

**An Estimation Model for Private Rate of Return on Education  
in high income petroleum based developing countries:  
The case of Kuwait**

A thesis submitted for the degree of Doctorate of Philosophy

by

Humoud A. S. Alqattan

School of Information Systems, Computing and Mathematics, Brunel University

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## **Abstract**

The benefits of a good education are numerous; it not only offers knowledge and power to individuals, but also enables them to lead the life they wish to; and to benefit both their own family and country. Education has a positive impact on the development of a country. An educated society can eradicate poverty, illiteracy and unemployment, and help in the improvement of the health care standards, the political structures, and the national productivity. The contribution of education in this development process is evident and easily recognized. Many studies show that investments in education generate benefits for people (private benefits) and society (social benefits), similar to those of the physical capital investments.

Due to the important role that education plays in the development of human capital, in order to conduct the process of development in developing countries, to achieve their growth aims, significant attention should be placed on studying human capital investment accumulation through the means of the rate of return on education (RORE). So far, numerous economists and researchers have attempted to estimate the RORE for the purpose of observing the efficiency of educational spending and resource allocation (see Psacharopoulos, 1973, 1980, 1985, 1994, 2002, and 2004), in order to be able to analyse the output of the educational process on the economy. The estimation of the rate of return on education (RORE) can help in describing different phenomena, such as the following: employees of the public sector benefiting greatly from higher earnings as compared to the employees of the private sector working in the same capacity; the observed difference in the attendance between males and females to complete their education; the large demand for ‘easy’-discipline, ‘aversion’ (sub) specialties and the high rate of dropouts from school by males.

The research problem of this thesis is that there has been a lack of information regarding estimating the RORE in high income petroleum-based developing countries, such as Kuwait, as most of the existing research has not accurately differentiated between low and high income developing nations. The aim of this

research is to clarify the influencing variables and factors affecting the investment on education and their relationships by identifying these factors. This study endeavours to develop a framework based on the RORE model and to verify it by estimating the rate of return in high-income petroleum based economies in developing countries, and in this context, data is acquired from Kuwait to verify it, as a case study. The results of the employed regression model show positive and economically significant parameters for return on education and a negative return for extra years of experience. The estimated rate of return for females is relatively higher than males. The average estimated rate of return to education is 5.2%; with the estimated return for females being 6.7%; and for males 5.5%. On the other hand, by expanding the model to include the 'level of education' terms, the results show the highest return for primary education and lowest for intermediate and diploma education. Results indicate also that the highest rates of return on education for females occur in high school, whereas for males in bachelor-level higher education.

Key words:

Rate of Return to Education, education production function, Private Rate of Return, Social Rate of Return, Individual earnings.

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## List of Abbreviations

RORE	Rate of return to education
NBER	National Bureau of Economic Research
Years_S	Years of schooling
Years_X	Years of Experience
LOG	Natural Logarithm
GB GHS	The Great Britain General Household Survey
IBRD	The International Bank for Reconstruction and Development
EU	European Union
MENA	Middle East and North Africa
NBER	National Bureau of Economic research
CPI	Consumer Price Index
CP	Constant prices: remove the effects of price changes (inflation) to give the equivalent prices or costs in the reference year (2005).
GDP	Gross Domestic Product: the total value of all goods and services produced within a country.
B.A.	Bachelor of Arts
B.Sc.	Bachelor of Science
M.A.	Master of Arts
M.Sc.	Master of Science
PhD.	Doctor of Philosophy
SD	Standard Deviation
SEM	Standard Error of Mean
GCC	Gulf Cooperation Council
OECD	Organization for Economic Co-operation and Development

## **Dedicated to**

My parents for all of their support over the years, My sons Hoor, Saqer, Khaled, Ahmed and Abdulaziz. My wife Alaa, her name should be next to mine on this thesis. Finally, I am indebted to many of my supporter, Prof. Bashier Talibi and Prof. Hussain Altalafha thank you for making the overall experience of my PhD most interesting.

## **Declaration**

I declare that this thesis I hereby submit for the degree of PhD. At Brunel University, UK, is my own work, supervised by Dr. Lampros Stergioulas and Dr. Jamal A. Al-Zayer. I have not previously submitted the work at any university or for any other at any research publications.

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## Conference and Journal Papers

The following is a list of four related publications directly arising from this thesis.

### Conference Paper

- 1• Al-qattan, H., Stergioulas, L., and A. Al-Zayer, J., The Returns to Education Based on Level of Education: Case of Kuwait European Business Research Conference hold in Rome Date: 27-28 August 2012. European Centre for Business and Economic Research (ECBER) World Business Institute, Australia, WBI London and BCA Aust. and NY.
- 2• Al-qattan, H., Estimating Rate of return on education in a High Level Income Petroleum Based Economy Country . 16th IBRC, 16th International Business Research Conference hold in Dubai from 12-13 April, 2012. World Business Institute, Australia and London.

### Journal Paper

- 1• Al-qattan, H., *Estimating Rate of Return to Education in a High Level Income Petroleum Based Economy Country*. World Review of Business Research, September 2012. [http://wbiaus.org/wrbr\\_final2.htm](http://wbiaus.org/wrbr_final2.htm).

In publishing process

- 2• Al-qattan, H., Stergioulas, L., and A. Al-Zayer, J., The Returns to Education Based on Level of Education: Case of Kuwait. World Review of Business Research, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2130636](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2130636)

# **Chapter 1:**

## **Introduction**

In general, development is directly associated with education, developing nations believe that there is a positive correlation between development and education by relating development with economic growth and education with human resources. Alfred Marshall (1890-1922) stated that 'The most valuable of all capital is that invested in human capital'. Therefore efforts are made to update literature of rate of return on education by analysing outcomes that have been observed in the last four decades (World Bank, 2008). Along with facts and figures that have been gathered for comparison, there is an entire list of controversies that are linked to the rate of return to education, especially in the studies that have been done in the developing countries for instance see Ali (2002). In our study, rates of return are computed for individual private return by using cross sectional data. To be able to determine the variables that are affecting the investment of education, it is necessary to distinguish and study the various methods for estimating the rate of return to education. Return on investment in education is based on Adam Smith's (1723 – 1790) human capital theory that has been calculated since the late 1950s by Gary Becker and Jacob Mincer (Mincer, 1958; Schultz, 1961; and Becker, 1962).

Calculations and estimation including estimates based on modern econometric techniques, and over time evidence from a wide variety of countries reassure us of the validity of the human capital theory, and the solution that has been provided by the relatively newer quasi-experimental researches on the management of education suggests that an investment in education is similar to investing in physical capital (Psacharopoulos and Patrinos, 2004). Estimation studies suggested that investment in education is justified not only for society and cultural reasons, but also strictly on the grounds of economic efficiency. It was hoped that this would make the governments to treat education with due respect in the matters of allocation of resources, rather than providing resources as a charity and/or on a residual basis, i.e., allocating to education the resources that remained after allocating to all other sectors (Tilak, 2007). According to Psacharopoulos and Patrinos (2004), developing countries need to further demonstrate the effects of education on wages; since there is a lack of studies and no separation between low and high income



developing countries. In the above-described context, this study will identify the various factors that are affecting the Rate of Return on Education (RORE) and a framework/model will be developed for estimating RORE in the high-income “petroleum-based product” developing countries, such as Kuwait.

In the literature, the first empirical cost-benefit analysis of education done by a Soviet economist (Strumilin, 1929) and the real rate of return estimation activity started in the late fifties (see, e.g. Becker, 1960). Schultz's (1961) presidential address to the American Economic Association and the publication of Becker's (1964) NBER (National Bureau of Economic Research) book gave a further boost to the subject, especially as a topic of PhD dissertations in US universities. Later on the method, a marginal improvement over the cost-benefit analysis, has been extensively used in most economic analyses of public investment projects, and received sufficient justification for its use in economic analysis of investment in education. In general, it has a powerful and strong logic, which appeals to all. The rate of return on education is that rate of discount that equates the net present value of life-time earnings of the individual, taken as the benefits of education, to the net present value of costs of education. For investment in any project to be economically justified, the rate of return should be positive, and should be higher than the ‘alternative rate of return’. Among several potential projects, investment is preferred in that project in which the rate of return is higher, rather than in the projects where it is lower.

## **1.1 Research Problem**

George Psacharopoulos (2006) in his research findings stated the following characteristics of RORE with respect to developing countries:

- (a) ROREs in developing countries are higher than in the advanced market economies.
- (b) The pattern of private ROREs is highest for primary education, followed by secondary education, by higher education, graduated level, and by postgraduate education, i.e. a pattern of RORE declining as education level rising.
- (c) The pattern of ROREs remains stable as countries develop with only relatively minor decreases in ROREs.

- (d) RORE in developing countries is higher than in advanced market economies.
- (e) RORE for females is higher than for males because of their lower foregone earnings, as reflected by their lower wages.

From the same perspective, the Arab Planning Institute (2002) published a cross-country study of estimating private return to education by using an expanded Mincer equation, for six Arab countries without any distinctions between low and high income developing countries; World Bank MENA region Report (2008) reported estimations for Private and Social Rates of Return to Education by Level of Education as well, the report shown the status of all MENA States in one category, without any discrimination. Another study advanced by Makdisi et al. (2000) claims that in terms of investment and expending on education the Arab counties have done a lot as compared to other developing nations, and as far as improvement in various educational disciplines, like enrollment of students and overall literacy, is concerned, the Arab countries are still far behind the developed nations, which means that more levels/years of education are required to gain a comparable level of payback from their investments.

The thrust of this thesis is that there is a lack of information regarding the estimation rate of return on education in developing countries, such as Kuwait, and most of the research did not accurately differentiate between low and high income developing nations as mentioned above, whereas the Word Bank classifies the countries mainly based on income (see Appendix A.1).

In conclusion, this information gap provides the impetus for this PhD research programme to study the RORE in high-income petroleum-based product developing countries, such as Kuwait, as it is valuable to provide an investigation of the differences in RORE between low and high-income developing countries which shown to be absent from the body of the previous studies all around the world. In this context, this study will also examine and revise the influencing factors affecting the investment of education and propose appropriate RORE framework.

## **1.2 Aim and Objectives of the research**

The aim of this research is to shed light on the influencing variables and factors affecting the investment of education and their relationships in order to help education decision makers to gain a better return on investment in education. In particular, a framework based on the RORE model will be constructed and verified by estimating the rate of return focusing on high-income economies; the framework will be applied and tested by using Kuwait as a case study to produce the final framework which can help policy decision makers regarding education planning. To achieve the aim of this study, the following objectives need to be addressed:

1. To identify the factors and relationships that affect RORE. An examination of past practices of RORE estimation efforts may suggest possible alternative solutions to the research problem at hand. The framework which will be developed in this research is a continuation of these efforts and a direct contribution to (expansion of) this body of literature and it is intended to assist the top management in the field of human capital investment and education, to monitor and approximate/assess the state of the education system for planning purposes.
2. To develop a conceptual model, based on the literature, to explain the relationships between the main variables/factors that are affecting the RORE on investment on education, and construct an appropriate RORE framework.
3. To conduct an empirical study to validate the conceptual model in the context of Kuwait as a case of high-income petroleum based developing country.
4. To build modified expanded models specialized to estimating rate of return for different levels of education.

## **1.3 Research Questions**

The above aim and objectives are achieved by investigating the following research questions:

Q1: How returns of education investment can actually be estimated in practice?

There are different methods for estimating RORE. This research focuses on one of the most popular method that has dominated the research in the area of Economics of Education for the last several decades.

Q2: What are the main variables that affect the returns of education investment?

Based on the chosen estimation method, this research aims to describe set of variables that influence the coefficient of the rate of return to education, and augment it with the additional requires variables for estimating the rate of return on education in high-income petroleum-based developing countries such as Kuwait.

Q3: To what extent is the rate of return to education of high-income petroleum developing countries consistent with the empirical findings of the return to education in comparison to the results of developed and developing countries?

For operational and analytical purposes, the World Bank's main criterion for classifying economies is gross national income with a gross national income per capita of US\$12,476 or more. Based on its gross national income per capita, every economy is classified as low income, middle income (subdivided into lower middle and upper middle), or high income.

According to the United Nations, for example, some high-income countries may also be developing countries. The GCC (Arabian Gulf States) countries, for example, are classified as developing high-income countries. Thus, a high-income country may be classified as either developed or developing (UN, 2005); for that reason, this research presents the findings for the rate of return on education in Kuwait as a case of high-income petroleum-based economy and compares it with other economies.

Q4: At which level of education, an individual gains the highest rate of returns to education?

Several studies reveal that returns to investments in education are positive and gradually as the level of education rises and suggest that investments in primary education should be emphasized at the expense of higher education (Psacharopoulos, 1994); whilst a few studies present results that indicate the contrary i.e. that returns to investments in education increase as the level of education rises (Manda and Bigsten, 1998; Liu, 1998). This is important, as it emphasizes the potential of education at all levels in the social and governmental policy and planning public spending. Recognition of this fact has lead many countries including Kuwait to prioritise public spending on education.

By answering the above question, we can also evaluate private returns to investment in the different levels of education.

According to Psacharopoulos (1994), the private return to investment in education is an important factor in determining educational attainment, participation and ultimately wages/income. Education is critical in income distribution and economic development.

## **1.4 Methodology**

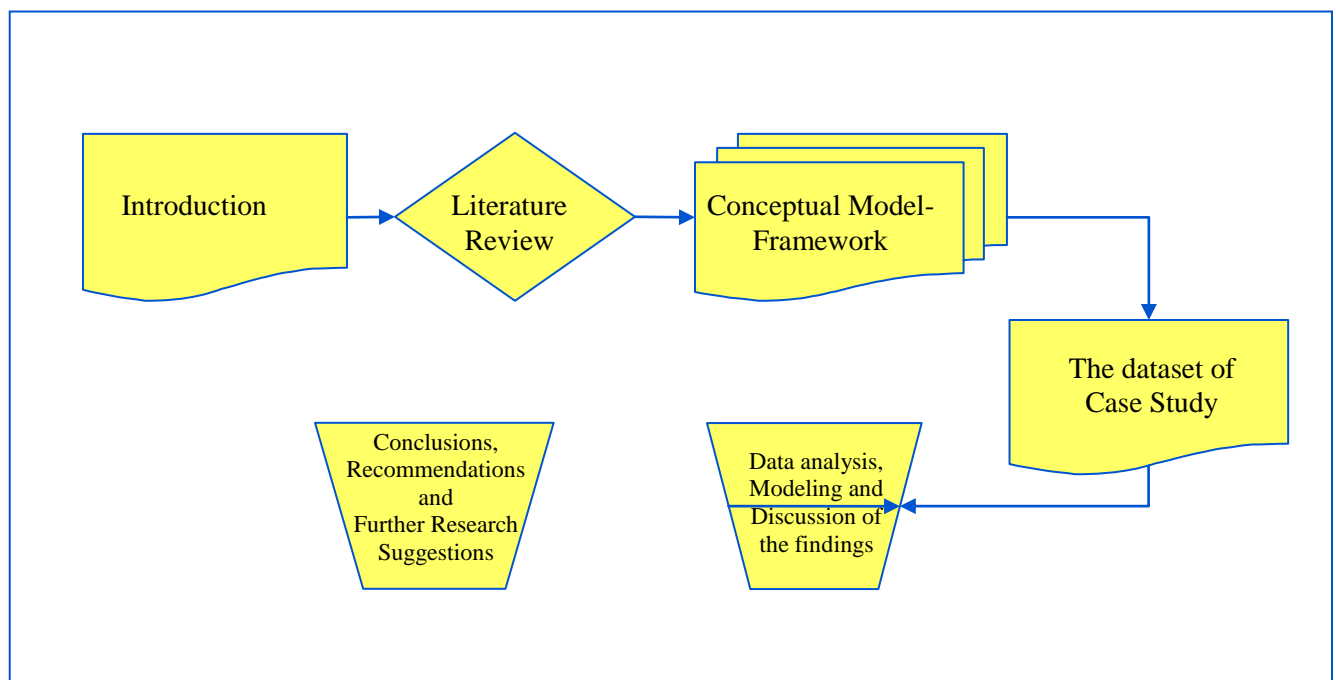
According to Mark et. al.(2003) “Research is something that people undertake in order to find out things in a systematic way, thereby increasing their knowledge”. Also, Branard (1994) states that, research can be defined as an examination to identify new information or relationships and to expand and confirm existing knowledge for some specified purpose. According to Panneerselvam (2007), studies that represent the performance measure of the system of interest in terms of its variables using regression are common and typical modeling research. The selection of which method to apply should be based on the informed understanding of the methods appropriateness for that particular research area or topic (Sarantakos, 1993).

As the aim of this thesis is to understand the influencing variables/factors on the investment of education and their relationships in order to help education decision makers achieve a better return on investment to education, the research involves the construction of a framework based on the earnings model and its verification it by estimating the rate of return in the contacts of Kuwait education. Those, the research work is mainly modeling study, which focuses on investigation the factors affecting the education return and using quantitative data to implement and verifying the developed framework. A quantitative research approach will be used for this study. The necessary individual cross-sectional data used in this research for estimating the parameter of the developed frame work comes from government statistics derived from a list of Kuwait Civil Service Commission database and the Supreme Council for Planning and Development Statistics in Kuwait. This statistical data set contains a large body of information about the demographics and labour market status. This data was analysed using correlation test to ensure the indents of the variables and employing regression models to verify the proposed

RORE framework (the analysis was performed using the E-Views econometric analysis software package).

## 1.5 Organization of the Research

This Research flowchart diagram is organized into seven chapters as shown in Fig 1.1



*Figure 1.1: Research Roadmap*

Chapter one: This Chapter introduces the problem in the context against related research and theoretical backgrounds. The study aim and objectives are presented in this chapter, Research questions, research methodology, and organization of the study.

Chapter Two: Studying the previous research in the area to provide an outline of the role investment plays in development of human capital model. That sheds light on the variables which affect the rate of return on education to assist the researcher for the purpose of developing a conceptual framework for this study.

In chapter two we discussed the previous work, large amount of the literature review and the importance of human capital, education and education payback for individual and society.

On the other hand, presents the methods of Estimating the Rate of return on education (RORE) and showing the available results of RORE belonging to some developing countries in the last but not least summarizing some critiques as of the literature.

Chapter Three: Estimations from various models regarding the rate of return on education is summarized. Also, presents the conceptual model used in this study.

This chapter provides the selected RORE method, identifies the main factors that impact the rate of return on education for the purposes of developing a conceptual model for this study. Subsequently, develop the research hypotheses towards presenting research implementation based on developed framework steps and data collection/analysis plan.

Chapter Four: This Chapter discusses the presents the characteristics of Kuwait as a case study and gives you an idea about Kuwait labour market which can help for estimating rate of return of return in education of High-Income petroleum based developing country.

Chapter four will attempt to understand the development of Kuwait's economy and its impact on the social structure of the society as well as the education system of the country. Emergence of labour markets, traditional trades and economic activities after the discovery of oil in the country will be discussed.

Chapter Five: This chapter compares the results of the case study with the findings of the literature.

Based on the literature of this study; the researcher use the main variables that affecting estimating RORE: earnings, years of schooling, and years of experience. The dependent variable is the log of monthly earnings which includes the basic salary and social allowance (which presents part of total salary that depends on individual marital status). Also this Chapter presents the Discussions of the case study and the findings.

Chapter Six: This Chapter presents the conclusions, recommendations and further research suggestions, implications, recommendations and suggestions of further studies required.

## 1.6 Summary

Possibly the oldest reference to education having a value in the output sense is in an old Chinese proverb: “Give a man a fish and you will feed him for a day. But if you teach him how to fish, he will be fed for a lifetime.”

It must be self-evident that education has some value. Otherwise, why are trillions of dollars spent annually on education around the globe? Both states and individuals who incur such an expense must expect a benefit in return. But whether the benefits actually exceed the education expenses is not a trivial question (Psacharopoulos, 2006). This study is important from three standpoints. First, to study and analyse the available research which calculates the rate of return of education in both under developed and developed countries, in order to propose an adopted appropriate framework to estimating the RORE in the high-income developing countries. Second, to develop a modified model in the context of Kuwait as a case of high-income petroleum based economic country. Finally, to provide the policy maker with a helpful technique as a planning indicator to monitoring the education resource allocation.



## **Chapter 2: Literature Review**

### **Introduction**

Previous chapter the research problem and how can be tackled by the aim and objectives of this research, the research roadmap was shown and explained.

This chapter provides an outline of the role investment plays in the development of human capital, and the rate of return on education. The chapter discusses and identifies the main factors that impact the rate of return on education for the purposes of developing a conceptual framework for this study.

Education is responsible for increasing labour productivity and their earnings but still remains to be seen as an investment in human capital which can be made useful human beings in different disciplines of life. According to Adam Smith's (1776/1976) classical inquiry into the nature and causes of wealth of nations: " A man at the expense of much labour and time to any of those employments which require extraordinary dexterity and skill, may be compared to an expensive machine. The work which he learns to perform must be expected over and above education with at least the ordinary profits of an equally valuable capital" and in his principal of economics, Alfred Marshall (1890/1922) stated that: "The most valuable capital is that invested in human beings". Economists Theodore W. Schultz, Gary S. Becker and Jacob Mincer developed the theory of human capital during the second half of twentieth century and provided economists with a better understanding of the importance of human capital.

### **2.1 Investment in Human Capital**

Human Capital can be defined as the ability of an individual to generate income by having certain set of skills or knowledge. It is an amalgamation of investments in education training and various experiences. Through education and training an individual comes to possess certain skills and knowledge which can enhance his work experience and can be referred to as a stock of productive human capital. This stock of skills and knowledge can be hired by various employers

to achieve a goal. It is important to note that the market value of these skills can be calculated by observing the demand of such skills in the market. It is safe to conclude that the amount of experience, skills and knowledge an individual possesses is what makes the hiring of that individual by potential employers (Becker, 1993).

Becker (1993) argues that "It is a fact that human capital is absolutely essential to growth in the modern world. The very few Arab sheikdoms that make their income from the high price of oil are the only exceptions to the rule that human capital, investments in people, is an essential ingredient to economic progress. I do not think there is any exception to that rule aside from a few oil producers. Fortunately, most countries do not have this large supply of oil, and cannot rely on it; most countries that have a large supply of oil are wasting their resources. This is just a fact, as we observe countries, I think. So most countries have to get by more on their wits than on simply what is in the ground. Therefore, we have to rely on our people, and basically what human capital does is put people at the center of any economy, and that is right where they should be".

Positive results are expected by investing in human capital. These positive changes can be noted by observing an increase in economic growth, higher earnings and reduced poverty. Education is, par excellence, both a field of investment and a development factor. The contribution of education and training in the development process was largely recognized and estimates show that investments in education and training generate benefits for people (private benefits) and society (social benefits), comparable to physical capital investments (World Bank, 2008).

Human resource investments significantly contribute to productivity growth and constitute the linkages of investments at microeconomic and macroeconomic levels. A study for the OECD (Organization for Economic Cooperation and Development) member countries shown that participation in an additional year of secondary education amplifies economic growth by almost 5%, as a short term effect and by 2.5% as a long term effect. OECD also observed that as compared to the previous decade, some EU member countries experienced a growth of 50% or more due to the improvements that were made in the field of human resources. (Com, 2002)

According to Elena (2008), in the 1990's, the world scene of education was dominated by a new paradigm which put emphasis on competition, high educational standards and service quality. Later, in March 2003, The European Council encouraged and regulated human resource investments as a necessity for promoting European competition, for generating massive growths and reducing unemployment, as well as a necessity for the birth of a knowledge based economy.

