head's schooling.

The returns to households non-farm production in average households education decreased by 1.5% where as returns to households non-farm production in

highest schooling in the household and household head's schooling has increased by 0.9% and 0.2% respectively.

At the national level, social returns to primary and secondary education decreased by 0.9% and 0.8% respectively. On the other hand social returns to tertiary education increased by 4.5%.

At the disaggregate level, social returns to tertiary education are increased in all categories. Social returns to primary education are decreased in males, females, agriculture and urban categories where as social returns to primary education are increased in poorest 80%, richest 20%, and non-agriculture categories.

Social returns to secondary education increased in male, richest 20% are urban agriculture and non-agriculture categories where as social returns to secondary education decreased in female, poorest 80% and rural categories.

Policy Implications for Educational Policy Development

What might the result indicate in terms of policy implications- which regions (urban/rural), which level (e.g. primary, secondary or university), which group of population (e.g. men or women, high income group or low income group), which economic sector and which types of household enterprises should be targeted for investment in Nepal?

Government funds should target rural areas, female population, bottom income quintiles, non- agriculture sector and primary education for investment in Nepal. Users' funds should target urban areas, male population, richest income quintile and tertiary education for investment in Nepal. Private returns are high enough to attract private investments from those who can afford. It is believable that

these transfers from upper to lower quintile should not provide disincentives to former population groups.

Fairly good rates of return to education after controlling for input variables indicate that more modern environments (with better technology) can make educational investments more productive. Government could provide better infrastructure (road, electricity, and irrigation) and modern farming inputs (chemical fertilizers or certified seeds) to improve farmer-efficiency from additional education. It could provide tax-break and other incentives to open up small financial/personal services enterprises from private sector.

The following are the specific policy implications for educational policy development:

Policy Implication No. 1

Top priority should be given to primary education as a form of human resource investment.

Policy Implication No. 2

Secondary and higher education are also socially profitable investments and therefore should be pursued alongside with primary education in a program of balanced human resource development.

Policy Implication No. 3

The large discrepancy between the private and social returns to investment in higher education (13.3% vs. 11% respectively in 1995 and 19.2% vs. 15.5% in 2003) suggests there exists room for private finance at the university level. A shift of part of the cost burden from the state to the individual and his family is not likely to lead to a

disincentive of investing in higher education given the present high private profitability margin.

Private return to university education is very high and students attending this level of education should share the cost not only because they are from rich households but also because they can expect to earn more in future. Complementary measures should be taken to accommodate poor students at university level. Current public subsidy at this level too high and is benefiting only the rich families.

Policy Implication No. 4

Estimated low rates of returns at secondary schooling level suggest that quality of schooling at this level is poor. Low per student expenditure at these levels is an indication for this. This suggests shifting of funds towards these lower levels to raise quality and rates of return.

Low rate of return and low retention rates (low promotion from primary level and low promotion to tertiary level) at this level can be attributed to poor quality/curriculum (low per student subsidy relative to university level and relative private expenditure). To produce a more marketable labor force with sufficient skill sets and adaptability, educational system at this level should undergo a major revision both in terms of quality/curriculum and financing.

Policy Implication No. 5

Gender and quintile gaps in schooling-attainment are staggering and therefore public funds should target female population, bottom quintiles and rural regions. Private returns are high enough to attract private investments from those who can afford; so it is believable that these transfers from upper quintiles to lower quintiles should not provide disincentives to former population groups.

Policy Implication No. 6

Fairly good rates of return to education after controlling for input variables indicate that more modern environments (with better technology) can make educational investments more productive. Government could provide better infrastructure (road, electricity, irrigation) and modern farming inputs (such as chemical fertilizers or certified seeds) to improve farmer-efficiency from additional education.

Policy Implication No. 7

The government should provide tax-break and other incentives to open up small financial/personal services enterprises from private sector.

Policy Implication No. 8

Educational investments, in general, are fairly attractive relative to other investment at both private and social level. Overall private rates of return of 8% in 1995 and 9% in 2003 to an extra year in school are a clear indication that access to education could help poor population groups to raise their earnings.