Backer (1993) gave more focus to the essential need of investment on human capital when he said:

"I am emphasizing human capital, and not machinery and physical capital, although you need this in any modern economy. You need good machines, equipment and plants. But you need the good workers and the good managers, and innovator entrepreneurs along with the right and sound structure, to utilize these machines effectively. There are many examples in the world where we have first-class machinery and third-class ways of production. This happens because the workers do not work the machinery effectively, the managers do not utilize the machinery to produce useful products, and the regulatory structure discourages workers from working very hard or managers from managing very effectively, one of the problems of having too much oil is that you do not have to cultivate self-reliance, hard work and individual responsibility, and that leads, as I said, towards waste. If you ask what the oil producers, including Venezuela, have to show in the long run for this enormous wealth that they have had, you will see that often per capita income has been on a strong downward movement for the last forty years".

Various methods exist as far as investing in human capital is concerned. The activities we engage in during our daily routines also help in enhancing our experience and human capital. These activities can include simple tasks like reading a book or a newspaper to more advanced activities like higher education or hands-on job training. Getting a formal education at an institution still remains the most valuable and important way of investing in human capital. There are numerous variables that can affect an individual's pursuit of education and what kind of effect that education will have on that individual and the demand of skills in the market which one gains by going to an institution. The intention of this research is to concentrate on education received at the formal public schools because practically it is impossible to gather the data for all kinds of learning within the context and scope of this thesis.

## 2.2 Importance of Education

There is much value to education. Otherwise, why are huge amounts of money spent annually on education around the world? Both countries and individuals who expend such expense must expect a benefit in return.

Psacharopoulos (2006) classified the benefits of education into a four-cell matrix, as shown in (Table 2.1)

*Table 2.1: Classification of the benefits of education*

Benefit Type	Private	Social
Market	Employability Higher earnings Less Unemployment Labour market flexibility Greater mobility	Higher productivity Higher net tax revenue Less reliance on government Financial support
Non-market	Greater consumer efficiency Better own and family health Better child quality	Lower crime rates Less spread of infectious diseases Better social cohesion Voter participation

*Source: The Value of Investment in Education: Theory, Evidence, and Policy By George Psacharopoulos, (2006)*

The benefits listed in the lower right cell are the hardest to classify since they do not yield any income as compared to those listed in the upper right cell which reflect a clear marketability in the labour market and earning potential (Psacharopoulos, 2006). Focusing again on OECD countries, we see a clear negative correlation between unemployment and level of education (Table 2.2). It can be observed that individuals who have not completed upper secondary education are more likely to not find employment as compared to tertiary graduates.

Table 2.2: Unemployment Rate by level of Education

	Below Upper Secondary	Upper Secondary	Tertiary
Australia	7.0 %	4.3%	3.0%
Canada	10.9%	6.5%	5.2%
France	12.1%	7.5%	6.1%
Germany	18.0%	10.2%	5.2%
Japan	6.7%	5.4%	3.7%
UK	6.9%	3.9%	2.4%
USA	9.9%	6.1%	3.4%
OECD mean	10.2%	6.2%	4.0%

Note: Data indicate the number of 25 to 64 year-olds who are unemployed as a percentage of the labour force aged 25-64.  
Source: OECD, (2005).

After completing a higher level of education an individual can benefit from increased chances of employment as well as higher earnings potential. According to the statistics, tertiary graduates in the US make two and a half times more money as compared to high school dropouts (Table 2.3).

Table 2.3: Relative Earnings of 25- TO 64-Year-Olds with Income from Employment by Level of Education (index)

	Below Upper Secondary	Upper Secondary	Tertiary
Australia	77	100	132
Canada	79	100	136
France	84	100	150
Germany	87	100	153
Japan	67	100	141
UK	69	100	162
USA	70	100	183

Note: Index base, upper secondary education=100  
Source: OECD, (2005)

## 2.2.1 Market and Non-Market Benefits and Externalities

Market benefits are based on earning differences between more and less educated people, benefits of education captured in the rate of return estimates in this research, whether private or narrow social, which is a private rate of return adjusted for the full cost of education or not-

included externalities are market benefits. On the other hand, the set of non-market benefits show affects not only on the recipient of education, but also affect the society as well. In studies conducted earlier about the involvement of economics in education the term “social rate of return calculation” really meant “estimated for the full cost of education, whether paid for by the individual or the nation.” The social rate of return of investment in education has been lowered against the private rate due to the global public subsidization of education (see Table 2.11). The externalities-inclusive social rate of return might well be above the private one if the individual investor was not to realize the difficulty to measure spillover effects of education maybe due to the rise in consumption efficiency (Psacharopoulos, 2006).

Investment in a formal education differs from financial investments. The time spent in school helps shape an individual’s interests and priorities. Working in groups with others allows students to learn about different point of views and help develop new theories and ideas. During their learning phase, they gain skills which can help them earn more money when they enter the labour market. Gains from schools are beneficial when they take up a job which not only promises an increase in their earnings but also provides ample opportunities for self-improvement and personal growth. When an individual acquires an education by attending a formal school, it lessens the probability of unemployment and being on social welfare, it also brightens his chances of finding employment with higher wages in the labour market as well as settling down in a happy marriage and leading a healthy prosperous life. Formal schooling promotes logical thinking and patience to wait for the right opportunities. It reduces criminal activities like robberies, thefts and other violent crimes. Education can teach individual simple tasks like how to enjoy a good book to more advanced tasks like finance management and some may say that education has helped them become a productive member of the society (Oreopoulos and Salvanes, 2009).

Table 2.4 provides an efficient list of the several benefits of education, along with some empirical estimates of their value.

Table 2.4: Mainly Non-market and External Benefits of Education

Benefit	Evidence
Crime	Per-capita police expenditure decreases by \$170 for an additional year of schooling in community.
Non-wage remuneration	More educated get higher fringe benefits and better working conditions.
Child education	Parental education affects child's education level and scholastic achievement.
Consumption efficiency	More schooling improves consumer choice. Family income increases by \$290 for an additional year of schooling.
Fertility, desired family size.	Mother's education lowers daughter's birth rate. More schooling improves contraceptive efficiency.
Household health	More education increases life expectancy. Net family assets increase by \$8,950 for an additional year of schooling.
Job search efficiency	More schooling reduces cost of search, increases mobility.
Charity	More schooling increases donations.
Technological change	Schooling helps R&D dissemination.
Social cohesion	Schooling increases voting and reduces alienation.
Income transfers	More schooling reduces dependence on transfers.
Savings	Savings rate increases with schooling.

Note: Dollar values are per year in 1996 prices.

Source: Adapted from Wolfe and Zuvekas, (1997).

One of the problems in estimating non-market and external effects is that benefits often span many categories and the effect is not directly observable in monetary terms (spillover effects). According to Haveman and Wolfe's (1984) creative method, it is possible to attach a monetary value to those benefits of education which are not directly marketable in the labour market. This is based on the assumption that an individual would want to pay for something which would not earn him any wages in the market.

## **2.2.2 Social versus Private Returns to Education**

It can be observed that the social rate of return on education can be both lesser or greater than the private rate of return. The externalities which may arise from education can cause the social rate of return to be greater. According to Krueger and Lindahl (2001) note that if higher education leads to technological progress that is not captured in the private return to that education, or if more education produces positive externalities, such as a reduction in crime and welfare participation, or more informed political decisions. The former is more likely if human capital is expanded at higher levels of education while the latter is more likely if it is expanded at lower levels. It is also possible that the social return to education is less than the private return. For example Spence (1973) observed that an education can take the form of simply a credential that was attained and which does little in raising an individual's set of skills and productivity. It is also noteworthy that attaining higher education in some countries may have the opposite affect and can increase unemployment and physical capital may outweigh human capital which would lead to a decrease in output. Another key observation is that education affects national income in a wide variety of ways which cannot be accurately calculated by wage rates. In developing countries, for instance, women have been prevented from pursuing higher education as it might consume their fertile years which according to popular belief in developing countries are a time when they should be bearing children instead of learning; on the other hand, education is positively linked to the health of newborns.

The above comparison clearly indicates the actual value of education for both an individual and society as a whole. Based on previous studies' quasi-experimental datasets and controlling for ability and other factors that influence earnings, it can be concluded that the individual enjoys on average of about 10% per year in returns for every dollar invested in education. Such yield is higher for basic levels of education and much higher in developing countries than in developed industrial counties, also the returns of general academics are higher than narrow vocational skills and the returns for women higher than men.

As it has been mentioned in this research, the micro level (narrow social) on the rate of return lower than private returns is because education was subsidized for the general public. But if one



is willing to monetize and add to the narrow social rate which is a private rate of return adjusted for the full cost of education to the variety of external social benefits reviewed in this research, the wide social rate of return could well exceed not only the narrow social rate but also the private one, as already mentioned, our knowledge is not sufficient to make a categorical statement in this respect. In today's world, based on the international results of the rate of return the private education holds more value than public education where this difference has a negative effect on public education finance policies.

A major drawback of the micro human capital literature is that it concentrates mainly on the private economic return to education instead of social return. In spite of the potential benefits that might stem from education motivate the majority of the macro growth literature (Krueger and Lindahl, 2001).

### **2.3 The Impact of Education on Micro and Macro Economics**

Economics presents a wide range of theories and models which link education to economic growth. Having an education enables an individual to increase his/her earnings but on the other hand it also produces a "ripple effect" via positive externalities in succession throughout the economy. Michaelowa (2000) of the Hamburg Institute for International Economics diagrams the impact of education at both micro and macro levels as Figure 2.1.

The effects of education both direct and indirect are depicted in the above diagram. Necessary assumptions that have been portrayed through the diagram are the following:

1. Education results in learning – it is not purely a “signal” of worker quality.
2. Greater levels of output that are a result of economic expansion can be consumed by the demand which might be present within the economy.
3. Financial and political policies are sufficient to fulfill the demands of a fast expanding economy (the supply of money grows at a rate which is equal to the GDP to avoid deflation).

Higher earning potential is directly linked to education which stems from the belief that education enhances the productivity of a worker. Workers are paid the actual value of their products and services, and workers with higher education should earn higher wages. Some

indirect effects to higher education have also surfaced as mentioned in the literature (Heckman et al, 1997).

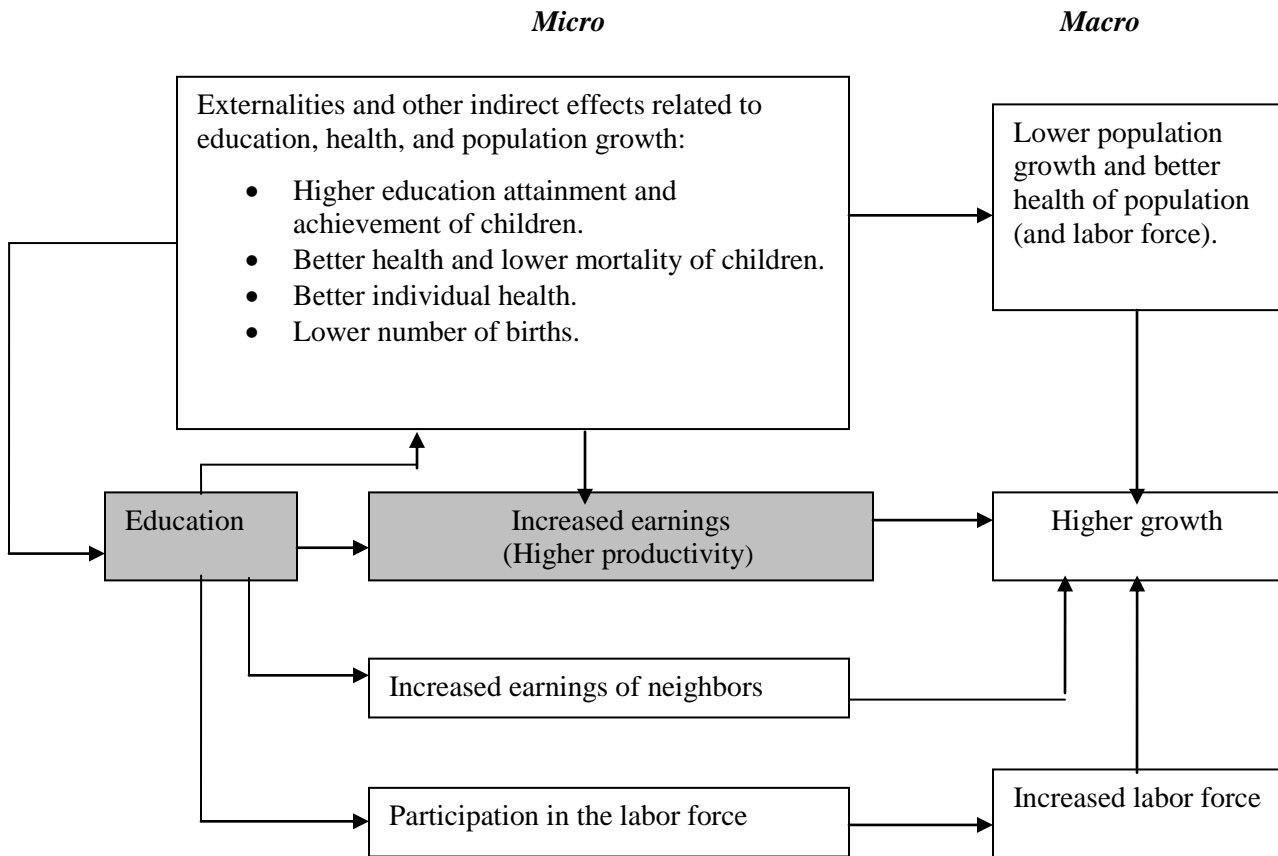


Figure 3.1: diagrams the impact of education at both micro and macro levels  
 Source: Michaelowa (2000) "Returns to Education in Low Income Countries: Evidence for Africa."

Studies have found a “positive effect of mother’s schooling on her children’s health in developing countries” (Michaelowa, 2000). Children who are healthy usually outperform weak or unhealthy students and achieve better grades. Similarly well-educated parents would make better decisions when planning a family which would lead to smaller families. When the size of the family is kept low it allows the parents to spare more time and focus on each child's individual education. Due to this extra attention a child would be able to do well in school and will be encouraged to pursue, the area of his/her interests and further education. Education may also benefits neighbors; In an example mentioned by Michaelowa (2000) about an educated farmer who makes use of advanced technology, might be an example for his neighbors who might notice the current trends in farming which he is employing and may choose to adapt to it

themselves. Observational learning forms a method through which education can be attained and dispersed.

The researcher going to quantify the private rate of return to education, based on the figure 2.1 the researcher will regress individuals' incomes on their level of education (as a quantifiable individual characteristic) and other characteristics. Whereas linking a nation's growth rate of GDP to its stock of human capital is more difficult. Some empirical studies find human capital to be positively related to the growth rate of GDP; other studies find the linkage to be insignificant. Some disagreement in the results of empirical studies arises from different measures of education and different definitions of human capital (Foster & Rosenzweig, 1995).

## **2.4 The Relationship between Education and Individual Earnings**

Becker (1993) argues that the skills and experience of a worker increases that particular worker's output, thus increasing his/her value to the employer. Therefore, the wage a worker is paid is not only compensation for the time a person spends working for the firm, but also compensation for the use of an individual's human capital during the time spent working; the human capital is 'rented' to the employer during this time. Both human capital and higher education have their advantages for individuals and collective societies. When years of schooling, learning and experience of a worker are increased it has a positive effect on the wages of the individuals.

Saxton (2000) argued that people with higher education and experience have a greater chance of finding employment in their field of interest, which increases the probability of them continuing their employment with the same company. Individuals with the required skill set are less likely to switch to other jobs. Furthermore he indicated that a positive connection exists, between a robust health and a good education.

Pereira and Martins (2004) believes that education, is one of the many investment decisions motivated by the fact that the investment yields a choice that one would not otherwise have. Part of the return to the investment is to be found in the set of options that emerges. For instance, when an individual decides upon the level of education to be attained it is believed that such

academic qualification will lead to a better-paid job that qualification will also extend the number of options in other matters as well as, the sector and/or specific firm where the individual will be employed. Part of the individual's return to education will thus be the return to subsequent choices or choices that are available only after qualification is obtained.

Education makes it easy to acquire new skills and experience, which can enhance productivity. When productivity increases, it leads to the creation of improved technology, better businesses, a new financial cycle, and, in the long run, promotes economic growth. Education itself can be regarded as a good, which, once acquired, can benefit both the individual and the society. The level of education that is achieved by workers directly affects their work experience in the labour market. An increase in productivity is the most common way education impacts the experience of workers which in turn leads to higher wages. The advanced their education becomes, the more capable the workers become in learning new skills, and getting acquainted with advanced technologies. By increasing their human capital workers enhance the productivity of their labour and of the other capital they use at work. If higher levels of productivity reflect higher levels of human capital which are in turn primarily a result of increased education then a positive relationship should exist between educational attainment and earnings (Bartel and Lichtenberg, 1991).

Pereira and Martins (2004) maintain that in order to observe the complete effect of education on earnings, one also has to bring into consideration the effect of education on several other variables (covariates), including wages therefore, the following can be concluded:

1. To obtain the full effect of education on wages one should be careful not to include in the wage equation covariates whose value can depend on education. In the extreme case one should only regress the  $\ln(\text{wage})$  in education.
2. If one includes in the regression covariates (variable that is possibly predictive of the outcome under study) that depend on education then the coefficient (A number or letter put before a letter or quantity, known or unknown) of education decreases (at least in the expected value of the estimator).

## **2.5 The Rate of Return to Human Capital**

Theodore W. Schultz, 1961 presented a concept about human capital which was further explained by Gary Becker. According to both these Nobel laureates, human capital is a resource in which human beings strive to learn skills and gain knowledge which would improve their worth in the labour market (Schultz, 1961 and Becker, 1962).

Majority of the researcher are of the view that human capital plays a key role in the economic growth of individual firms and economic performance of the countries, the transformation of the economy into production further increases this importance. Due to this aspect, numerous countries have expanded their educational budgets to produce highly skilled workers with high human capital and are planning how to efficiently spend educational resources in an effective way. If education is considered an investment and its rate of return is analysed, it will become clear that when this investment is made in individuals and nations, it manifests itself as a wasteful spending (lost income or direct costs of tuition) in the shorter term but provides major gains in the long term future higher income for individuals and economic growth for nations. How do the earnings of an individual increase through education? Powdthavee's and Vignoles's (2006) study of the human capital theory reveals that when an individual invests his/her time and money in education in the long run, they make themselves more valuable and productive in the labour market. This provides an indication that the labour market is based on competition and the wages of an individual are directly associated with his/her productivity; any achievement in productivity will lead to higher earnings for that individual.

Education and human capital share a lot of common features. Skills gained through education can enhance the value of human capital which in turn leads to an increase in productivity. A higher level of human capital at individual or nation level is related with a higher rate of economic growth, because it increases labour productivity. It is argued that labour productivity which is an important engine in augmenting output growth should increase in accordance with the level of human capital especially, through secondary and tertiary education which is very essential for technological innovation, absorption and diffusion (Engelbrecht, 2002). Increasing productivity in the manufacturing sector, as well as its innumerable corollary services such as

packing, marketing, distribution, inventory control, payment systems, information systems, transactions processing, quality control...etc, is an outcome of an increase in the level of human capital (Romer, 1993). On the other hand, Signaling theory (Spence, 1973) for example, hypothesizes that individuals acquire education merely to signal their already higher productivity to potential employers and that the education itself is not necessarily productivity enhancing.

According to the human capital theory, the rate of return can be used to calculate the value of education and work experience, and this can enable policy makers to find the answers to two very important questions:

1. What level and type of education should a person invest in?
2. What level and type of education should the society invest in?

Another question which arises is that if an individual person invests in education and benefits from it by earning higher wages then why does the country need to be involved in the process in the first place? Various market crashes validate the involvement of the country. If investment decisions are left solely to the individuals of a society, then underinvestment and misguided investment might result. The reason for this is that usually individuals only consider personal achievement which results from their investments. If an individual with a higher education becomes more productive after completing his/her degree and because of this the output of the people in his/her team also grows that a positive result is achieved from his or her education which he/she won't consider before starting his/her degree. At this point, the governments will interfere and provide the individual with financial aid and grants to optimize his educational experience. Insufficient resources to pursue higher education by individuals are another form of market failure. People may not have the resources necessary to invest and acquire an education. The reasons for this might be existing debt or lower wages, and hence, they cannot afford the cost of education. Another important failure is that parents might not be aware of the benefits of higher education and hence might not be interested in encouraging their children to pursue this level of education. Intervention of the state in education has been widely accepted and appreciated. In most developed countries of the world, education through primary and secondary levels is free and the state bears the cost of education at that level. On the other hand, even though governments interfere in the education market, sometimes they are unable to improve the education experience (Machin and Vignoles, 2005).

The reason for this is that when a government invests in education, it only considers a single type of return it expects a greater return from higher education and therefore invests more in that sector as compared to special needs education where returns are low. One of the major reasons why a country's investment in education might be inefficient is because the government officials do not know to which sectors of education to invest in. It is important for the policy makers to have access to research which details the benefits on investing in education and its long term positive effects, and what sectors of education and training to invest in. If government officials make use of available research on the issue and then plan out their policies accordingly they will be able to address the majority of the education market failings that are caused by their inefficient policies.

### **2.5.1 Estimating the Rate of return on education (RORE)**

Calculating the grade point average (GPA) is a common method through which an individual's achievement in education is calculated. Generally the case is that the higher a student's GPA is, the more time she/he has invested in raising his human capital. However, GPA is not an accurate indicator of achievement, especially if students belong to different areas of study. The majority of the women, unlike men, prefer to major in subjects which have less market value. Men on the other hand prefer to major in subjects which have high marketability, allowing them to earn higher wages. Because of these decisions, men and women take up different types of jobs which have completely different working conditions, environments and wages. Men for example prefer working in a business or manufacturing setting, while women may prefer to take up teaching positions at an institute of higher learning...etc. (Haager, 2000). Employers engaged in businesses may find themselves compensating more for their employees, as compared to educational institutions because of lack manpower in their fields and the current condition of the market; this clearly shown that regardless of gender students who major in business at their institutes would be able to earn more than those who take up teaching positions at a university (Filer, 1985).

The World Bank report, 2008 stated that there are three types of empirical studies in the literature concern about the relation between education and economic. The first two are

microeconomic in nature, they study the relation between education and individual income on the one hand, and education and productivity on the other. Although the results of these studies vary, they essentially show that there exists a positive relation between an individual's level of education, his or her productivity, and his or her earnings. The third type of empirical analysis seeks to estimate the impact of investment in education on economic growth using econometric techniques. However, it is this attempt to estimate the macroeconomic relation between investment in education and output that produces major contradictions.