Policy Implication No. 9

As reflected by very low schooling attainment (measured by years of schooling), Nepal's educational capital base is minimal at present. Therefore, expansion of educational investments at all levels of education is necessary. However, lack of resources for all around expansion calls for prioritization on certain areas. The estimation results from our study can make a small but useful contribution to implicating some possible priorities, at least initially.

Policy Implication No. 10

Educational policy in Nepal should tend to touch on the issues such as basic access to schooling, equity, quality and efficiency.

Policy Implication No. 11

As economic returns to education are reasonably high, investment in education in Nepal needs to be expanded. Development of education should include both quantitative expansion and qualitative improvement.

Policy Implication No. 12

Educational planners in Nepal should first treat education as an important investment activity like any other physical capital investment activity and not as consumption expenditure, which could be pruned. Education should be planned as a major component of human resource development strategy and as an important input into the development process. It needs to be closely integrated with overall development planning so that the inter-sectoral links between education, economic growth, health, nutrition, population, poverty, employment and income distribution are improved. This should be clearly reflected in the philosophy and practice of national development planning exercises and should not end up as mere rhetorical statements in documents on educational policies.

Policy Implication No. 13

Public investment allocations for education should not be made in an ad hoc manner or on a residual basis, that is, resources for education should not be determined after allocation for all other major sectors have been made. Economic criteria should serve as baseline in making investment decisions in education, and

social and cultural values of education should be so considered as to complement the economic criteria.

Policy Implication No. 14

Economic returns to education of women are about as attractive as those to the education of men. Education of backward religion groups and women needs to be viewed to be as important as the education of men. Not only as a matter of charity, grace and social equity, but also from a strictly efficiency point of view, investment in education of backward groups including women, needs to expanded.

Conclusions

The purpose of this study was to apply human capital model to evaluate the relationship between education and earnings at three different levels – earnings from individual wage-sector, household farm holdings, and household non-farm enterprises – to extend and fill several gaps in the literature in Nepal using available NLSS I and NLSS II data – a rich data set in terms of coverage, methodology, and quality – to provide evidence on present linkages between education and individual/household income. In addition, this study attempted to closely examine the return to educational investments by gender, geographic regions, quintile groups, educational levels, economic sector, religion, and types of schools. Based on the major findings and discussion presented earlier, the following conclusions are drawn from this study.

1. The results of this study are fully consistent with and reinforce earlier findings and patterns. Based on both private and social rate of return, primary education is seen number one investment priority in Nepal as the number one investment priority in developing countries.

2. Years of schooling are a necessary indicator of education. The overall rate of return to additional years of schooling is 8% in 1995/96 and 9% in 2003/04 in the wage sector in Nepal. It can be claimed that educational investments are fairly profitable with respect to comparable investment projects.

3. Higher rates of returns to non-agricultural wage-sector and low rates of return to agricultural wage-sector questions the productivity effect of education and suggest that there is signaling effect of schooling.

4. Educating females is more profitable than educating males, a result somewhat paradoxical but often found elsewhere too.

5. Urban regions and richer quintile groups get favorable returns, implying poor quality of education and difficulty of access to better paying labor markets for rural areas and poorer quintile groups.

6. Very high private returns to tertiary education and the existence of high public subsidization at this level call for increased private spending at this level and shift of public funds to other levels. From society's perspective, this option would be both efficient and equitable.

7. The social rate of return to education is lower than the corresponding private rate. This, almost as a rule, is due to two reasons: first, the private costs of education constitute only a fraction, however, small or big, of the social costs of education. Second, the pre-tax earnings differentials differ not very significantly from the post-tax earnings differentials and, on the whole, the cost correction is much stronger than the tax one so that private rate is higher than the social rate.

8. The low rates of return to secondary level have two fold implications. First, they imply the need to make efforts to drastically reduce wastage at this level. Second, this implies that secondary level of education does not serve as terminal levels.

9. The social as well as private rates of return in some cases are negative. Thus, the marginal rates of return to the secondary and tertiary level for the sample population and to sex and ethnicity groups are negative. The negative rates of return are generally due to the high incidence of wastage at secondary and tertiary levels and the high non-participation rates for women in the labor force. The negative rates of return may lead one to conclude that further investment should not be made at the corresponding levels of education. But even if the marginal rate of return is negative to secondary education, it would not be conclusive for investment planning at this level, because secondary education is an intermediate and necessary educational step to higher education, at which the returns are positive. In this context, the average rate of return assumes importance from the point of view of planning.