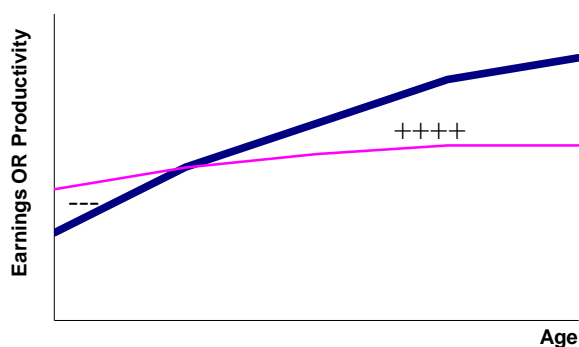
According to Psacharopoulos and Patrinos, (2004), the seeds of the theoretical link between education and productivity are in the writings of classical economists, but for reasons explained by Schultz (1971), Adam Smith's insight was left dormant until the late 1950s, the time when the modern human capital school was born Human capital theory, a concept introduced by Nobel Laureate Theodore W. Schultz and elaborated on by Nobel Laureate Gary Becker, is the notion that individuals acquire skills and knowledge to increase their value in labour markets (Schultz, 1961 and Becker, 1962).

Schultz (1961a, 1961b) introduced the concept of investment in human capital to explain most of the growth puzzle. Becker (1964) and Mincer (1974) modeled the concept of investment in human capital and the measurement of its value. The basic theory underpinning human capital is very simple; the formation of human capital entails the sacrifice of resources today for the sake of a stream of benefits in the future (Psacharopoulos and Patrinos 2004). There is a broad agreement that human capital is an important determinant of economic success of individuals, firms and economic performance of nations. The transformation of the economy into a production further increases this importance. This approaching has led several nations to increase their educational budgets and has put the question of how to spend educational resources in a cost-effective way.

In rate of return analyses, education is analysed as an investment, which involves individuals and the nations incurring costs now (lost income or direct costs of tuition), in order to harvest gains in the future (higher income for individuals and economic growth for nations). This tradeoff is illustrated in Figure 2.2 The age-earnings profile of an untrained or less educated worker (thin line) is compared with the profile of a trained or more educated one (thick line). The age-



earnings profile of the less educated worker is nearly flat, whereas the more educated worker has a steeper age-earnings profile. The more educated worker sacrifices earnings early on in his or her career, so his or her earnings are lower than those of the less educated one. However, after the training period is over (at the intersection of the two profiles), the earnings of the trained worker exceed those of the untrained. This is because the trained worker is more productive than an untrained worker of the same age. During the training years the worker incurs a cost for the sake of benefits later in life. Using proper discounting, the tradeoff is encapsulated in the concept of the returns to investment in education or training. Note that for the theory to be valid, the two profiles should cross. Otherwise there would be either negative or infinite returns on investment in training. Also, the profiles have to cross early in one's professional career to allow time for the recovery of costs (Psacharopoulos and Patrinos 2004).



*Figure 2.2: The age-earnings profile*

*Source: Psacharopoulos and Patrinos, (2004).*

There are two points to consider in the human capital theory:

1. A comparison of costs and benefits by the private rate of return considering investment.
2. A comparison of costs and benefits by the social rate of return from and by the society.

Behavior of individuals trying to obtain different levels and types of education can be explained by private rate of returns; on the other hand social rate of return can be used to calculate different educational policies concerning expansion and contraction of various types and levels of education. In current economics research available there appears to be some confusion about the rate of return to investment in education. It has been the tradition in the mainstream “economics of education” literature to mean a ‘social’ rate, a private rate adjusted for the full cost of schooling, rather than just what the individual pays for his or her education. In

economics research, social rates of return reflecting such benefits which lay beyond the ones which were harnessed by individual investors should also include externalities (Psacharopoulos and Patrinos, 2004).

Table 2.5: Roadmap for Estimating the RORE

Nature of benefits	Data base	Empirical result	Methodology/Approach
Market monetary	Micro data	Private returns	Full discounting
			Mincerian earnings function
		Narrow social returns	Full costing
National accounts Monetary	Macro data	Contribution to growth	Within-country growth accounting
			Cross-country panel regression
Wide social	Micro/Macro combination	Non-market benefits	Contingent valuation
		Externalities	New growth theory

Source: *International Handbook on the Economics of Education* (2004)

Throughout RORE estimation literature, we can observed that there are two main methods; first method, an improvement over the cost-benefit analysis, has been widely used in most economic analyses, provides sufficient justification for its use in economic analysis of investment in education; also in case of investment decision-making at the individual level, the cost-benefit framework has strong significance. In general, it has a powerful and strong logic, which appeals to all, to be more defined rate of return to education, the internal rate of return to education, is that rate of discount that equates the net present value of life-time earnings of the individual, taken as the benefits of education, to the net present value of costs of education. Several practical problems arise with cost-benefit analysis method if would like to applied it in developing countries, including whether earnings accurately reflect marginal productivities, how to adjust for the influence of factors other than education, the omission of fringe benefits, the lack of availability and rarely of Age-earnings profiles should be based on time-series statistical data, i.e. data collected over the whole of the working life, a period of forty years or more, indirect benefits, discounting over time, the principle of opportunity costs, the probability of unemployment, and special factors applying to women. (Hough, 1993)

Alternatively rates of return to education are also estimated using Mincerian earnings model, originally proposed by Jacob Mincer (1972). The full method of comparing costs and earnings has been more extensively used by researchers. Among those who popularized this method, many welcomed the estimation of rates of return as providing a strong case for public investment in education. These estimates suggested that investment in education is justified not only for social and cultural reasons, but also strictly on the grounds of economic efficiency (see, e.g., Psacharopoulos and Patrinos, 2004 and Tilak, 2007). Most of those studies are focused and modified on well-known applications of the Mincerian method, as well as focusing on the private rates of return. Therefore, applying the same model will enhance the cross-countries comparison. The best way to estimate the rate of return on education is by studying the relationship between earnings and individual characteristics which according to microeconomic observation provide calculations of the impact education has on an individual's earnings. On the other hand, some researchers may study those results which give an insight into microeconomics, based calculations of rates of return which are similar to those in macroeconomics ranging from 6 - 12% per annum. The rate of return should be positive, and should be higher than the alternative rate of return for investment in any project to be economically justified.

There is however, some evidence to support the view that education is needed as a means of allowing countries to make good use of available technology with the implication, observed in Mincerian returns, that returns to education diminish with levels of development, biased selections were discovered in the results that were published because the findings indicated that both higher and lower returns lacked credibility (Psacharopoulos and Patrinos, 2004).

### **2.5.2 Rate of return on education in Developing Countries**

From literatures that estimate ROREs, there are only three studies which present ROREs in Arab countries as a case of developing countries. First, the more recent review of Psacharopoulos and Patrinos (2004) presents ROREs for 83 countries by using the full method for estimating returns to education shown that just four Arab country are covered which is very limited (see Table 2.6).

Table 2.6: Returns to investment in education by level percentage (%) full method.

Country	Year	Social			Private			Source
		Primary	Secondary	Higher	Primary	Secondary	Higher	
Morocco	1970	50.0	10.0	13.0	-	-	-	Psacharopoulos (1985)
Sudan	1974	-	8.0	4.0	-	-	-	Cohen and House (1994)
Tunisia	1980	-	-	-	-	13.0	27.0	Bonattour (1986)
Yemen	1985	2.0	26.0	24.0	10.0	41.0	56.0	USAID (1986)

Source: Psacharopoulos and Patrinos, (2004)

And by using the coefficient on average years of schooling as an indicator of the RORE for 73 countries only five Arab country shown (see Table 2.7)

Table 2.7: The coefficient on years of schooling

Country	Year	Mean years of schooling	Coefficient (%)	Source
Egypt	1997	-	5.2	Lambropoulos and Karadjia (1999)
Kuwait	1983	8.9	4.5	Al-Qudsi (1989)
Morocco	1970	2.9	15.8	Psacharopoulos (1985)
Sudan	1985	10.2	9.3	Cohen and House (1994)
Tunisia	1980	4.8	8.0	Banattour (1986)

Source: Psacharopoulos and Patrinos, (2004)

Second, the Arab Planning Institute, 2002 published a cross country study of estimating private return to education by using an expanded Mincer equation for six Arab country (see Table 2.8 & Table 2.9).

Table 2.8: The coefficient on years of schooling

Country	Year	Coefficient (%)	Expected Coefficient From International Monitoring (%)
Jordan	2000	5.5	10.7
Kuwait	1997	11.4	7.4
Oman	1996	10.3	10.7
Morocco	1998	8.2	10.7
Mauritania	1996	6.9	10.9
Yemen	1999	1.8	9.7

Source: The Arab Planning Institute (2002)

Finally, the World Bank's MENA (Middle East and North Africa) region Report (2008) shown estimates for Private and Social Rates of Return to Education by level of Education in four Arab countries (see Table 2.10).

Table 2.9: Returns to investment in education by level percentage (%) Expanded Mincerian Equation

Country	Year	Private		
		Primary	Secondary	Higher
Jordan	2000	1.39	10.0	13.0
Kuwait	1997	-	8.0	4.0
Oman	1996	4.7	-	-
Morocco	1998	4.23	26.0	24.0
Mauritania	1996	-0.96		
Arab States From International Monitoring	-	-	13.0	24.7
The World	-	26.6	17.0	19.0

Source: The Arab Planning Institute, (2002)

Table 2.10: Returns to investment in education by level percentage (%) full method. \*

Country	Year	Social			Private		
		Primary	Secondary	Higher	Primary	Secondary	Higher
Egypt	1988	-	-	-	5	6	8
Jordan	2002	-	-	-	2	4	9
Morocco	1999	-	8	9	5	8	9
Yemen	1997	-	-	-	3	2	5

Source: World Bank 2004 (staff estimates). Jordan 2002: calculations based on HEIS Survey (2002)

Note: \*Males only, simple average of private and public sector rates.

The available statistics on the Arab world provided above can be said to be both limited in coverage and dated. According to Ali (2002), the rate of return on education in Arab countries does not seem to confirm the general patterns based on the compilation evidence from around the world. Recent estimates for Kuwait also presented rather low returns to education (Chishti and Kalaf, 1999). This provides information about the uniqueness of the Arab region which requires further research to clarify. Makdsi et al. (2000) argue that despite the fact that Arab countries have done better than developing nations as far as investing in education is concerned, they are still behind other developing countries in terms of net improvement in several education measures, i.e. enrolment rates and literacy.

Makdsi et al (2000) tested the effect of different factors during his in depth analysis of variables that impact economic growth in MENA (Middle East and North Africa); they tested the impact of various variables. They used a set of panel data that includes 86 countries. They show that the coefficients of these variables carry the expected sign and are significant for the entire sample. However, the region's GDP per capita growth was positive and rapid in the 1960s and 1970s, and much lower in the 1980s and 1990s. The region's earlier track record of per capita economic growth was so impressive that it outpaced the corresponding growth rates in the rest of the world, whereas the region's performance was almost the worst in the latter decades. Likewise, investment in human capital in the region was much more linear and steady. While the region saw a major increase in investment in human capital during the period of rapid growth in the 1960s and 1970s, investment in human capital continued in the 1980s and 1990s. The earlier

investment should have had a positive effect on growth in the 1980s and 1990s, but this positive effect did not materialize (The World Bank, 2008)

Another line of argument presented by Ridha (1998) who claimed that the quality of education in developing countries is low because education systems are over-politicized to the extent that they deviate from the objectives that they supposed to accomplish. There are possible explanations for the tenuous relationship between education and economic growth in MENA region reported by the World Bank (2008). One explanation is that the quality of instruction in the region is too low for schooling to contribute to growth and productivity. Another is that it is the relative rather than the absolute level of educational outcomes that explains the tenuous link between education and economic growth in MENA. Foreign direct investment, for example, would gravitate to those countries that have better education outcomes, all other factors being equal. A third explanation is related to the variance of educational attainment, larger in MENA than in other regions: international research indicates that a more equal distribution of educational attainment is positively correlated with higher economic growth. Finally, the weak relationship between education outcomes and economic growth may also be related to the high levels of public sector employment, and low numbers of dynamic and internationally competitive economic sectors.

In conclusion, the empirical tests generally show that education is one of the initial conditions that define the long-term steady state toward which the economy tends: the countries that in 1960 had a higher level of education had a greater opportunity, 40 years later, to reach a higher level of development. On the other hand, despite the diversity of methods and measures of human capital variables, the role of human capital in the convergence process is still not consistently positive. It is unclear that the countries that invested more in education universally experienced a higher growth rate (World Bank, 2008).

## **2.6 Critical reflection**

The effort is made to update earlier literature of rate of return on education by considering studies that have been conducted in the last four decades. Along with a compilation of comparable figures, a series of controversies that have been associated with the rate of return on

education studies especially in the studies that done in developing countries. At regular period during more than 30 years, George Psacharopoulos has produced wide-ranging reviews of the rates of return to education (RORE) in developed and developing countries (see Psacharopoulos, 1973, 1980, 1985, 1994, 2002, and 2004). The main findings of these reviews were the aid policy of the developing nations' governments for the education sector and their priorities about education in these nations. For each of his 6 six reviews, Psacharopoulos has brilliantly marshaled all 27 RORE studies of nations, analysed their facts and figures, and estimated both social and private RORE's collectively for each geographical region. In light of this research, George Psacharopoulos maintains that the following RORE's are static and the pattern is clearly visible throughout the nations of the world.

a. At all levels of education, private RORE's usually exceed the total social opportunity cost of capital.

From (Table 2.11) it is clearly shown that in all regions the private RORE is higher than Social RORE for example: in Asia for private RORE of primary education is 0.02 and social RORE is 0.162.

b. It has been observed that RORE's in developing nations is higher than already developed economies.

From (Table 2.11) it is clearly shown that developing regions such as Sub-Saharan Africa has higher RORE in all level of education than OECD region.

c. Both private and social RORE's have been found to be greater for the case of primary education, followed by secondary education.

From (Table 2.11) it is clearly shown that in Europe the private RORE in primary education is higher than secondary education.

d. Both private and social RORE's decline when a group's income expands.

From (Table 2.12) it is clearly shown that the RORE for the high income group is lower than for the low income group.

e. During the development process of various nations, RORE's remains consistent with only minor changes.



Table 2.11: Returns to investment in education by level percentage (%) full method, regional averages (%)

Region	Social			Private		
	Primary	Secondary	Higher	Primary	Secondary	Higher
Asia*	16.2	11.1	11.0	20.0	15.8	18.2
Europe/Middle East/North Africa*	15.6	9.7	9.9	13.8	13.6	18.8
Latin America/Caribbean	17.4	12.9	12.3	26.6	17.0	19.5
OECD	8.5	9.4	8.5	13.4	11.3	11.6
Sub-Saharan Africa	25.4	18.4	11.3	37.6	24.6	27.8
World	18.9	13.1	10.8	26.6	17.0	19.0

Source: Psacharopoulos and Patrinos, (2004), figures computed from individual country estimates.

\* Non-OECD

In his recent review, Psacharopoulos (2006) stresses that even when both private and social RORE's decline when a group's income expands, interest in all levels of education remains and public investments can still be made (see Table 2.12), and that “primary education continues to exhibit the highest social profitability in the world regions” (Psacharopoulos and Patrinos, 2004).

Table 2.12: Returns to investment in education by level year, average by per-capita income group percentage (%)

per-capita income group	Mean per-capita (US \$)	Social			Private		
		Primary	Secondary	Higher	Primary	Secondary	Higher
High Income (\$9266 or more)	22,530	13.4	10.3	9.5	25.6	12.2	12.4
Low Income (\$755 or less)	363	21.3	15.7	11.2	25.8	19.9	26.0
Middle Income (\$9265)	2996	18.8	12.9	11.3	27.4	18.0	19.3
World	7669	18.9	13.1	10.8	26.6	17.0	19.0

Source: Psacharopoulos and Patrinos, (2004), the figures computed from individual country estimate.

The argument presented in this research is that the most of RORE studies did not accurately differentiate between developing and high income developing nations, because the results were based on the World Bank’s own classification and the findings reported were for low income and middle income nations only. Low-income and middle-income economies are sometimes referred

to as developing economies. Therefore, the separation of developing countries; in term "developing economies" has been used to denote the set of low and middle income economies (<http://data.worldbank.org>, see the Appendix A.1), which categorizes 186 countries who are a member of the World Bank and the rest of the countries who have a population of 30,000 or more.

No longer are estimating returns to education seen as prescriptive, but rather as indicators, suggesting areas of concentration. An excellent example is estimating the technology impact on wage differentials, which led to a huge literature on changing wage structures (see, for example, Krueger, 1993; Patrinos, 2001).

At the same time, the importance of returns to education is seen in their adoption as a key indicator by the OECD (2001a) in their annual Education at a Glance series and other policy documents (OECD, 1997, 2001b). Increasingly, governments and other agencies are funding studies of returns to education along with other research, to guide macro-policy decisions about the organization and financing of education reforms.

According to Psacharopoulos and Patrinos (2004), further studies need to be carried out about the benefits of schooling in developing nations. Using quasi-experimental design, additional evidence should be obtained to study the effect of education on earnings. Therefore, the present study will estimate RORE in the high-income developing countries by identifying the factors that affect RORE estimation in high-income developing economies.

Along with estimating the return on education, the present study can assist in describing important influential issues in the education policies of the governments; for instances; that public sector employees enjoy superior earnings to those of measurably equivalent workers in the private sector, The large demand for easy-disciplinary and aversion subspecialties and hard attendance of females to complete graduate studies compared the reluctance of males, high rate of dropout from school by male...etc.

## **2.7 Summary**

This chapter presents a background of the importance of investment on human capital and the relationship between human capital and the return to investment in education. Also, in this strand, the chapter discusses the main factors that impact the rate of return on education to end up with an overview of the appropriate conceptual models for this research.

The next chapter discusses/analyses estimates concerning the economic rewards to individuals and the society. It should be stressed that from the findings of this chapter and according to the evidence collected from around the world, the rate of return on education in a high-income developing country does not seem to confirm the general patterns of neither developing nor developed countries.

## **Chapter 3: Conceptual Model**

### **Introduction**

In Chapter 2, we reviewed and discussed the previous extensive body of literature, which demonstrated the importance of human capital, education and education payback for individual and society. Moreover, that chapter presented available results of RORE belonging to some developed and developing countries and last but not least summarized some critical reflections based on the literature. Chapter 3 provides the most known RORE estimation methods to identify the main factors that have impact on the rate of return on education, and developed research hypotheses for the purposes of developing a conceptual framework model for this study. Finally, this chapter presents a summary of the data collection/analysis plan.

### **3.1 Education as an Investment**

Since the dawn of the nineteenth century both sociologists and economists have pondered the rewards that societies and individuals get from successfully completing higher levels of education. It has been observed that irrespectively of their education, employees who attend an institution of learning longer than others are at an advantage of earning higher wages. If other factors are not considered, then comparisons of earnings of individuals with different levels of schooling would prove the return to education (Krueger and Lindahl, 2001). Initial attempts to sustain this “ability bias” consisted of observations of siblings to study the primary differences between previously unobserved family characteristics (e.g. Gorseline, 1932), and regression analysis, which included as control variables studied characteristics such as IQ and parental education (e.g., Griliches and Mason, 1972). These researches have explored in detail Griliches (1977), Rosen (1977), Willis (1986), and Card (1999).

Human capital requires resources like time and money; therefore we should be able to calculate the rate of return on such an investment. Although, similar to investments in physical capital, investment in human capital has its idiosyncrasies regarding the way costs and benefits are conceptualized and measured.

As mention above, the researcher maintains that the rate of return on education in high-income petroleum based developing economies does not seem to confirm the general patterns of neither developing nor developed countries, based on the compilation of evidence from around the world. This provides information about the uniqueness of the region which requires further research to be understood. At this point it is necessary to observe the theoretical basis and methodology to produce a relevant framework of progressive state high-income developing countries.

The analysis of rate of return proves that education can be considered as an investment which requires investments by both individuals and governments so that it can be beneficial in the long run. A series of expenditures take place when construction of the school campus begins, hiring of the faculty...etc. These expenditures provide benefit in the long run when graduates become productive members of the society. The discussion observations discussed below concentrate on rate of return for the purpose of comparing various other projects. Calculating the net present value or internal rate of return is possible for educational investments. More than one rate of return is not achieved in educational projects; therefore the internal rate of return provides the same answer as the net present value. The internal rate of return of an educational project can be calculated from social and private standpoints. The private rate of return provides explanation of the demand for education. Furthermore, it can also be used to determine its role in equity, poverty reduction and benefits to the society. The social rate of return provides details about the expenditure and benefits from the government's standpoint such as complete cost of education instead of only the cost incurred by the student (Psacharopoulos, 1995).

It is possible to calculate the economic value of education by using the human capital theory. A study of the human capital theory reveals that when an individual invests his time and money in education in the long run he makes himself more valuable and productive in the labour market which allows him to earn higher wages. This assumes that the nature of the relationship between education, labour market, and the rate of return to education, should consider the most important assumptions as follow: the level of schooling does not affect the length of the working life of an individual; there is no risk aversion for different individuals; there is no rationing in the labour market for the more highly educated; wages are determined competitively at all levels of

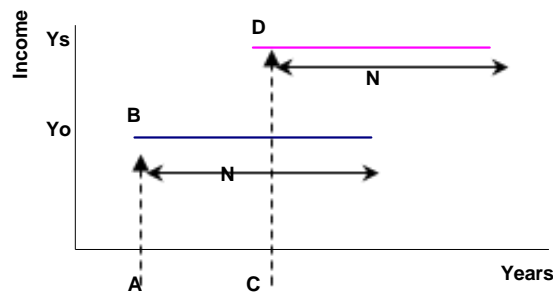
education, such that higher pay for more educated labour is not due to administered policy by the government; and finally, the rate of discount reflecting the cost of waiting for future income is the same for individuals (Mazumdar, 1989). Of course, one can question these assumptions but according to signaling theory (Spence, 1973) for example, individuals acquire education merely to signal their already superior productivity to potential employers, and that the education itself is not necessarily productivity enhancing. Equally, there is a number of theoretical reasons as to why wages may not reflect an individual's true productivity. For instance, this might be the case in the public sector where there is no profit motive, and wages are less likely to reflect true productivity (Powdthavee and Vignoles, 2006). Majority of the empirical proof is in favor of the human capital perspective (Machin and Vignoles, 2005).

### **3.2 Earnings Equation**

It is difficult to implement the cost-benefit method because of the lack of availability of time-series data; and at the same time there is considerable unease over its usage, especially regarding some of the restrictive assumptions that have to be made and regarding problems of data availability and the necessary adjustments that frequently have to be made to data. Age-earnings profiles should be based on time-series statistical data, i.e. data collected over the whole of the working life, a period of forty years or more. For obvious reasons, these rarely exist and it is necessary instead to rely on cross-section data, i.e. snapshot evidence of cross-sections of society at one moment in time. On the other hand, an advantage of using cross-section data is that it is not necessary to correct for the changing effects of inflation over time.

So the alternative formulation to estimate rates of return to schooling is via multiple regression analysis, using the human capital theory; more recent studies in developing and developed countries have often used the Mincer approach and have varied widely in their findings (see Psacharopoulos, 2004) As formulated by Mincer is illustrated in Figure 3.1. The earning stream over the life time of workers due to a schooling level is represented by Y; in graph AB, OA represents the period of no income while the worker is at school; then he earns a positive amount  $Y_0$  for the entire period of N years of his working life. With a higher level of education S, the

period of no earnings (forgone earnings) is extended from 0A to 0C, but the level of earnings in each year of his working life are higher, as shown in line CD which represents the individual choosing between the two levels of schooling while comparing the cost of longer years of forgone earnings with the extra income he gains for each year that he will be working. We should note that the costs that an individual bears during his time at an institution, including any incidental costs are part of his foregone earnings and in most cases are provided free for our country of study which is Kuwait. In actual practice forgone earnings is the only cost which is incurred in private rate of return estimation (Mazumdar, 1989)



Note: Expected Income at  $Y_0$  with no schooling and  $Y_s$  with  $S$  years of schooling with a work life of  $N$  years independent of  $S$

Figure 3.1: Age-Earnings Profiles

Source: Mazumdar, (1989)

The standard framework for the establishment of the experimental approximation of the return in terms of education is the main aspect that was brought to light by Mincer (1974). The typical human capital theory (Becker, 1964) put forth the notion that  $S$  i.e. the number of years one has been schooled, is selected in order to augment the present value that is expected in terms of the income that will be generated in the future i.e.  $Y$ , up to retirement at date  $T$ , net of the costs of education,  $C_s$ , so, at the optimum  $s$ , the PV of the  $S^{\text{th}}$  year of schooling equals the costs of the  $S^{\text{th}}$  year of education, and equilibrium is characterized by:

$$\sum_{t=1}^{T-s} \frac{Y_s - Y_{s-1}}{(1 + r_s)^t} = Y_{s-1} + C_s \dots\dots\dots(\text{eq.1})$$

where  $r_s$  represents the internal rate of return (we are assuming that  $S$  is infinitely divisible, for simplicity, so ‘year’ should not be interpreted literally). Optimal investment decision-making

would imply that one would invest in the  $S^{\text{th}}$  year of schooling if  $r_s > i$ ; the market rate of interest. If  $T$  is large, then the left-hand side of the equilibrium relationship can be approximated so that the equilibrium condition becomes:

$$\frac{Y_s - Y_{s-1}}{r_s} = Y_{s-1} + C_s \dots\dots\dots(\text{eq.2})$$

Then, if  $C_s$  is sufficiently small, we can rearrange this expression to demonstrate:

$$r_s \approx \frac{Y_s - Y_{s-1}}{Y_{s-1}} \approx \log Y_s - \log Y_{s-1} \dots\dots\dots(\text{eq.3}) \quad (\text{Where } \approx \text{ means "approximately equal to"})$$

This tells us that the return to the  $S^{\text{th}}$  year of schooling is approximately the difference in log wages between leaving at  $s$  and at  $s-1$ . Thus, one could estimate the returns to  $s$  by seeing how log wages vary with  $S$  (Harmon et.al, 2003).

### 3.3 Conceptual Models

The earnings function would be approximately estimated by a simple regression of earnings on years of schooling, if completion of schooling meant completion of investment in human capital, to capture the variation in earnings associated with experience in the schooling model, though experience can be viewed as an inherent depreciation phenomenon in the human capital terminology. The growth of earnings with experience is interpreted in the human capital model as being a significance of continued net self-investment activities after the completion of schooling.

The first task of the study is to derive and estimate the relation between earnings and the years of study and years of experience; this is the human capital earnings function was then applied. The empirical approximation of the human capital theoretical framework is the familiar functional form of the earnings model (see Mincer, 1974):

$$\ln Y_i = \alpha + \beta S_i + \gamma_1 X_i + u_i \dots\dots\dots(\text{Basic model})$$



where:

Ln Y: the natural log for wage (basic and social in our case).

S: the years of schooling.

X: the years of experience.

$\mu$ : the random error that captures the other variables that have an impact on earnings, but were excluded from model.

We realized here that  $\alpha$  is related to the initial earnings capacity (intercept) and  $\beta$  is the coefficient for the years of schooling, which is the average return for each year of schooling. The situation explained beforehand is known as the function of basic earnings.

The theory is concentrated at younger ages to predict the investments; but continues at a diminishing rate throughout much of a person's working life. Investments are not incurred all at once in a short period because of increasing marginal costs; they are staggered over time and decline continuously — both because benefits decline as the payoff period shortens and because opportunity costs are likely to rise with experience; this is true of gross as well as net investments. Since earnings are a return on cumulated net investments, they also rise at a diminishing rate over the working life and decline when net investment becomes negative, as in old age (more experience), the typical (logarithmic) working-life earnings profile is therefore concave. Its rate of growth is a positive function of the amount invested and of the rate of return; its degree of concavity depends on how rapidly investments decline over time. The magnitude of the cumulated investment is not observable, but is a concave function of experience. Hence, to expand the schooling model into a more complete earnings function, the linear schooling term must be augmented by a nonlinear, concave, years-of-experience term (Mincer, 1975).

$$\text{Ln}Y_i = \alpha + \beta S_i + \gamma_1 X_i + \gamma_2 X_i^2 + u_i \dots\dots\dots(\text{model.1})$$

where  $\text{Ln}Y_i$  is the natural log of the value of earnings measured for an individual  $i$  (such as earnings per hour, week or month);  $S_i$  represents a measure of the duration of their schooling in "years";  $X_i$  is a measure of the duration of their experience in "years" ; and  $u_i$  is a disturbance term representing other forces which may not be explicitly measured, and is assumed independent of  $X_i$  and  $S_i$  the value experience is included as a quadratic term to capture the

concavity of the experience earnings profile. Mincer's derivation of the empirical model implies that, under the assumptions made (particularly no tuition costs). In this function, the  $\beta$  coefficient on years of schooling can be interpreted as the average rate of return to one additional year of schooling. Since  $\beta = (\partial \ln Y / \partial S)$ , then this is the relative increase in wages following an increase in S, or the rate of return to the marginal year of schooling (Mincer, 1974).

It is safe to conclude from the literature review that the reduction of net-age wages is the most efficient method of calculating the returns to education because it takes into consideration the essential part of the initial earning history of an individual. It is important to mention here that this model been implemented by many researchers in developing countries such as (Alqudsi, 1985, 1989, Chishti and Khalaf, 1999, Fargany, 2000, Ali, 2002).

This approach needs detailed data in the shape of sufficient observations of a particular age at a given educational level for creating thorough age-earnings profiles which do not overlap each other (Psacharopoulos and Patrinos, 2004). The main affecting variables on earnings from Basic Mincerian (model.1) are shown in Figure 3.2:

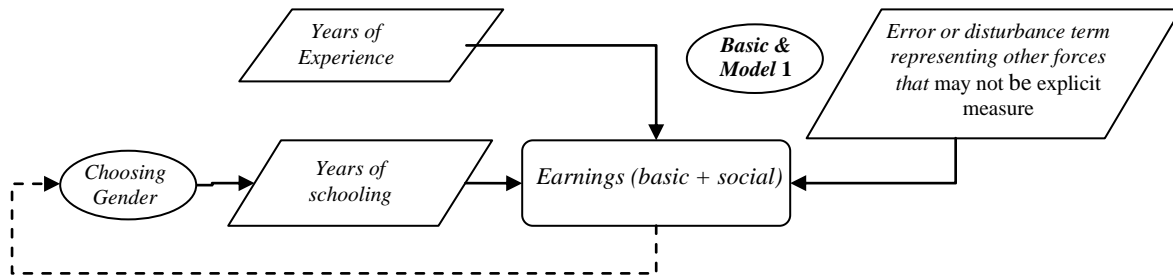


Figure 3.2: The most influencing variables on earnings from Basic Mincerian Equation

Source: Author's

$$\ln Y_i = \alpha + \beta S_i + \gamma_1 X_i + \gamma_2 X_i^2 + u_i \dots \dots \dots (\text{model.1})$$

This regression model, (model.1) clearly uses the earnings as dependent variable, years of schooling, years of experience and residual value or error as independents variables.

According to this method, the expense of education represents forgone earnings, and so measures only the private rate of return, and assumes further that individuals have an infinite time horizon.

Mincer's research facilitates the calculation of returns to education through semi-log earnings function. For that purpose various researchers incorporate raw coefficients of education in the extended function to discover returns to education which on the other hand are earning effects.

The problem is to attain precise calculations of earnings differential because of education being undisturbed by earnings differentials that might be due to personal characteristics or location, as Griliches (1977) reaffirms. The conclusion is that the effect of ability, and related factors, does not exceed 10% of the estimated schooling coefficient. Although possibly ability seems to play a part in the estimation of RORE, most of RORE literature showed dissatisfaction with the estimation results on ability.. This means that there is nomanimous agreement concerning the afore-mentioned results. In addition, several countries constructed their payroll system based on a fixed salary scale, such as Kuwait where the level of education has a bigger influence on wages, rather than the ability or production. Despite Becker's (1964) warning, one of the main methodological limitations is that many researchers feel the need to incorporate regression in the data which includes occupation; this approach does not consider the effect education has on wages that come from occupational travelling. Researchers who include occupation data in earnings do so with the aim of modeling earnings and not to calculate the rate of return to education, this creates problems when a layman and not a researcher try to comprehend the education coefficient as a Mincerian rate of return (Psacharopoulos and Patrinos, 2004). The Mincerian specification has been extended to address questions, such as discrimination, effectiveness of training programs (Blundell et al, 1999), school quality (Card and Krueger, 1996), return to language skills (Borjas, 1999), and even the return to 'beauty' (Hammermesh and Biddle, 1998 and Harmon et.al, 2003).

Another rate of return calculation concentrates on the causality debate between education and earnings (Card, 1999). Instrumental variable (IV) estimates of the returns to education, based on family background, are higher than classic Ordinary Least Squares estimates (OLS) based on the early work of Mincer, Becker and Chiswick (Becker and Chiswick, 1966; Mincer, 1974). The estimation method makes little difference on the returns to education. The IV estimates are often higher than OLS estimates, although it is unclear to what extent this is due to measurement error or inadequate instrumentation (see Trostel et al., 2002).

The literature is filled up with findings that estimate the rate of return incorporating regression approach where the calculated return is attained as the coefficient in years of education variable in a log wage equation which consists of experience and other personal attributes (Psacharopoulos and Patrinos, 2004).

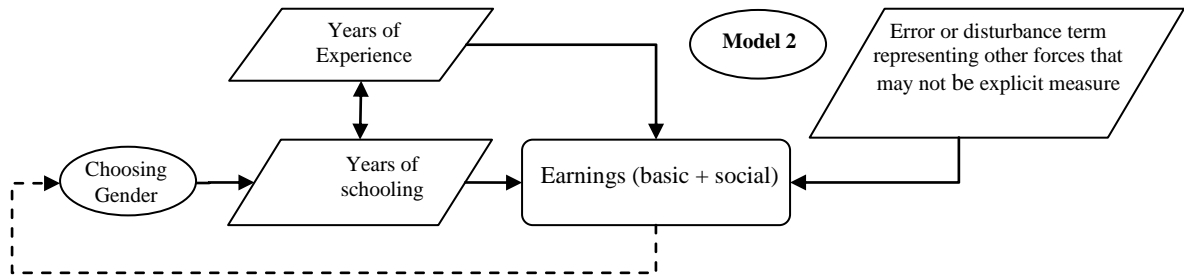


Figure 3.3: The influencing variables on earnings from extended Mincerian equation

Source: Author's

$$\ln Y_i = \alpha + \beta_1 S_i + \beta_2 S_i * X_i + \gamma_1 X_i + \gamma_2 X_i^2 + u_i \dots \dots \dots (\text{model.2})$$

Based on the above framework (Figure 3.3), The Human Capital theory implies that the variance in individual's earnings is largely attributed to their education and experience. The basic theoretical model (model.1) generally used to explain this variance is some adaptation of the Mincerian function in which log earnings are regressed on education, experience and experience squared. In (model.2) adding the interpretation of the estimated coefficient of education in such a model, namely that it measures the effect of schooling on earnings, is valid on the presumption that the level of education is independent of the amount of work experience. Casual empiricism suggests it to be an implausible assumption so that researchers have generally found it not to be a valid assumption (Psacharopoulos and Layard, 1979).

In order to allow for the interdependence in the rate of return between various levels of education and experience, some researchers, have including terms in the regression in which the level of schooling is multiplied by the level of experience and its squared terms. However, this approach arbitrarily imposes a multiplicative structure on the relationship between the two variables, and it also makes the interpretation of the estimated coefficients problematic. An alternative approach

is to allow for the possibility of varying coefficients at various levels of experience, estimates separate from regression for the return to schooling at various levels of the experienced group, and similarly to estimate separate regressions at various levels of schooling group, which has been followed, by McNabb and Richardson (1989) among others.

The bulk of the empirical evidence on this issue is broadly supportive of a human capital perspective (Machin and Vignoles, 2005). In particular, we focus on education as a private decision to invest in ‘human capital,’ and we explore the ‘internal’ rate of return to that private investment. The literature is replete with studies that estimate this rate of return using regression methods where the estimated return is obtained as the coefficient on years of education variable in a log wage equation that contains controls for work experience and other individual characteristics (Psacharopoulos and Patrinos, 2004). In the framework, the earning function model (1) can be modified and expanded to include level of education dummies as independent variables relevant to Kuwait case, and personal characteristics that are likely to influence wages (such as marital status, location, religion, race and sex), and taking into account that this procedure does not lead to stealing part of the effect of education on earnings. Our extended framework is shown in figure 3.4. As we intend to estimate the private rate of return, see the dummy variables (for instance, at different levels of education) which can be defined as in model.3:

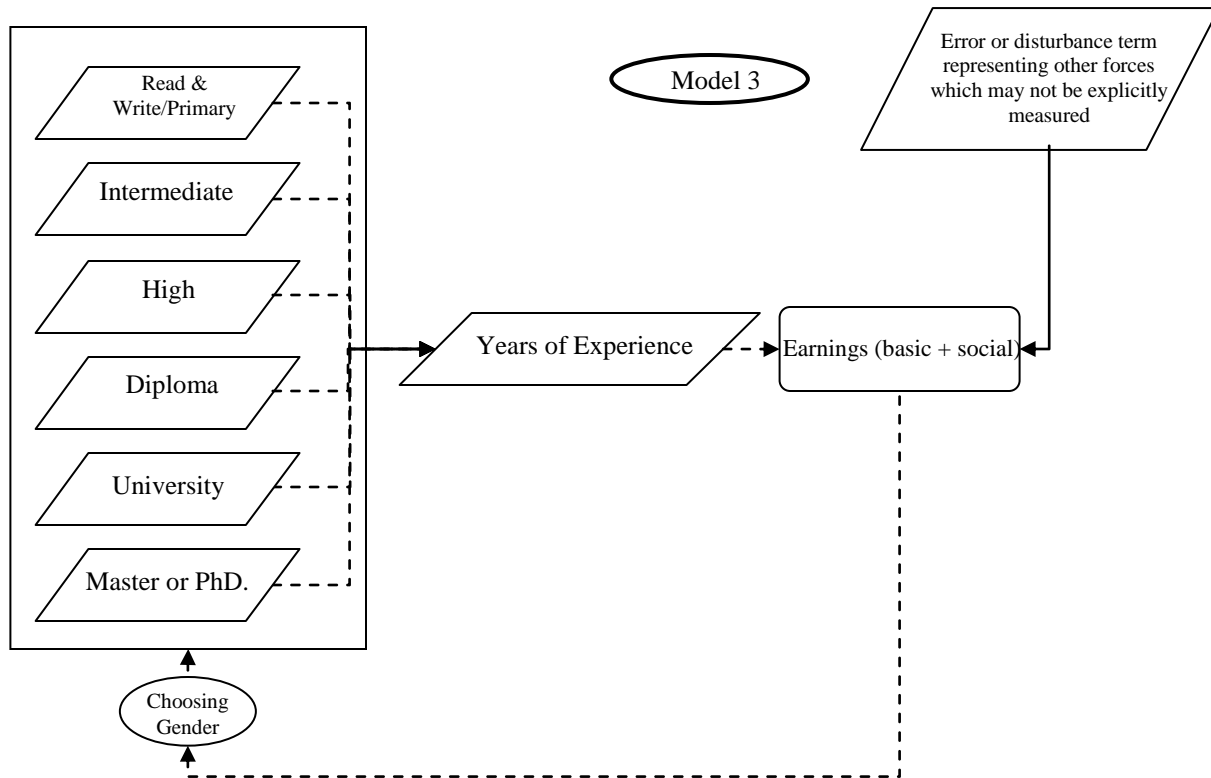


Figure 3.4: The influencing variables on earnings from extended Mincerian equation (with the adding variables of level of education).

Source: Author's

$$\ln Y_j = \alpha + \sum b_j D_j + \gamma_1 X_j + \gamma_2 X_j^2 + u_i \dots \dots \dots (\text{model.3})$$

$D_j$  are dummy variables and  $j$  stands for the level of education in this specification, the rate of return to the  $j_{th}$  level of education ( $r_j$ ) which could be estimated by comparing the coefficient of  $b_j$  with that of  $b_{j-1}$  and dividing the number of years of schooling  $S_j$  at the  $j_{th}$  level ( $n_j$ ), as in (eq.4) (Psacharopoulos, 1980).

$$r_j = \frac{b_j - b_{(j-1)}}{S_j} \dots \dots \dots (\text{eq.4})$$

Most of the empirical evidence on this matter openly supports the human capital standpoint. At this point we on the fact that the education option is the personal decision of an individual to invest in human capital and we observe the internal rate of return of that personal investment.

One of the major challenges that policy-makers are facing, is the efficient and equitable reallocation of public resources. This research addresses a case of how public resources are

employed efficiently and equitably, and studies examine the extent to which public resources for education are used efficiently by constructing a framework for estimating the private RORE. Many of the world's high income developing nations have made large investments in human capital. The goal is to improve economic progress by enhancing work output, increasing wages and reducing poverty. The importance of education in human capital has been argued by Becker 1993, the endogenous growth models and the application of augmented Solow model (Mankiw et. al., 1992). Due to this education takes up most of the state's budget. Beaker (1962) and Mincer's (1974) human capital model is used for such calculations. The application of Mincerian earning functions has been quite successful on countries data with semi algorithm details being very strong in empirical studies. On the other hand controversies still surround investments being made in education on both developed and developing nations. Earlier researches reveal that in higher levels of education the returns to investments decrease and investments in primary education should be increased as they promise greater returns. Whereas on the other hand some studies show completely opposite results i.e. that the return on education increases in higher levels of education (Lau and Chou, 1987). This is necessary as it may undermine the importance of education at all levels during development.

Based on the above arguments and research questions, the following research hypotheses will be investigated using high income petroleum based economies countries, such as Kuwait, as a case study:

#### 1<sup>st</sup>.Hypothesis

H: There is a relationship between years of schooling and years of experience.

$$H_0: \rho_s - \rho_{ex} = 0$$

$$H_1: \rho_s - \rho_{ex} \neq 0$$

where:

$H_0$ : Null hypothesis.

$\rho_s - \rho_{ex}$ : population for years of schooling – population for years of experience.

$H_1$ : Alternative hypothesis.

#### 2<sup>nd</sup>.Hypothesis

H: The average private RORE in high-income petroleum based developing countries are consistent to the empirical findings of either developing or developed countries.

$$H_0: \mu_{Khi} = \mu_{Ohi}$$

$$H_1: \mu_{Khi} \neq \mu_{Ohi}$$

$H_0$ : Null hypothesis

$\mu_{Khi}$ : Mean for high-income petroleum based developing countries (Kuwait).

$\mu_{Ohi}$ : Mean for other developing/developed countries.

$H_1$ : Alternative hypothesis

3<sup>rd</sup>.Hypothesis

H: The female private RORE is higher than male private RORE.

$$H_0: \mu_F > \mu_M$$

$$H_1: \mu_F \leq \mu_M$$

where:

$H_0$ : Null hypothesis

$\mu_F$ : Mean for Female high-income petroleum based developing countries.

$\mu_M$ : Mean for Male high-income petroleum based developing countries.

$H_1$ : Alternative hypothesis

4<sup>th</sup>.Hypothesis

H: The private RORE for low income group's higher than the private RORE higher income group's.

$$H_0: \mu_{L,i} > \mu_{H,i}$$

$$H_1: \mu_{L,i} \leq \mu_{H,i}$$

where:

$H_0$ : Null hypothesis

$\mu_{L,i}$ : Mean for low-income group in petroleum based developing countries (Kuwait).

$\mu_{H,i}$ : Mean for higher-income group in petroleum based developing countries (Kuwait).

$H_1$ : Alternative hypothesis

5<sup>th</sup>.Hypothesis

H: The Private RORE is negatively correlated with the level of education.

$$H_0: \mu_i > \mu_{i+1}$$

$$H_1: \mu_i \leq \mu_{i+1}$$

where:



H<sub>0</sub>: Null hypothesis

$\mu_i$ : Mean for i=education level; high-income petroleum based developing countries (Kuwait).

$\mu_{i+1}$ : Mean for i+1=education level; high-income petroleum based developing countries (Kuwait).

H<sub>1</sub>: Alternative hypothesis

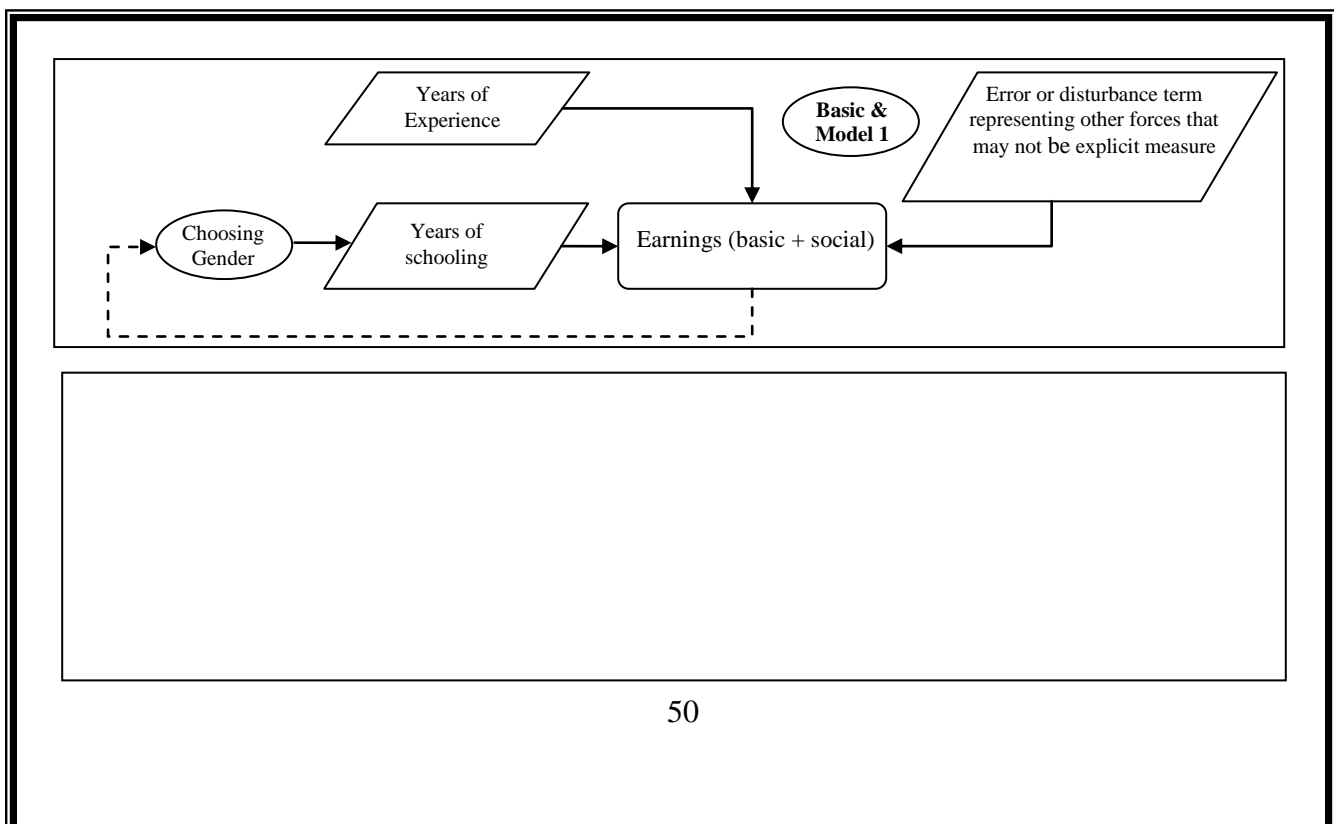
The framework below in figure 3.5 represents the approach by which the research is summarized as to the effect of variables needed to be tested in order to achieve the objective of the research.