10. The higher rates of return to the backward religion group justify further investment in the education of this group. it is important to not that the returns to higher in spite of wage discrimination against this group, and this is primarily because of the lower per pupil cost of their education. This may as well be an indicator of the poor quality of education the backward ethnic receive. It is necessary, thus, not only to invest more in the education of this group but also to invest more per pupil so that the inequalities in the quality of education are reduced. To explain, why returns to education of the non backward castes are low, one has to look at the non-economic aspects of

education. The non backward castes, as we have seen, invest more in education than the backward castes, not necessarily anticipating higher economic returns to their education. In fact, a part of their investment is consumption and motivated on cultural and status considerations. The non-backward casts might send their children to expensive schools to satisfy their cultural and status needs. In fact, some economists feel that education is increasingly becoming an item of wide cultural consumption. Perhaps more so, in case of the non backward castes.

11. Education has a significant and positive contribution to household incomes from farm activities and non-farm enterprises, although this efficiency of household education is greater in non-farm activities. In both sectors, productivity-contribution of education seems to work best when complimentary technological inputs are available.

12. Estimates of rates of return to education have been often used to provide policy decisions regarding investments in education in developing countries, both relative to non-educational investments and across different levels of education. However, it is believe that the real usefulness of these estimations for government decisions is open to criticism.

13. The results in our study are based on human capital earnings functions and any implications are logical followings from our specifications. Direct use of the regression coefficients is not warranted for two reasons. Firstly, although our rate-of-return analysis was based on a very rich data set and a widely accepted methodology (Mincerian Earnings Functions), some important determinants of schooling attainment-ability and school-quality in particular – where left out from the regressions for lack of data. A proper measurement and inclusion of

these variables in our specification would probably give better results for rates of returns. Secondly, because we are unable to adjust for the social benefits (externality we fail to measure) of education in our estimates of social rates of return, implications from our current estimates are not fully applicable. Moreover, the question regarding whether better educated are paid more because they are more productive or because they are deliberately recruited into the ruling elite of society (screening hypothesis) is unresolved from this results.

14. Having acknowledged these shortcomings and uncertainties regarding this rate of return analysis, the researcher felt that this study deserves some appreciation for its attempt to extend and fill several gaps in the education earnings literature in Nepal. The results, that we arrive at, are not intended to attract definite actions but to suggest possible policy implications.

Agenda for Future Research

This study is based on the NLSS I (1995/96) and NLSS II (2003/04) data. The Nepal labor force survey 1999 is also available from Central Bureau of Statistic Nepal. Using this data, one can compare how the rates of return to education have changed over time in Nepal. Such an updated study of cost-benefit analysis would be very useful for education policy makers.

This study is based on quantitative analysis. Why rates of return for female are higher, urban areas is higher? Why social return is lower? Why rates of return have increased in 2003/04? The further qualitative research is needed to substantiate the estimated returns and to answer the above questions.

This study focused on formal schooling - primary, secondary and tertiary education - in other to investigate the linkage between education and earning in Nepal. However, formal education is not only the factor for increasing earnings. Non-formal education including literacy education, agricultural extension, and on-the-job training has made a significant contribution to increasing earning.

Problems in regression analysis such as normality, multicollinearity, and heteroscedasticity should be corrected. In this study, these problems are diagnosed only. Multicollinearity problem was diagnosed using correlation matrix, VIF and tolerance. The correlation coefficients, VIF, and tolerance do not suggest that the multicolinearity problem is present in our specification.

This study used Breuech - Pagan/Cook-weisberg test for heteroskedasticity. The heteroskedasticity problem was present in our specification. It is suggested to correct heteroskedasticity problem to get the accurate estimates. We checked for normal distribution of residuals by plotting error term with fitted dependent variable (Appendix G). The Jarque-Bera test of normality is suggested to diagnose the normality problem for reliable estimates.

This study estimated monetary rate of return to education using quantitative analysis. The further qualitative research is suggested to carry out to capture non economic benefits and externalities of educational investment.

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