The research framework consists of three models; each showing the impact of the different variables in estimating rate of return to education.

Model 1: Adaptation of Mincerian function in which log earnings are regressed on schooling, work experience, and experience squared.

Model 2: Adaptation of Mincerian function in which log earnings are regressed on schooling, work experience, interaction between schooling, work experience, and experience squared.

Model 3: Adaptation of Mincerian model in which log earnings are regressed on different levels of education.



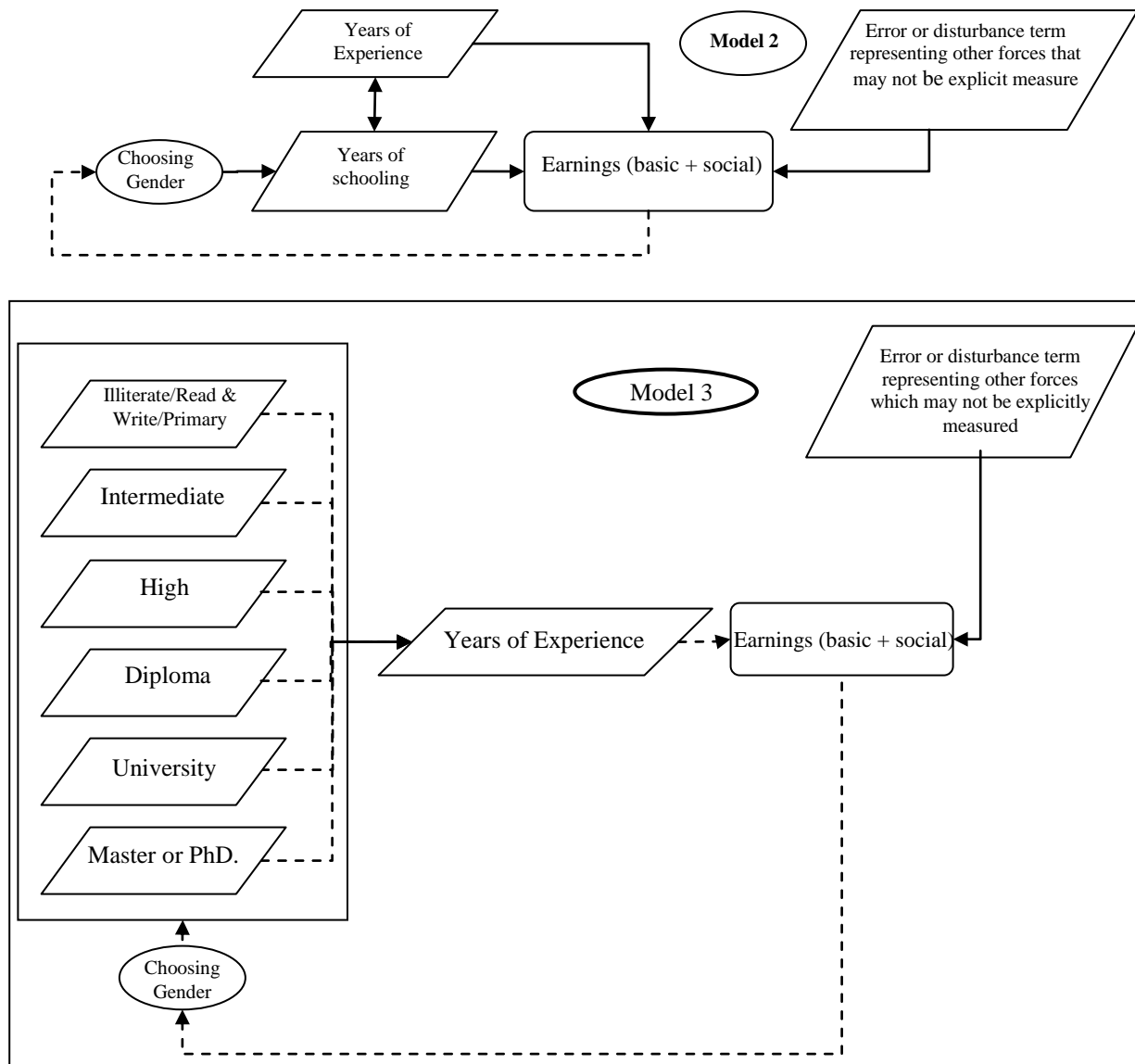


Figure 3.5: Research Framework  
Source: Author's

The outcome of the conceptual framework intends to answer the following research questions:

Q1: How returns of education investment are actually estimated in practice?

Q2: What are the variables that affect the returns of education investment?

Q3: To what extent is the return to education of high-income petroleum developing countries consistent with the empirical findings of the return to education for developed and developing countries?

Q4: In which level of education the individual meet the highest rate of returns to education?

This outcome of the framework can only be achieved after testing all above hypotheses which will provide a concrete knowledge about the characteristics of the high-income petroleum based developing countries such as the GCC countries, and in this context Kuwait, as a case study example Appendix A.1 classify all World Bank studies (<http://data.worldbank.org>).

### **3.4 Implementation plan**

The previous sections discussed the conceptual framework with three steps showing the earnings equation to discuss various aspects of the Human Capital Theory framework along with the benefits of individual investments in education as well as those made by the government.

The rate of return on education is defined as a field of economics which analyses and establishes education and the effect it has on lives of people, societies and the economy they live in. The selection of which method should be applied to the research is based on the informed understanding of the method's appropriateness for that particular research area or topic. For the purposes of this research, a symbolic model is an extremely useful form of research that represents the performance measure of the system of interest in terms of its variables, which means that the attributes of the developed system are related by equation (i.e. regression in our case) (Panneerselvam, 2007).

In the case of quantitative studies such as this, modeling empirical research typically takes the form of case studies by primary and/or secondary data collection. However, almost all RORE studies are dependent on earnings data from wage employment that there is not much published data and information regarding employees because of its privacy and confidential information. Therefore, the information about the labour force and income of employees needs to be collected from primary sources as secondary data. Thus, it was decided that secondary data collection would be the most appropriate method to ensure that appropriate and suitable parameters and factors are used in the research. This research uses unpublished confidential labour force data from the Civil Service Commission database to accomplish the task of data collection, as well as a secondary demographic data published from General Secretariat of the Supreme Council for Planning and Development.

A quantitative regression method is used to analyse the data which could answer the posed research questions. Mincer (1974) used consensus data of the 1960 in his original research. He incorporated an experience measure known as potential experience (i.e. current age – age left time schooling) and concluded that the returns from schooling were 10% with returns from experience being 8% this establishes as a benchmark. Psacharopoulos and Layard (1979) drew results from UK which were almost 10% using the GB GHS 1972 data See Willis (1986) and Psacharopoulos (1994) for many more examples of this simple specification (Harmon et.al, 2003).

### **3.5 Data collection/analysis plan**

High-income developing governments invested heavily in education. In fact, education with investment in human capital was expected to contribute to growth by improving the productivity of the labour force, reduce income inequality and poverty. Investment in education is evaluated in terms of returns to investment. The rate of returns can be estimated as the discount rate that equates the present value of economic costs and the benefits of an investment. Private rate of returns to education is calculated using after-tax earnings differentials and only those educational costs actually borne by the student or their family. Social rates of return are based on before tax earnings differentials or total earnings and the total resources the society incurred on education. The human capital model of Becker (1962) and Mincer (1974) has been the method used for such evaluation. The Mincerian earning functions have been well applied on individual countries' data, with the semi logarithm specification being very robust in empirical studies. Since the aim of this research is to shed light on the influencing variables and factors affecting the investment of education and their relationships in order to help education decision makers to get a better return on investment in education, based on that the researcher modified the research framework steps shown in (section 3.2) and to applying the three explained models we using a cross sectional data for Kuwait as a case of high-income petroleum base economy.

The data for this research is drawn from the Kuwait Civil Service Commission and the General Secretariat of the Supreme Council for Planning and Development database. The Civil Service

Commission database comprises 43 ministries and administrations, and covers about 95 percent of all public sector employees. Since more than 90 percent of Kuwaiti labour is employed in the public sector, this data covers approximately 90 percent of the total Kuwaitis employed where, the rest of employees either in petroleum sector or other public sector which are not included in the database. The Civil Service Commission data has 195,027 observations; where 146,499 received their qualifications from Kuwait schools/institutions out of 195,027 Kuwaiti employees; which are distributed as 83,448 female; 63,051 male.

*Table 3.1: Summary of the Kuwaitis employees dataset based on gender statistics*

	Frequency	Percent	Valid Percent	Cumulative Percent
female	83448	57.0	57.0	57.0
Valid male	63051	43.0	43.0	100.0
Total	146499	100.0	100.0	

*Source: Author's calculations*

### **3.6 Summary**

At the end of this chapter, the researcher can conclude that this step of conceptual framework is constructed, and has to be implemented in the empirical field in Kuwait as a case of a high-income developing country in order to capture tangible evidence. Testing the hypotheses will provide economic key issues to the decision-makers that can be leveraged to support education planning. On the other hand this chapter discussed in detail the research methodology; variables, data and the model used.

The literature showed that the Mincerian model was one of the best and widely used approach to collect region specific evidence of rate of return of education of oil rich developing countries like Kuwait. The hypotheses that have been created can be used to highlight key economic issues to the policy makers who can plan and prepare their policies accordingly.

The following chapter sheds light on the demographic, economic, education system and labour market characteristics of Kuwait as a high income developing nation.

## **Chapter 4: The dataset of the Kuwaiti case study: basic statistics and comparisons.**

### **Introduction**

The previous chapter provided information about various research estimating RORE techniques based on that constructing a suitable research conceptual framework steps by modifying and expanding Mincerian model to be best suited for Kuwait as a high income developing nation.

Chapter four will attempt to understand the development of Kuwait's economy and its impact on the social structure of the society as well as the education system of the country. Emergence of labour markets, traditional trades and economic activities after the discovery of oil in the country will be discussed.

Kuwait is small independent Arab state, located in the north-west of the Arabian Gulf. It occupies about 6,200 square miles. Because of its geographic location and climate, Kuwait consists mostly of barren desert. Yet, its location appears to have been fortunate and to have endowed the country with the means of its economic survival throughout history. Kuwait has the advantage of having one of the best natural harbors on the western shore of the gulf and one of

the largest oil reserves. Indeed, these two features have played a key role in formulating the social structure and economic nature of the society during the period before and after the oil boom.

## 4.1 Kuwaiti Population

Demographic studies have become one of the independent statistical sciences, and information related to the numbers, characteristics and distribution of population has a great importance for policy making and setting up planning programs.

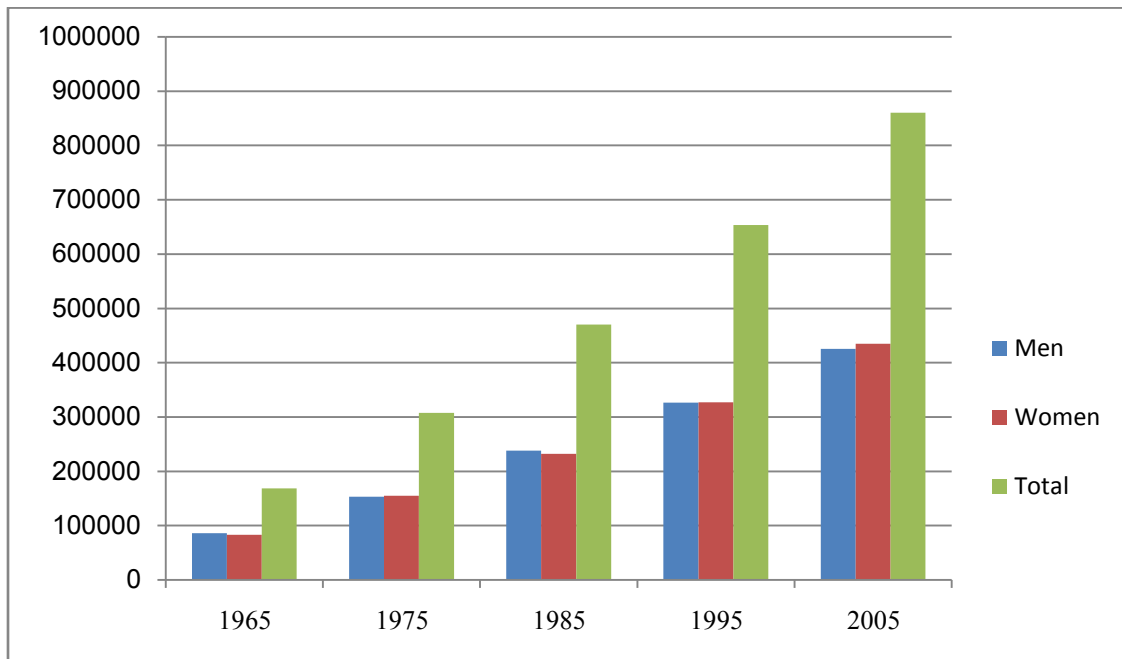


Figure 4.1: Kuwait Population Trend (1965-2005)

Source: Kuwait Statistics, 2008

Statistics available from the General Secretariat of the Supreme council for Planning and Development for 2005 reveal that 0.860mn Kuwaitis out of 2.193mn population.

Table 4.1: Kuwait's Population statistics

In Thousands	Kuwaiti	Non-Kuwaiti	Total
1965	168,793	298,546	467,339
1975	307,755	687,082	994,837

1985	470,473	1,226,828	1,697,301
1995	653,616	921,954	1,575,570
2005	860,324	1,333,327	2,193,651

Source: Annual Kuwait Statistical Abstract, 2008

Kuwaitis numbered 0.995mn by the end 2008. But we do anticipate that the current growth rates would push the number of Kuwaitis above the milestone 1mn mark by the end of 2009. In terms of gender, females dominate the Kuwaiti population, outnumbering males 0.505mn to 0.490mn in 2008, Even though, the population profile of Kuwaiti nationals has not been significantly altered, although we do realize that the “baby boom” profile, which Kuwait has been characterized by, has continued its decline. This population trend signals a larger amount of individuals would be entering the job market in the coming years, not only putting pressure for the creation of jobs, but also raising demand for housing, healthcare, education, etc.

Table 4.2: Age Distribution of Kuwaitis Population (2005)

Age	Male	Female	Total
0-4	59,349	55,874	115,223
5-9	60,713	56,447	117,160
10-14	56,307	52,961	109,268
15-19	49,908	48,294	98,202
20-24	40,363	39,596	79,959
25-29	31,071	33,425	64,496
30-34	27,294	30,291	57,585
35-39	24,481	27,565	52,046
40-44	20,827	23,616	44,443
45-49	15,727	19,912	35,639
50-54	11,827	15,144	26,971
55-59	8,120	11,328	19,448
60-64	6,834	8,134	14,968
65+	12,458	12,458	24,916
Total	425,279	435,045	860,324

Source: Annual Kuwait Statistical Abstract, 2008



## 4.2 Kuwaiti Economy

Establishment of Kuwait in the eighteenth century created a society with economic activities different from that which had existed among the nomadic tribal communities of the Arabian Peninsula. Economic activities in Kuwait were largely of a maritime nature. This was due to the barren environment and lack of natural resources in the country. Kuwait engaged in such economic activities as fishing, pearl diving and trading. They were also occupied in related industries such as boat building. Agriculture existed, particularly in the oases, while cattle were herded and crafts manufactured for export. During an economic depression, some Kuwaitis even engaged in smuggling. An understanding of some of the most important economic activities of the traditional trades is vital to enable us to recognize their role in shaping the Kuwaitis' work ethic, organizational behavior and labour skills, and the impact these had on the modern economy (Al-naqeeb, 1976).

Pearl diving, was the most important economic activity in Kuwait during the traditional trading era. It provided the main source of both employment and income. During the 1920s the annual income of the pearling season was estimated to be \$7 million (Alrashid, 1971); yet, a sailor's annual income did not exceed \$80. Divers in particular fell victim to the exploitative system under which the industry was operated. The workers in this activity received no salary, but were paid by shares from the season's income after the pearls were sold and the profits divided among the crew members, according to their responsibilities (Aidin, 1958).

Kuwait's favorable geographic location helped the country become one of the leading traders in the Gulf region. With oil discovered, the population abandoned all traditional economic activities and rapidly transformed the country's economy into an entirely oil-based economy. In 1946, the first shipment of crude oil was made by the Kuwait Oil Company (KOC). Later in 1973, the situation began to change in favour of the oil exporting countries. World demand for oil was increasing, implicating the international market as oil appreciated in value. Since 1946, when the first oil shipment was exported, Kuwait has seen the beginnings of a new era of development

in its history. A modern economy has emerged dominated by oil which has seen the demise of all traditional activities such as pearling, fishing, and building. It soon became evident that Kuwait was totally dependent on oil for its domestic development and economic growth. Among the 80 less developed nations in the world Kuwait has joined the 30 nations which are characterized by their dependence for half of their foreign exchange investments on a single commodity. Moreover, assuming no technological revolution, which would make petroleum an obsolete commodity, the major support for Kuwait's economy will be its oil resources (IBRD, 1965).

The government oil revenues have exceeded in most fiscal years, exceeding the absorption capacity of the domestic economy. Strict conservationist policies have been adopted by Kuwait since its oil production reached an all-time peak of 3.86 million barrels a day in March 1972; the following month, government set the first limit on the annual average crude-oil production at 3 million barrels per day. In 1975, a current out-put limit of 2 million barrels per day was set (Elmallakh and Attaa, 1981). However, in spite of the official conservationist policies adopted since 1972, oil production still runs relatively high. The surplus in the state's oil revenues as a result of its over-production policies has facilitated the rapid growth of the public services sector in the country (Alghazali, 1989).

Kuwait's economy has crude oil reserves of about 104 billion which makes up 8% of the world's total supply of crude oil. However, petroleum still remains the highest source of revenue which is responsible for 95% of the export revenue and makes up 80% of Kuwait's annual income. Due to the accelerated growth the country has experienced in the past several years due to rapidly rising oil prices in the international market; the government announced its 10th budget surplus. Because of this tremendous growth the government didn't feel it was necessary to take initiative and announce economic policies for other sectors of the economy especially education. The oil price drop of 2008 reduced the country's fiscal surplus for 2009. Even though the current financial crisis which countries are experiencing around the world has slowed down the rate of investments and development in Kuwait, the government has taken a stance that it will use the enormous finances it has at its disposal to provide stability to the economy if required (Central Bank of Kuwaiti data, 2007).

According to International Monetary Fund data (2010), the accelerated growth of the economy since 2004 provided a concrete platform to Kuwait's economy prior to the financial crisis. GDP of the country grew 7% each year from 2004 - 2008 and local demand grew at a rate of 11%. On the other hand inflation rose rapidly as well and was in the double figures in 2008, this indicated local demands and increasing import prices. The economy which grew rapidly because of oil exports the fiscal surpluses averaged only 34 - 42% despite an increment in imports and government spending.

The gross domestic product (GDP) at current prices increased at an accelerated rate of 22.1% during 2008, against 10.6% during the past year. It reached KD 39,787.4 million during that year, against KD 32,586.3 million during 2007, i.e. a growth of KD 7,201.1 million, compared with a growth of KD 3,116.7 million during 2007.

According to the statistical data, Kuwait's investments in education have improved and the country is expecting to improve on the ability to earn more revenue in the coming future. Given this perspective, from the education sector in Kuwait, requires understanding of the variables affecting the estimation of return on education and how to estimate the return to get the most value from this expenditure.

### **4.3 Kuwaiti Educating System**

This section provides an overview of the current education system in Kuwait and study of the school-age population. The purpose of presenting this information is to provide the context for analysing the education rate of return presented in subsequent chapters.

#### **4.3.1 History of Education in Kuwait**

The enormous wealth of oil has played an important role in improving the educational system in Kuwait. At the dawn of the 20<sup>th</sup> century only a handful of schools operated in the country including some Quranic schools which taught arithmetic among reading and writing. There was

no concept of public education and investments for education generally came from the rich citizens. After the Second World War the government made social reforms and made investing in education its top priority. During 1960 there were 45,000 students enrolled in schools in Kuwait, 18,000 of which were girls (Ali, 2002). Numerous other improvements were made in education in Kuwait during the 1960's. Kuwait's constitution of 1960 clearly informs about the governments belief in education and states that government encourages higher education, achievement of which is the fundamental right of every citizen. The government made schooling compulsory for all during 1965. A private school system emerged after the government offered reasonable subsidies in 1967 (Ibid).

### 4.3.2 Description of the education system

The Pervious education system in the state of Kuwait (up till 2004/05) offered a number of ways for meeting the needs of students General education begins with Kindergarten for 4 to 5 year olds and progresses through Primary (4 grades), Intermediate (4 grades), and Secondary (4 grades). General education is provided in public schools, Arabic private schools and schools of Religious education. Country specific courses are being offered by international private schools. Other disciplines of education are available in schools of Special Needs Education, adult and literacy education. Public vocational training is offered in PAAET (Public Authority of Applied Education and Training) and tertiary education is offered at Kuwait University, institutes of Arts and Music study, and the ministry of higher education's licensed, new private higher education universities, such as the American University of Kuwait, Gulf University for Science and Technology and Kuwait Maastricht Business School. Following tables shown the educational opportunities that have been made available to students in Kuwait Figure 4.2.

4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<b>GENERAL EDUCATION</b>																	
Kindergarten		Primary			Intermediate				Secondary				Post-Secondary				
Public schools																	
Arabic Private schools																	
International Private schools																	
<b>OTHER TYEPS OF EDUCATION</b>																	
				Religious education													
								Adult and Literacy Education									
Special Needs education																	
<b>VOCATIONAL AND TERTIARY EDUCATION</b>																	

			Vocational and Training (PAAET)
			Kuwait University/PAAET/
OTHER DESTINATION			
			Police Academy/ Military College
			Police / Military School
			Study Abroad

Figure 4.2: Kuwait education system opportunities for student from 4 to 21 year-olds  
Source: education Indicators in the State of Kuwait, (2004)

The map in Figure 4.2 shown the typical age at which study at each levels is intended (The official age of entry to a primary school is 5 years and 6 months or older (as of 15th September). When interpreting education indicators, it is important to note that students enter and leave the system at different points for various reasons (for example, to pursue university education abroad) and that they move between institutions within the system. This can affect indicators, such as student enrolment and transition rates (from one stage to the next) because data is not available from all institutions (notably military and police schools), so students who continue their education in these institutions are not accounted for. In addition, data is currently collected at the aggregate school level (not the student level), so the destination of individual students who leave institutions is not known (Education Indicators in the State of Kuwait, 2004).

The new education system in Kuwait offers a variety of ways to fulfill the wants of students of all ages. Education till the intermediate level has been deemed compulsory by the government. School education starts at kindergarten and continues into primary level (Grade 1 - 5). From there on it moves to intermediate level (Grade 6 - 10) and finally concludes at Secondary level (Grade 11 - 12). The same pattern is followed by private schools which have been instructed to teach public curriculum. International private schools offer a curriculum which is based on their country of origin. Other disciplines of education are taught at various other institutes and colleges. Special schools have been setup to cater to the wants of children with special needs and to help them learn. After successfully completing secondary education students can apply for higher education at Kuwait University or at the Public Authority for Applied and Education and Training (PAAET) which offers numerous technical trainings and courses. Students can also chose to attend other foreign universities or institutes to gain specialized training in Arts, law and

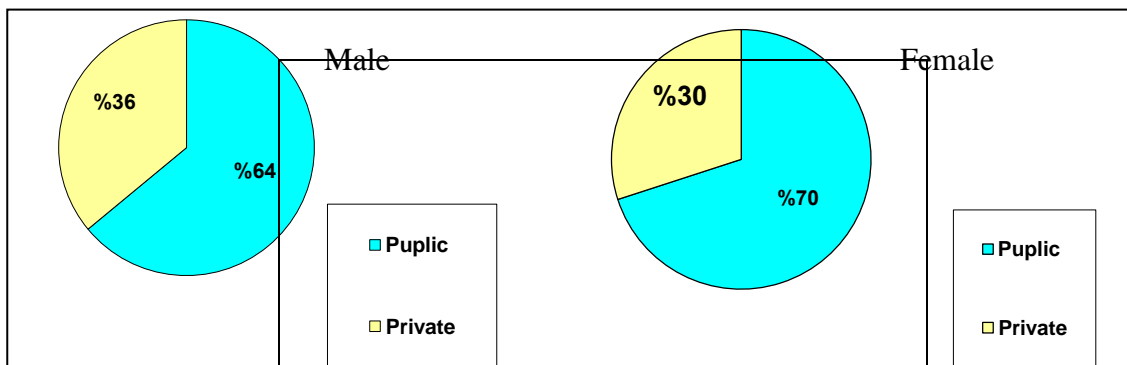
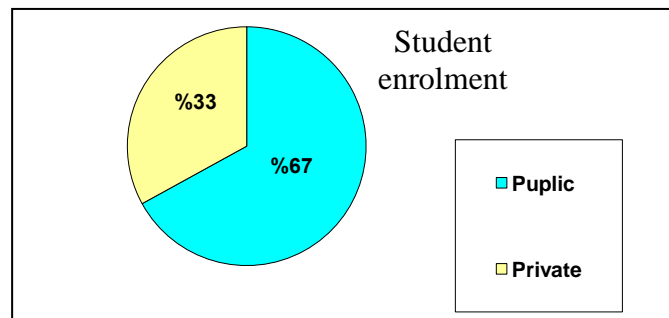
enforcement and military training. Moreover students can also opt to apply abroad to an institute of their liking.

4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<b>GENERAL EDUCATION</b>																	
Kindergarten		Primary				Intermediate				Secondary			Post-Secondary				
Public schools																	
Arabic Private schools																	
Arabic and International Private schools																	
<b>OTHER TYEPS OF EDUCATION</b>																	
Religious education																	
Adult and Literacy Education																	
Public Special Needs education																	
Private Special Needs education																	
<b>VOCATIONAL AND TERTIARY EDUCATION</b>																	
Vocational and Training (PAAET)																	
Kuwait University/PAAET																	
Private University																	
<b>OTHER DESTINATION</b>																	
Police Academy/ Military College																	
Police / Military School																	
Study Abroad																	
Public Education																	
Private Education																	

Figure 4.3: The new Kuwait education system opportunities for student from 4 to 21 year-olds  
 Source: education Indicators in the State of Kuwait, 2007

A map of the educational opportunities available to young people in Kuwait is shown in Figure 4.3. Figure 4.3 shown the typical entry age at each level of education (the official age of entry into primary schools is 5 years and 6 months or older as of the 15th of September). Free public education includes kindergarten, primary, intermediate and secondary schools, religious

institutes, special needs schools, PAAET institutes and colleges, Kuwait University, and police and army institutes and colleges. Private (fee paying) education includes Arabic and foreign schools, some schools for children with special needs, and private universities (Education Indicators in the State of Kuwait, 2007).



Non-Kuwaitis

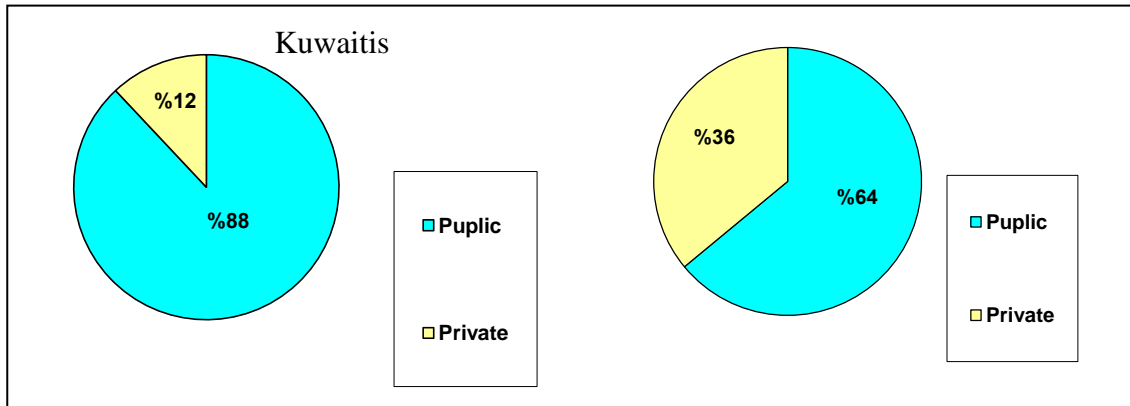


Figure 4.4: The percentage of students' enrolment in the public and private Kuwait education system  
 Source: education Indicators in the State of Kuwait, 2007

Figure 4.4 shown the percentage of students enrolled in both the public and private schools, Out of the total 67% went to public schools while 33% went to a private institution. The number of students enrolled at private school systems has grown slightly over the years. Majority of the Kuwaiti citizens 88% went to public schools while most of the non-citizens 76% chose to go a private school. As compared to females 30% more males attended private schools 36%.

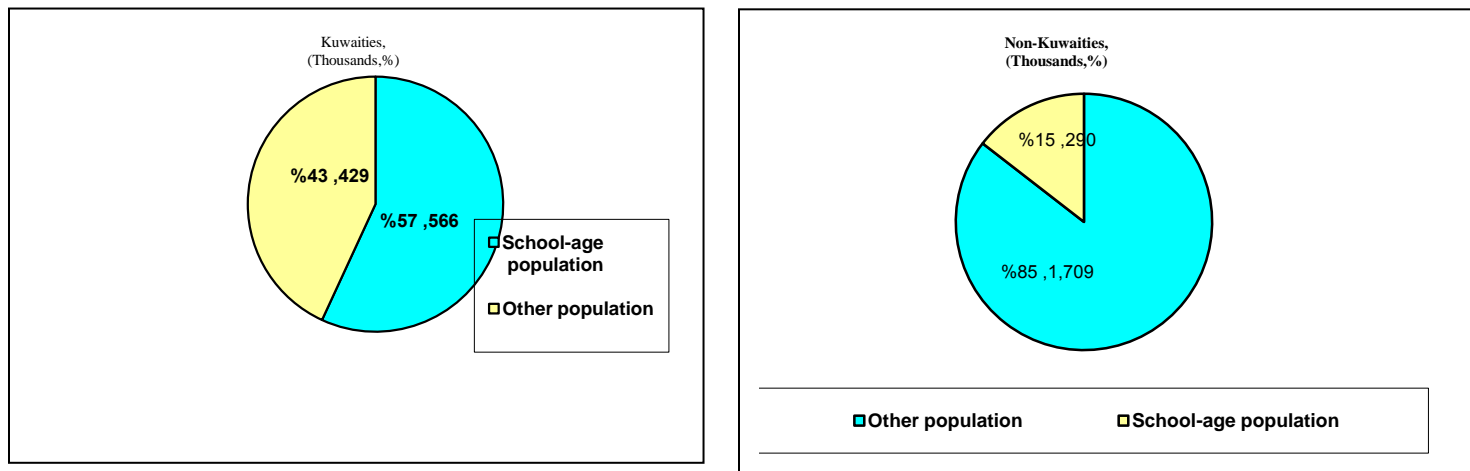


Figure 4.5: Size of the total and school-age population by citizenship, 2005  
 Source: education Indicators in the State of Kuwait, 2005



Figure 4.5 show the size of the total population in Kuwait and the size of the school-age population in 2005 using data from the civil services records (Population data is of 31st December of the civil year indicated).

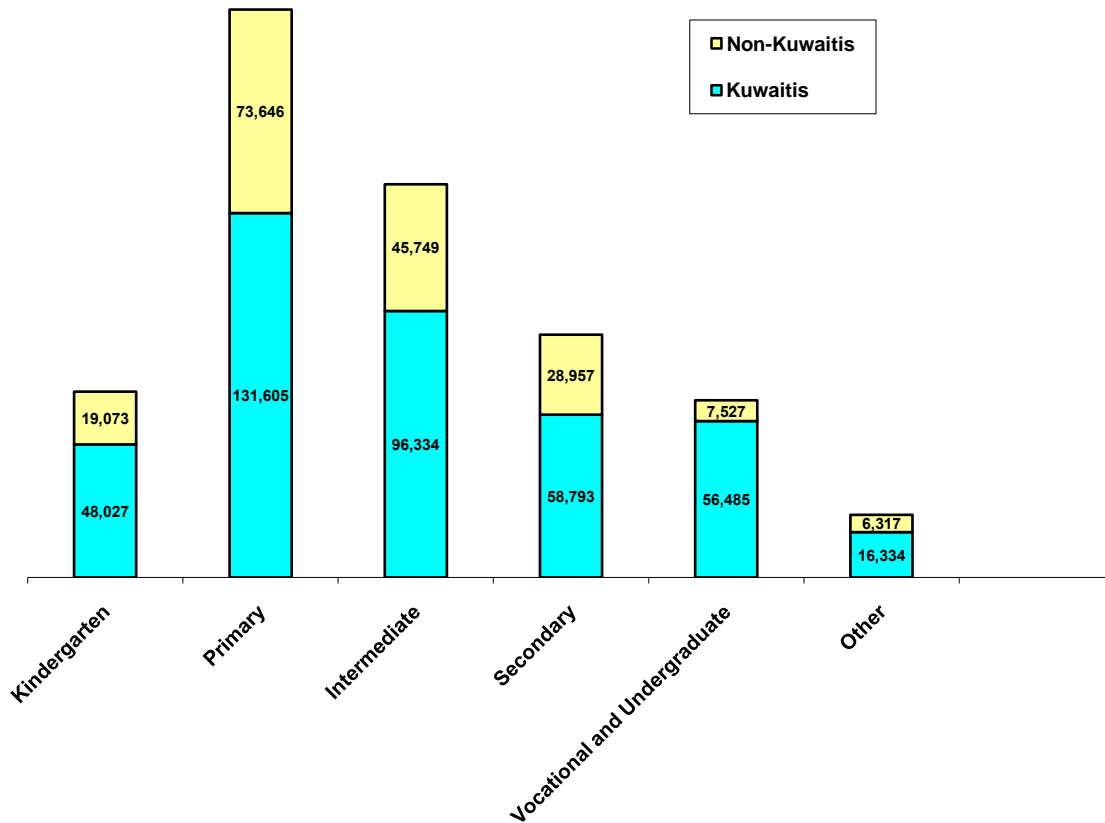


Figure 4.6: Number of enrolment students by level of education and citizenship for Kuwaitis and non-Kuwaitis (public and private)

Source: education Indicators in the State of Kuwait, 2007

Figure 4.6 show the enrollment of students in various levels of education; children enrolled in kindergarten at both public and private schools were calculated to be around 67,000 in 2005/2006, while students studying at the primary level were around 205,000. At the intermediate level it was estimated that the enrollment is about 142,000 and 88,000 students were seeking secondary school education.

### 4.3.3 Outputs of the Education System

The primary objective of the education system is to provide young/adults with the knowledge and the training necessary to contribute towards the betterment of the society. One way to measure the success of the education system is to observe the education attained by both the adult population and the working class population. Data from multiple years is required in order to observe the patterns of this indicator as time is required to fully observe the effect of the educational system on the entire population. It is necessary to observe the current level of education that has been attained by the population for comparison purposes among sub-groups. With continuous observation, the effect of the education system on the entire population of Kuwait will become apparent. Statistics about adult education have been obtained from civil registration sources.

Figure 4.7 shows the highest educational level achieved by Kuwaiti males and females between the age group of 15 – 24 years and 25 – 59 years. The generation belonging to the 15 – 24 age-group has fewer ratios of people who are illiterate or who have not successfully completed primary level education. This holds true for Kuwaiti females especially of which 3.6% belonging to the same age-group are illiterate or have not completed primary level education as compared to 15% of the 25-59 age-group.

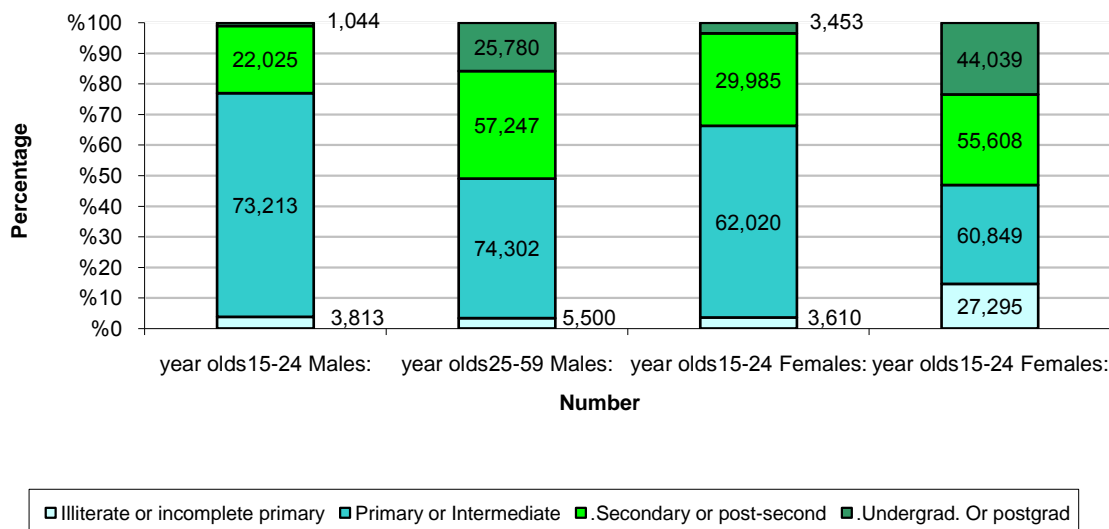


Figure 4.7: Highest Education Attainment of 15-24 and 25-59 years old Kuwaitis, 2005  
 Source: education Indicators in the State of Kuwait, 2005

#### 4.4 Impact of education on the labour market

Because the education system has a direct and strong impact on the quality of the labour force collecting all needed data is the initial and most affecting part for this type of research; the dataset are drawn from the Kuwait Civil Service Commission and the General Secretariat of the Supreme Council for Planning and Development database. The Civil Service Commission database comprises of 43 ministries and administrations, and covers about 95 percent of all government sector employees; where the rest of employees either in petroleum sector or other special public sector are not included in the database. In the year 2010, majority of the Kuwaitis working in the labour market were employed by the public sector. The Civil Service Commission data has 195,027 observations; where 146,499 received their qualifications from Kuwait schools/institutions out of 195,027 Kuwaiti employees; which are distributed as 83,448 female; 63,051 male. Where, the ratio of unemployment in Kuwait rose 2002 - 2005 from 2.4 - 3.2% for males and for females it grew from 5 - 5.3%. We have used the data from the year 2010 for this research, which is the most recent data available.

From 2010 labour force data showed that more than 90 percent of Kuwaiti employees are employed in the government sector, only a few Kuwaitis work in the private sector and more than 60 percent of the government sector consists of Kuwaitis. Approximately 57 percent of Kuwaiti workers are females; while males constitute 43 percent, where in 1996 Kuwaiti labour force consisted of 55 percent males and 45 percent females, as shown in Figure 4.8.

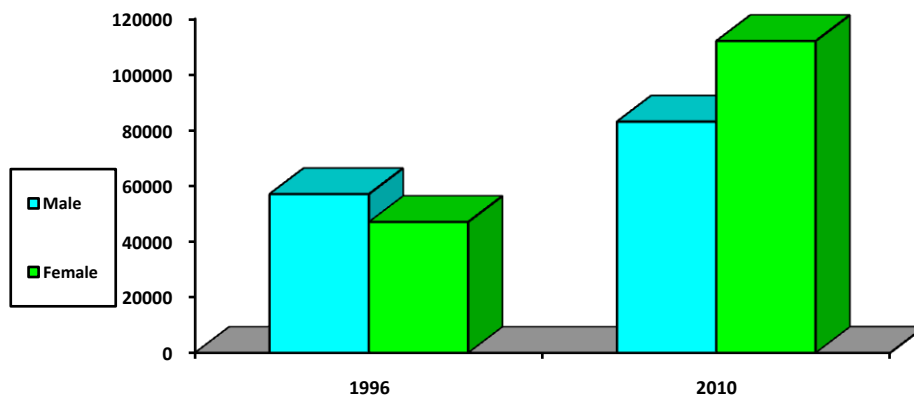


Figure 4.8: Kuwait's male/female labour force in 1996 and 2010  
 Source: Kuwait Civil Service Commission, 2010

As the research focusing only on public sectors employees and graduated from Kuwait therefore, analysing only Kuwaitis public sector employees' characteristics. The mean, median, maximum, minimum, standard deviation, and other statistical variables for the sample data are reported in the (Table 4.3) for earnings (basic salary + social allowance we add the social allowance because it is a significant part in the salary), years of schooling and years of experience.

Table 4.3: all Kuwaiti employee statistical description data

All Observations	Wage	Years of Schooling	Years of Experience
Mean	568.86	12.87	12.60
Median	543	12	11
Maximum	3762	20	55
Minimum	226	4	0
Std. Dev.	195.43	3.33	7.60
Skewness	2.66	-0.40	0.73
Observations	146499	146499	146499

Calculated by Author's, 2010

Source: Kuwait Civil Service Commission, 2010

The mean, median, maximum, minimum, standard deviation, and other statistical variables for female sample data are reported in the (Table 4.4) for earnings, years of schooling and years of experience.

Table 4.4: Kuwaiti female statistical description data

All Observations	Wage	Years of Schooling	Years of Experience
Mean	533.05	13.61	11.19
Median	523.00	14.00	10.00
Maximum	2875.00	20.00	53.00
Minimum	226.00	4.00	0.00
Std. Dev.	152.86	2.89	6.45
Skewness	2.40	-0.69	0.93
Observations	83448	83448	83448

Calculated by Author's, 2010

Source: Kuwait Civil Service Commission, 2010

The mean, median, maximum, minimum, standard deviation, and other statistical variables for male sample data are reported in the (Table 4.5) for earnings, years of schooling and years of experience.

Table 4.5: Kuwaiti male statistical description data

All Observations	Wage	Years of Schooling	Years of Experience
Mean	616.26	11.89	14.45
Median	588.00	12.00	14.00
Maximum	3762.00	20.00	55.00
Minimum	226.00	4.00	0.00
Std. Dev.	232.11	3.61	8.54
Skewness	2.43	0.03	0.38
Observations	63051	63051	63051

*Calculated by Author's, 2010*

*Source: Kuwait Civil Service Commission, 2010*

However, the mean years of schooling for female higher than male; the mean earnings of women are lower than those of men. The significant differences between the averages of male and female employees' earnings, education, and experience imply a pooling of male and female data that would obscure important differences in their effects on the return to education. Therefore, we have performed our analyses separately for male and female employees in order to estimate the rate of return on education for both genders.

Table 4.6: Mean monthly earnings of workers by education levels overall and by gender

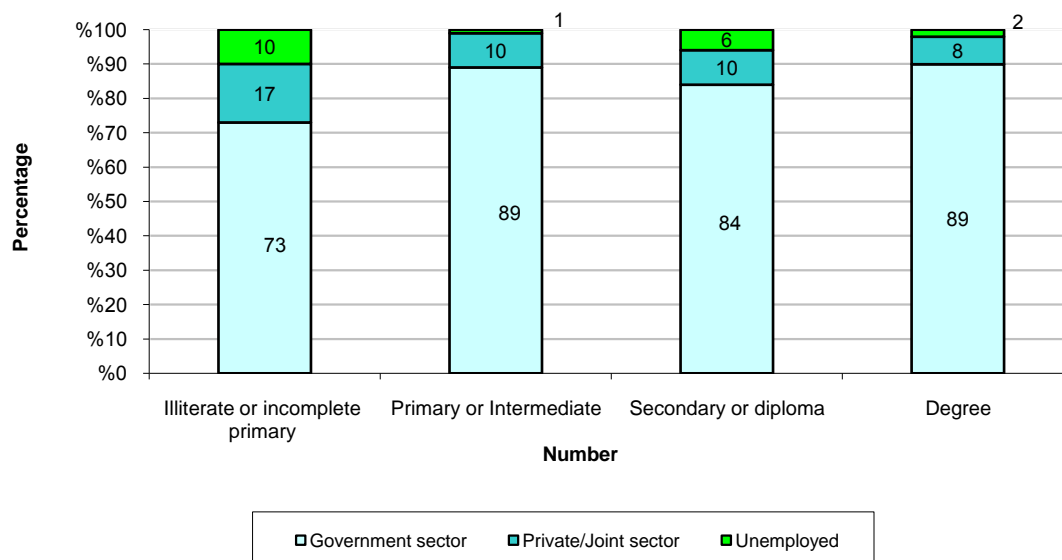
School Category	Overall		Male		Female	
	# Observation	Earnings	# Observation	Earnings	# Observation	Earnings
read and write only/Primary (4 years)	1900	430.000	1570	422.564	330	310.266
Intermediate (8 years)	31567	458.300	20985	494.784	10582	385.916
High (12 years)	39853	536.800	15826	594.715	24027	498.668
Diploma	18615	533.513	8309	616.919	10306	466.269
Bachelor (16 years)	51206	654.000	14424	778.293	36782	605.274
Post Graduate (> 18 years)	3358	980.070	1937	1056.062	1421	876.477

Calculated by Author's, 2010

Source: Kuwait Civil Service Commission, 2010

Table 4.6 shown average earnings of workers in the Kuwaiti sample by levels of education. As expected, average earnings increase as the level of education rises. Males with post-education education earn twice more than those with no formal education. The Females on average earn less than their male counterparts for all education levels, but the inequality between gender becomes progressively higher as education rises where the ratios rise from 0.73 between those with no schooling/primary to 0.83 between those with tertiary education.

Figure 4.9 illustrate the link in terms of the economic activity and educational attainment when it comes to Kuwaitis. The government sector shown high employment levels despite of one's education or qualification i.e. between 73-89%, this basically shown that Kuwaitis are guaranteed employment.



*Note: Includes 15+ year olds either in work or looking for work.*

*Figure 4.9: Kuwaiti by sector of employment based on level of education of, 2005*

*Source: Highest education Indicators in the State of Kuwait, 2005*

## **4.5 Public Financial Resources Invested in Education**

This section provides an outline of the financial resources of the public that have been invested in education in Kuwait. It details overall public expenses on levels of education in the public sector and on public expenditure per student. It also provides information on the distribution of these resources by level of education, by current expenses and by wage and non-wage costs. Kuwait has made huge investments in the public education sector which has placed in the middle of the OECD nations. Education is offered free of cost to Kuwaiti children and to some non-citizens as well whose parents are offering their services as teachers in the public sector or who have employment in the Ministry of education. Expenditure on private education by the Public is almost negligible. Concrete data on the private expenditure in education and tuitions paid to attend private institutions is not available; therefore this section will only discuss public education expenditure only.

### **4.5.1 Total Public Expenditure on Education**

Two ways in order present expenditure over time: Current prices and constant prices.

1- Expenditure figures presented in *current prices*: give the costs based on prices that prevailed in the relevant years, so they do not take account of any change in prices over time (i.e. inflation).

2- Expenditure figures presented in *constant prices*: give the costs based on prices in the reference year for example in our case year 2005. Therefore, constant price figures are adjusted to give the cost that would be expected, had the prices been the same as they were in 2005 (i.e. earlier figures are adjusted to remove the effects of inflation). The purpose of adjusting figures to constant prices is to determine whether an increase in spending is a real increase, or whether it is

due to inflation alone. Changes based on constant prices are known as real increases or decreases (or changes in real terms). To adjust a figure to constant 2005 prices, it is multiplied by the ratio of the Consumer Price Index (CPI) in the reference year (2005) to the CPI for the year of the data to be adjusted” (See Appendix 2 for CPI figures).

#### **4.5.2 Public expenditure on education in constant prices**

During 2005 the prices were constant and expenditure on the education sector augmented to over 904m KD during the year 2005-6. This has been illustrated in figure 4.10. There was an increase of over 9% in a span of just two years.



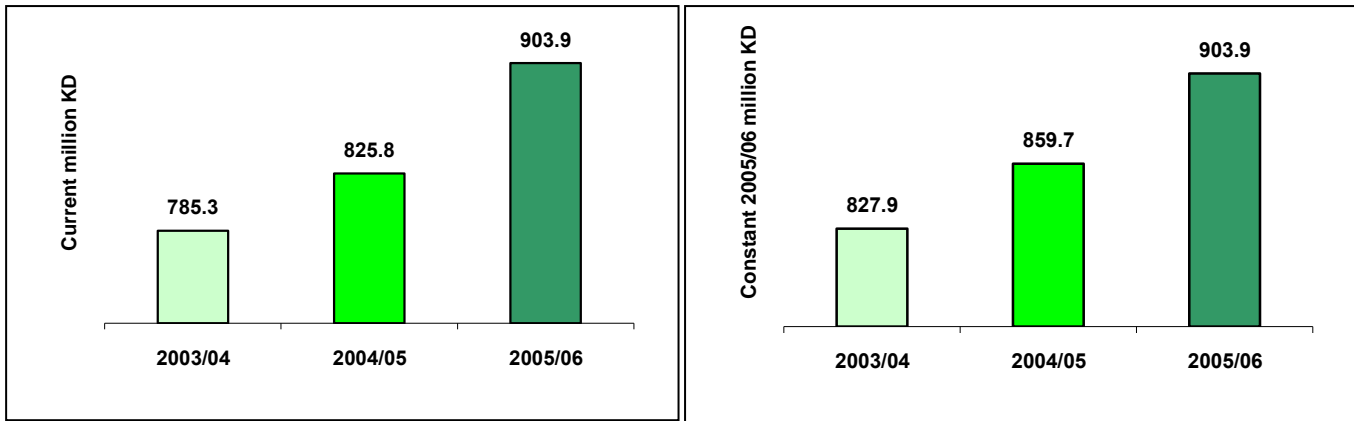


Figure 4.10: Total expenditure on public education in current and constant 2005 prices (millions KD), 2003/04 to 2005/06  
 Source: Highest education Indicators in the State of Kuwait, 2005

### 4.5.3 Public expenditure on education as a percentage of GDP

A real increase has been observed however in terms of the wealth of the country, there has actually been a decline. The reason for this is the rate of the expenditure's increase has been slower than the increase in the GDP.

### 4.5.4 Public expenditure on education related to total public expenditure

The figure 4.11 below shown that indicators from the 2003-2006 periods over 904 million KD were given up for the education sector. This makes up over 13% of the overall expenses borne by the government. The share has remained consistent over the course of the three years.

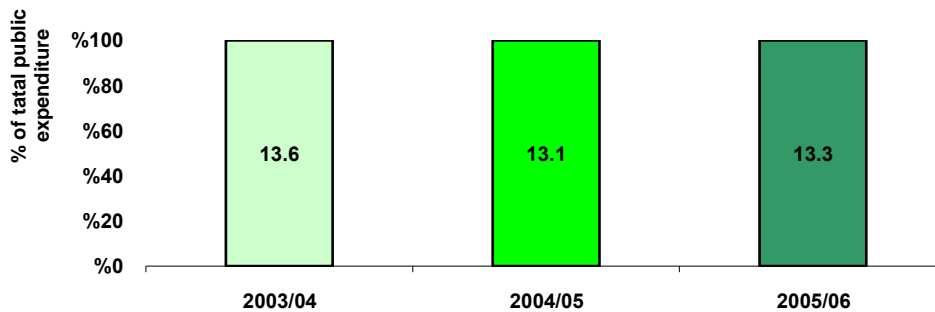
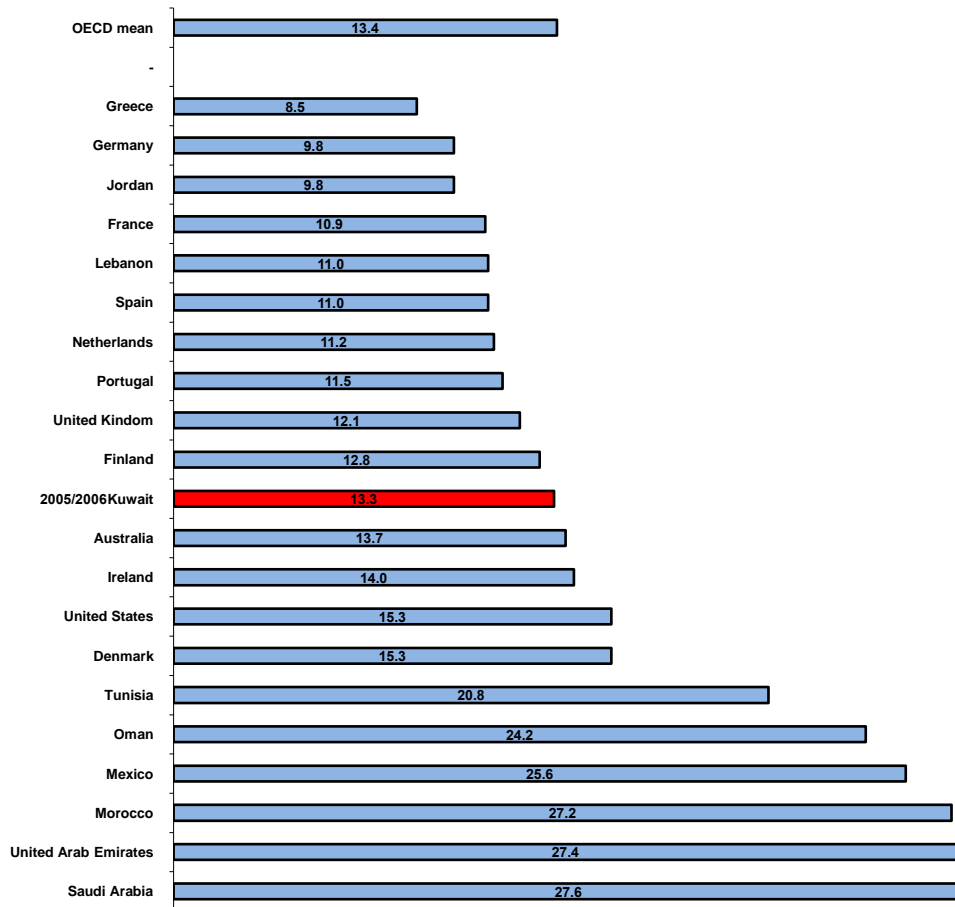


Figure 4.11: Public expenditure as a percentage of total public expenditure, 2003/04 to 2005/06  
 Source: Highest education Indicators in the State of Kuwait, 2005



*Note: Data is for 2005/08 for Kuwait, 2003/04 for OECD counties.*

*Figure 4.12: International Comparison of Public expenditure as a percentage of total public expenditure, 2005/06*

*Source: Highest education Indicators in the State of Kuwait, 2005*

Figure 4.12 shown Kuwait as a case of high income country petroleum based economy comparable to the advanced countries in public percentage education expending; where it is very close to Australia and Finland, and also it very high than other developing countries.

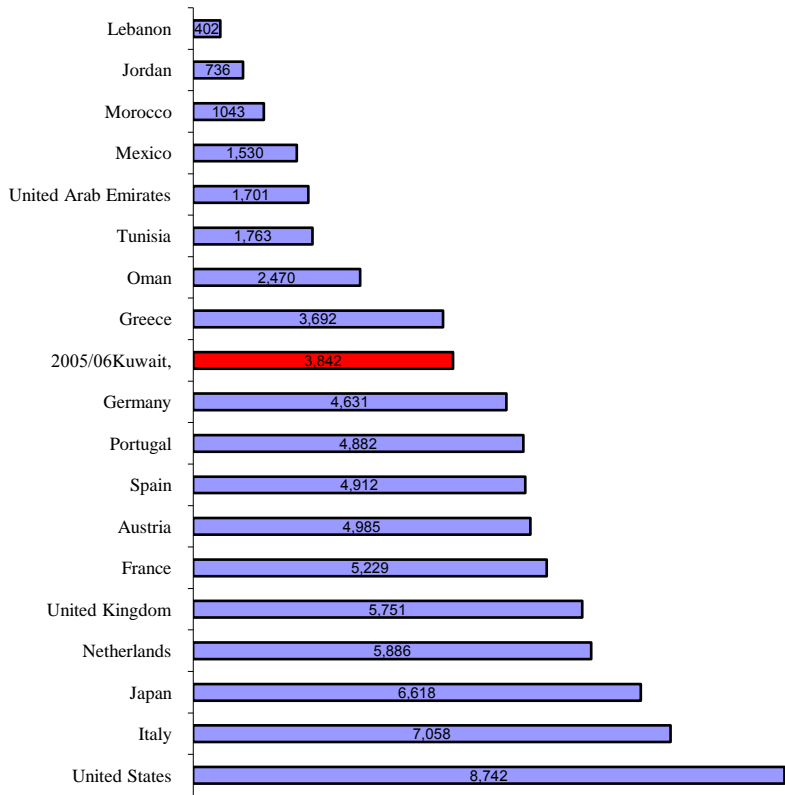


*Note: Data is for 2005/06 for Kuwait and 2005 for Lebanon, Morocco and Tunisia*

*Figure 4.13: International comparison of public expenditure per student (all levels of education) in international dollars, 2004*

*Source: Highest education Indicators in the State of Kuwait, 2005*

Figure 4.13 shown Kuwait as a case of high income country petroleum based economy comparable to the advanced countries in per student for all level of education expending; where it is very close to Japan and Portugal, and also it very high than other developing countries.

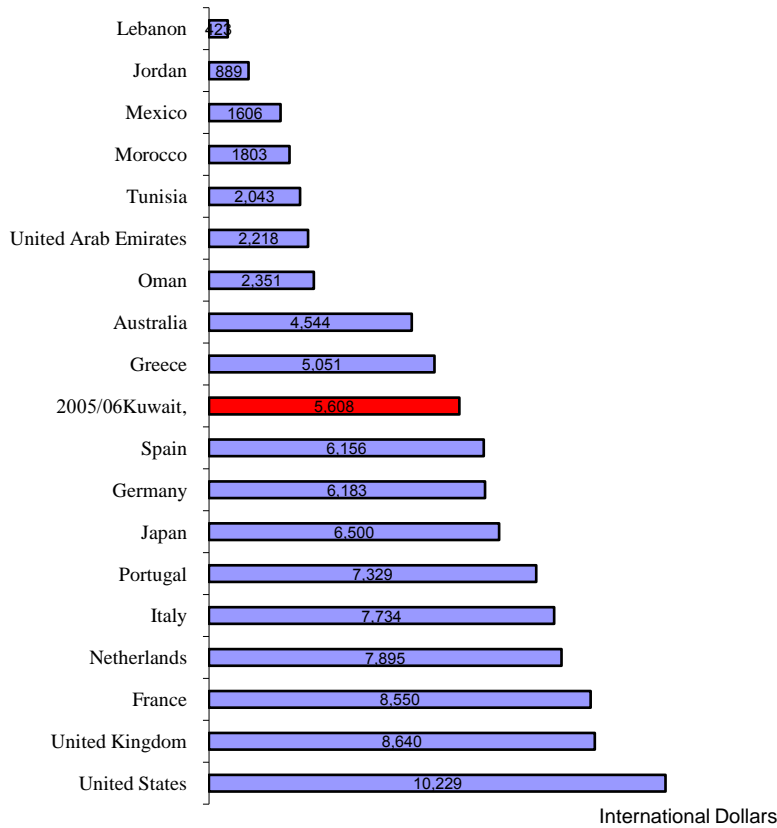


*Note: Data is for 2005/06 for Kuwait and 2005 for Lebanon, Morocco and Tunisia*

*Figure 4.14: International comparison of public expenditure per primary student in international dollars, 2004*

*Source: Highest education Indicators in the State of Kuwait, 2005*

Figure 4.14 shown Kuwait as a case of high income country petroleum based economy comparable to the advanced countries in per primary student level expending; where it is very close to Germany and Greece, and also it very high than other developing countries.

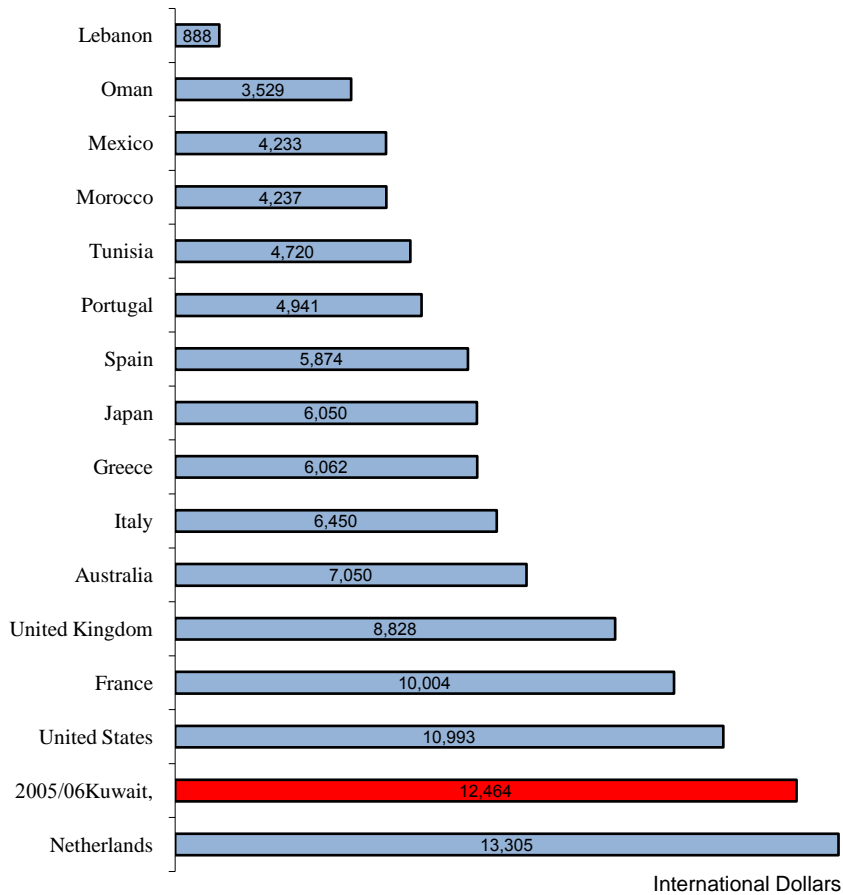


*Note: Include intermediate and secondary levels in Kuwait; Data is for 2005/06 for Kuwait and 2005 for Lebanon, Morocco and Tunisia*

*Figure 4.15: International comparison of public expenditure per Intermediate student in international dollars, 2004*

*Source: Highest education Indicators in the State of Kuwait, 2005*

Figure 4.15 shown Kuwait as a case of high income country petroleum based economy comparable to the advanced countries in per Intermediate and secondary level expending; where it is very close to Spain and Greece, and also it very high than other developing countries.



*Note: Data illustrated represents figures for 2005-06 in terms of Kuwait and only 2005 for Tunisia, Morocco and Lebanon*  
 Figure 4.16: Global assessment of public expenditure per Tertiary student in international dollars, 2004  
 Source: Highest education Indicators in the State of Kuwait, 2005

Figure 4.16 shown Kuwait as a case of high income country petroleum based economy comparable to the advanced countries in per Tertiary student expending; where it is very close to Germany and Greece, and also it very high than other developing countries.

## 4.6 Summary

This chapter aim to understand the development of the economy and its impact on the social structure of society and education system in Kuwait as a case of high income petroleum based economic countries, the chapter looks at the traditional economic activities and trades, the emergence and the nature of the labour market and education sector after the discovery of oil. Furthermore, this chapter presents the public expenditure on education and education expenditure per student. Many economic key issues, such as resource allocations, income

distribution, and other economic productivity and growth measures are tied with the investment in education.

In Kuwait the public sector employs about 90% of the total Kuwaiti workforce and their salaries/allowances are among the important instruments to distribute the national oil wealth. Given this perspective, in the next chapter in particular the researchers implement the steps according to conceptual framework model in chapter 3 using E-Views analysis packages and SPSS to answer the question: How returns of education investment are actually estimated in practice?, What are the variables that affect the returns of education investment?, To what extent is the return to education of high-income petroleum developing countries consistent with the empirical findings of the return to education in comparison to the results of developed and developing countries? And in which level of education the individual meet the highest rate of returns to education?

## **Chapter 5: Data analysis, Modeling and Discussion of the findings**

### **Introduction**

Based on the literature review, the researcher uses the main variables which were found to be significantly affecting the estimation RORE: earnings, years of schooling, and years of experience. The dependent variable is the log of monthly earnings which includes the basic salary and social allowance (which presents part of total salary that depends on individual marital status). This is a significant part of the total earnings (see Appendix A3 that shows the government pay scales). For lower grades, the allowances are more than the basic salary.

Therefore, an argument could be made in favor of using basic salary as the dependent variable rather than total earnings. However, we chose total earnings (basic + social allowance) because rates of social allowances are tied to various grades, and the grades are tied to education and experience; and because the significant position of the social allowances are viewed as part of the returns to human capital. Two independent variables are used in this study, namely, education and experience. The latter has been taken directly from the database without any adjustment. In the database, education is reported in terms of academic qualifications rather than years of schooling.

Academic qualifications are converted into average estimates of years of schooling. Historically, in all the previous education systems of Kuwait, Primary school is equivalent to 4-7 years full-time schooling; Intermediate school is equivalent to 8-11 years of full-time schooling; and Secondary school is equivalent to 12 years of schooling. There are a number of post-high school diplomas which require 12 to 14 years of schooling, and a post university diploma which require 16 years of schooling. The B.A/B.Sc. degree is equivalent to 16 years, the M.A/M.Sc. degree ranges between 18 and 21 years of schooling, and the PhD. degree between 22 and 23 years of education. This information, which is available in more detail than reported here, has been used to convert academic qualifications into number of years of schooling, as in Table 5.1.



Table 5.1: Coding and converting the dataset into reasonable figures for estimates.

Sex = 1 if male, 0 female
Place of qualification = 1 if Kuwait , 0 otherwise
Nationality = 1 if Kuwaiti , 0 otherwise
years of education: 4 years ≈ Primary and elementary courses on Applied , 8 years ≈ Intermediate and intermediate courses of the Applied, 12 years ≈ High school or equivalent , 14 years ≈ Diploma , 16 years ≈ University , 20 years ≈ Master or PhD

Source: Author's, 2010

For this reason, this research focuses only on the public sector employees who graduated from Kuwait. The mean, median, maximum, minimum, standard deviation, and other statistical variables for the sample data are reported in (Table 5.2), for earnings (basic salary + social allowance because it is a significant part in the salary), years of schooling and years of experience are shown in figures (5.1.1-5.1.3).

Table 5.2: All Kuwaitis employees' Descriptive statistics of the sample dataset

All Observations	Wage	Years of Schooling	Years of Experience
Mean	568.86	12.87	12.60
Median	543	12	11
Maximum	3762	20	55
Minimum	226	4	0
Std. Dev.	195.43	3.33	7.60
Skewness	2.66	-0.40	0.73
Observations	146499	146499	146499

Source: Author's, 2010

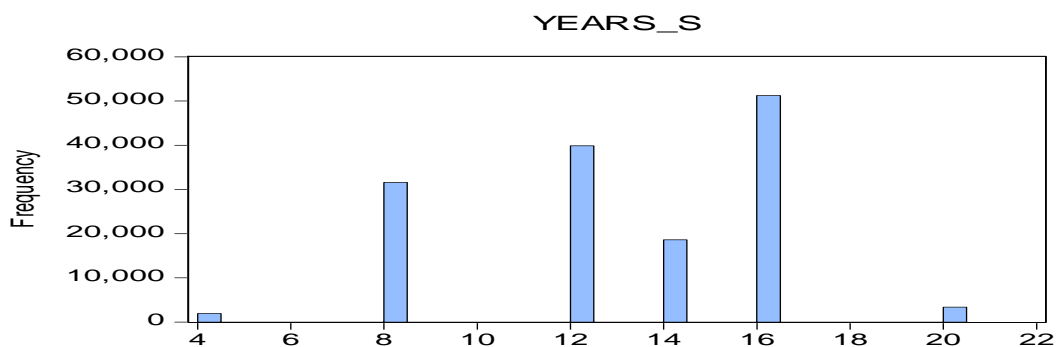


Figure 5.1.1: All Kuwaitis employees', based on number of years of schooling

Source: Author's, 2010

From (Figure 5.1.1), most of the Kuwaiti employees received 16 years of schooling, which means university qualification degree.

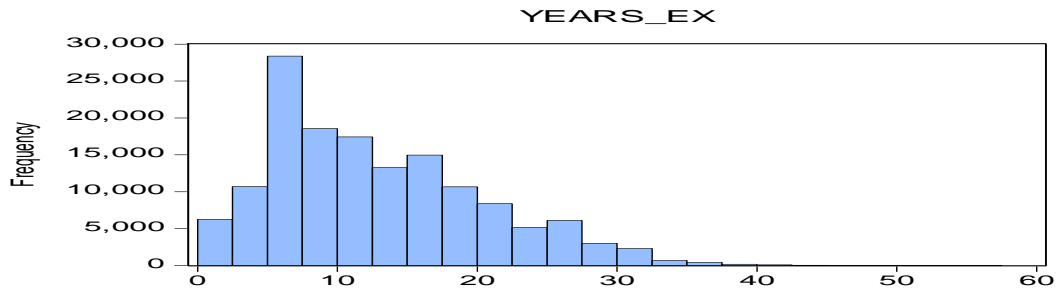


Figure 5.1.2: All Kuwaitis employees, based on number of years of Experience  
Source: Author's, 2010

From (Figure 5.1.2), most of the Kuwaiti employees received around 13 years of experience, which means most of them youths and young ages.

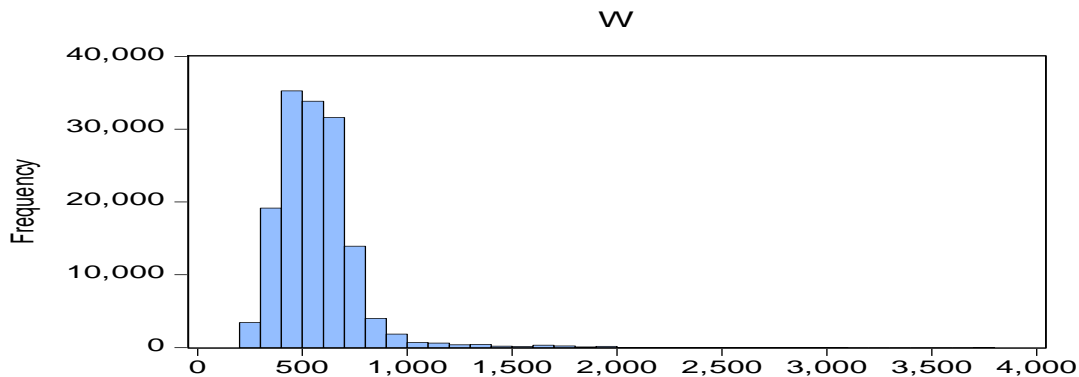


Figure 5.1.3: All Kuwaitis employee based on Wages (Basic + Social allowance)  
Source: Author's, 2010

From (Figure 5.1.3), the average salaries (Basic+Social allowance) shown an almost normal distribution curve (bell shaped) of Kuwaiti employees around 569 Kuwaiti Dinars, The mean, median, maximum, minimum, standard deviation and other statistics for female data are reported in the table 5.3 and histogram graph for earnings (basic + social), years of schooling and years of experience are shown in figures (5.2.1-5.2.3)

Table 5.3: Kuwaitis Female employee statistics of the sample dataset

All Observations	Wage	Years of Schooling	Years of Experience
Mean	533.05	13.61	11.19
Median	523.00	14.00	10.00
Maximum	2875.00	20.00	53.00
Minimum	226.00	4.00	0.00
Std. Dev.	152.86	2.89	6.45
Skewness	2.40	-0.69	0.93
Observations	83448	83448	83448

Source: Author's, 2010

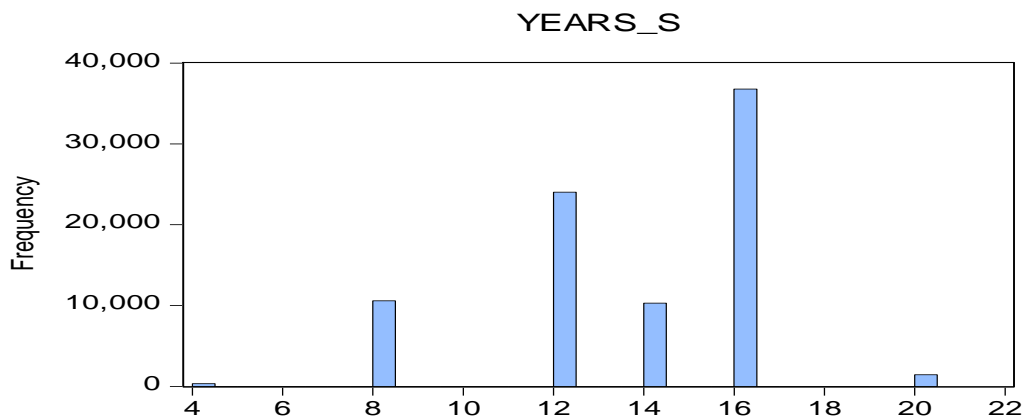


Figure 5.2.1: Kuwaitis Female employee based on number of years of schooling

Source: Author's, 2010

From (Figure 5.2.1), most of the Kuwaiti female employees received 16 years of schooling, which means university qualification degree. also, the average mean of female qualification is 14 years of schooling mean diploma degree.

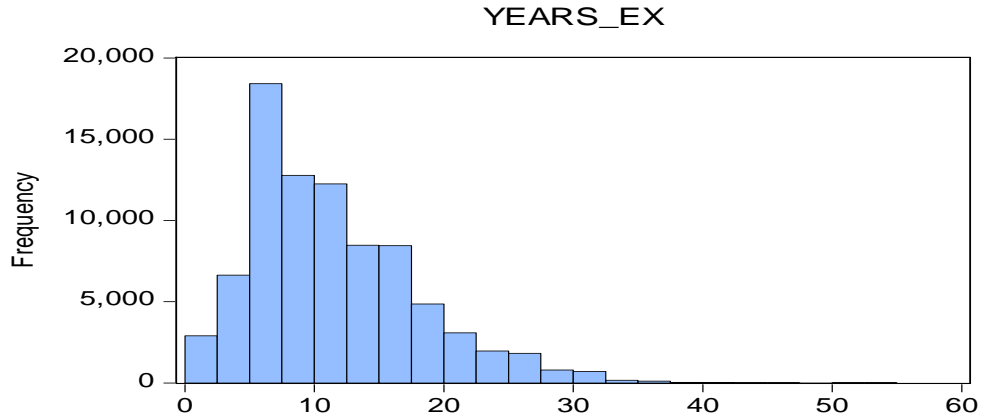


Figure 5.2.2: Kuwaitis Female employee based on number of years of Experience  
 Source: Author's, 2010

From (Figure 5.2.2), most of the Kuwaiti female employees received around 11 years of experience, which means most of them youths and young ages.

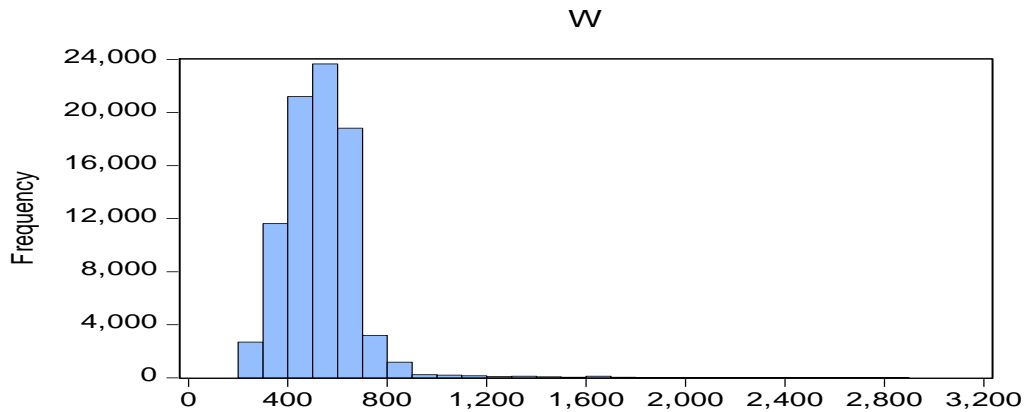


Figure 5.2.3: Kuwaitis Female employee based on Wages (Basic + Social allowance)  
 Source: Author's, 2010

From (Figure 5.2.3), the average salaries (Basic+Social allowance) shown an almost normal distribution curve (bell shaped) of Kuwaiti female employees around 533 Kuwaiti Dinars. The mean, median, maximum, minimum, standard deviation and other statistics for male data are reported in the table 5.4 and histogram graph for earnings (basic + social), level of qualification and years of experience are shown in figures (5.3.1-5.3.3)

Table 5.4: Kuwaitis Male employee statistical of sample dataset

All Observations	Wage	Years of Schooling	Years of Experience
Mean	616.26	11.89	14.45
Median	588.00	12.00	14.00
Maximum	3762.00	20.00	55.00
Minimum	226.00	4.00	0.00
Std. Dev.	232.11	3.61	8.54
Skewness	2.43	0.03	0.38
Observations	63051	63051	63051

Source: Author's, 2010

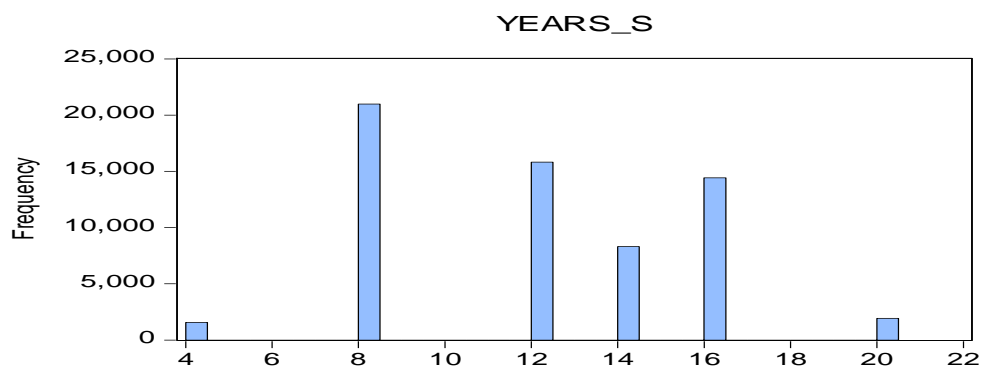


Figure 5.3.1: Kuwaitis Male employee based on number of years of schooling

Source: Author's, 2010

From (Figure 5.3.1), most of the Kuwaiti male employees received 8 years of schooling, which means an intermediate school qualification degree. Also, the average mean of male qualification is 12 years of schooling, which means a high school degree.

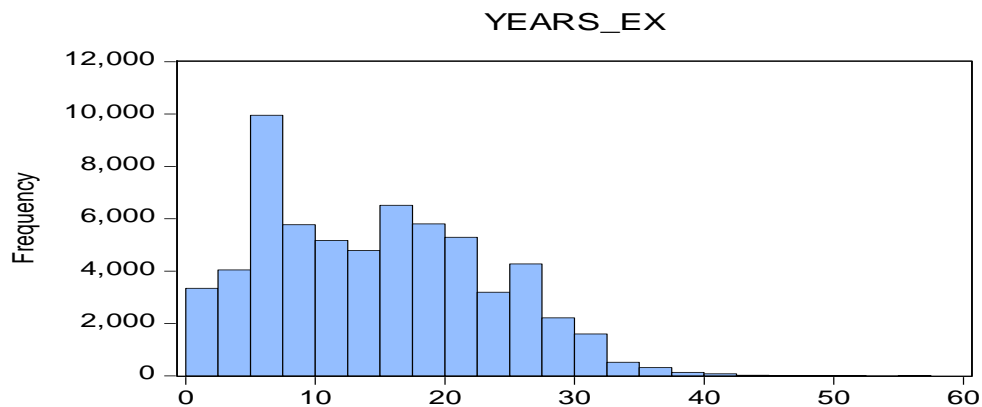


Figure 5.3.2: Kuwaitis Male employee based on number of years of Experience

Source: Author's, 2010

From (Figure 5.3.2) most of the Kuwaiti male employees received around 15 years of experience, which means most of them youths and young ages.

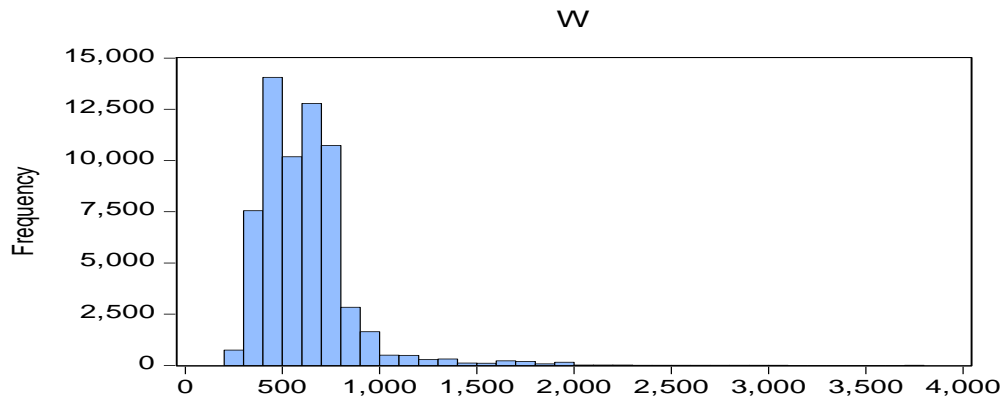


Figure 5.3.3 Kuwaitis Male employee based on Wages (Basic + Social allowance)  
 Source: Author's, 2010

From (Figure 5.3.3), the average salaries (Basic+Social allowance) shown an approximate normal distribution curve (bell shaped) of Kuwaiti male employees around 616 Kuwaiti Dinars. From the above tables and figures Kuwaiti workers had an average of 12 years of schooling and 11 years of labour market experience, whilst female workers had more average schooling (14 years) than male workers (12 years) the labour market experience for male 4 years more than female of (14 years to 10 years). On the other hand, the mean earnings (basic + social allowance) of women are lower than those of men, whereas the mean years of schooling for women are higher than those of men. The significant differences between the averages of male and female employees' earnings, education, and experience imply pooling of male and female data would obscure important differences in their effects on return to education. Therefore, we have performed all our analyses separately for male and female employees in order to estimate the rate of return on education for both genders.

## 5.1 Models and Empirical Results

Since, the aim of this research is to gain a better understanding of the effects of influencing variables/factors on the investment of education and their relationships in order to help education

decision makers get a better return on investment in education. Therefore, we generated three research hypotheses that were described earlier in Chapter 2.

The scheme diagram figure 5.4 illustrates the research analysis techniques which are going to be used for testing the research hypotheses.

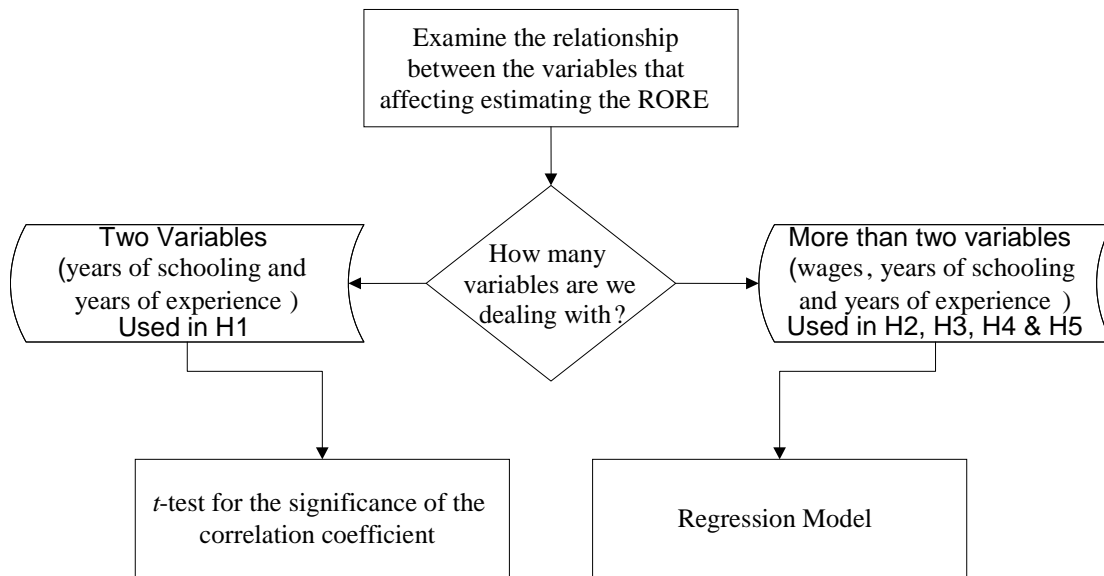


Figure 5.4: flowchart for illustrate the analysis techniques used for testing the hypotheses.  
Source: Author's

Earlier than start testing the models; we must be confident that OLS would be the best-fit, unbiased and efficient estimate for data we have to test to assumptions, first the autocorrelation; second the heteroscedasticity. Because it is a cross sectional data the violation of Autocorrelation assumption not exist and irrelevant to test; the second assumption checked by using Breusch- Pagan-Godfrey to test Heteroscedasticity the  $P=0.00$  which means the Heteroscedasticity not applicable for the given individual data structure therefore the data Homoscedasticity.

For test the first hypothesis; H: There is a relationship between years of schooling and years of experience:  $H_0: \rho_s - \rho_{ex} = 0$

$$H_1: \rho_s - \rho_{ex} \neq 0$$

In order to describe the relation between these two variables for Kuwaiti public labour force 2010 data statistically, the non-directional hypothesis and two tail test with Type I error (level of significance is 0.05) is used. This is a very powerful and useful test enabling us to understand how this statistic gives us valuable information about the relationship.

The output figures in Table 5.5 have shown the correlation coefficients matrix between the main variables (wages, years of schooling and years of experience) for the entire Kuwaiti employee force that received their qualifications in Kuwait. The correlation between years of schooling and years of experience is -0.03 which means almost no relation and the coefficient of determination  $R^2=9*10^{-4}\%$  meaning that a weak or no relationship.

*Table 5.5: Correlation values for the three variables (Years Schooling, Years Experience and wages) for all Kuwaitis employees received their qualification in Kuwait*

	Years Schooling	Years' Experience	Wages
Years Schooling	1	-0.03	0.45
Years' Experience	-0.03	1	0.61
Wages	0.45	0.61	1

*Source: Author's*

The t-test for the two variables (years of schooling and years of experience) is shown in Table 5.6 the two-tailed P value is less than 0.0001, by conventional criteria; this difference is considered to be extremely statistically significant. The mean of years of schooling minus years of experience equals 0.279. 95% confidence interval of this difference: From 0.237 to 0.322. Intermediate values used in calculations:  $t = 12.906$ ;  $df = 292996$  and standard error of difference = 0.022 then were the calculated value of t (12.906) more than table value of t (3.09), reject the null hypothesis and do not reject the research hypothesis.



Table 5.6: The t-test for the two variables (Years Schooling, Years Experience)

Group	years of schooling	years of experience
Mean	12.87	12.59
SD	3.33	7.60
SEM	0.01	0.02
N	146499	
T	12.91	
Df	292996	

Source: Author's

Alternatively, from the correlation matrix the correlation between years of schooling and wages is 0.45 and the coefficient of determination  $R^2=20\%$  which is a moderate relationship. Whereas, the correlation matrix between years of experience and wages is 0.61 and  $R^2=37\%$  which is a strong relationship, so we can point that these calculations specify how these variables share something in common tend to be correlated with one another.

The output figures in Table 5.7 and Table 5.8 show the correlation coefficients matrix between the main variables (wages, years of schooling and years of experience) for Kuwaiti female employees who have their qualifications from Kuwait and Kuwaiti male employees who have their qualifications from Kuwait.

Table 5.7: Correlation values for the three variables (Years Schooling, Years Experience and wages) for female Kuwaiti employees received their qualification in Kuwait

	Years Schooling	Years' Experience	Wages
Years Schooling	1	-0.0044	0.54
Years' Experience	-0.0044	1	0.62
Wages	0.54	0.62	1

Source: Author's

The output figures in (Table 5.7) and (Table 5.8) showed the correlation coefficients matrix between the main variables (wages, years of schooling and years of experience) for the entire Kuwaiti female and male employee who received their qualifications from Kuwait. The correlation between years of schooling and years of experience is -0.004 which means almost no relation and the coefficient of determination  $R^2=9*10^{-4}\%$  meaning that a weak or no relationship.

Table 5.8: Correlation values for the three variables (Years Schooling, Years Experience and wages) for male Kuwaiti employees received their qualification in Kuwait

	Years Schooling	Years' Experience	Wages
Years Schooling	1	0.049	0.54
Years' Experience	0.0491	1	0.58
Wages	0.54	0.58	1

Source: Author's

The aforementioned female and male sample figures confirm the manner that leaves no room for doubt, there is either a weak or no relationship between years of schooling and years of experience in our case study as a result we reject the null  $H_0$  hypothesis of  $H_1$  in our case where  $H_1$ : There is a relationship between years of schooling and years of experience.

Correspondingly, it shown a strong relationship for years of experience and wages besides moderate relationship for years of schooling and wages; because of this strong and moderate relationship we can go further to implement the regression models.

## 5.2 Results from the application of the framework models

The correlation results in the previous section confirm two important points, first: the two independent variables (years of schooling and years of experience) are correlated with the dependent variable (wages). Second: the two independent variables (years of schooling and years of experience) are uncorrelated with each other; these two points support our view for implementing the regression model steps presented in Chapter 3 towards testing  $H_2$ ,  $H_3$ ,  $H_4$  and  $H_5$  as shown below:

$H_2$ : The average private RORE in high-income petroleum based developing countries are consistent to the empirical findings of either developing or developed countries.

$H_3$ : The female private RORE is higher than male private RORE.

$H_4$ : The private RORE for low income group's higher than the private RORE higher income group's.

$H_5$ : The Private RORE is negatively correlated with the level of education.

## 5.2.1 Results of model 1

The human capital model of Becker (1962) and Mincer (1974) has been the method used for the study presented in this research. The Mincerian earning functions has been well applied to individual countries data, with the semi-logarithm specifications being very robust in empirical studies. Figure 5.5 briefly reviews and explains the Mincerian earnings model.

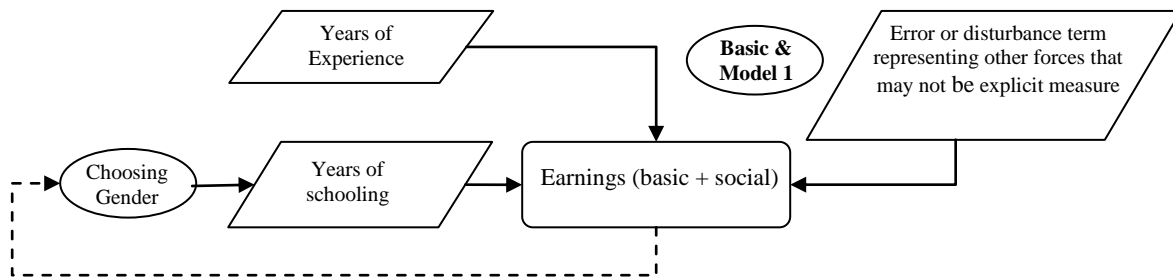


Figure 5.5: flowchart of Illustration of the Mincerian model 1  
Source: Author's

Mincer (1974) used the first human capital model that was basically focused on the earning function as shown in Basic model and model-1

$$\ln Y_i = \alpha + \beta S_i + \gamma_1 X_i + u_i \dots \dots \dots \text{(Basic model)}$$

$$\ln Y_i = \alpha + \beta S_i + \gamma_1 X_i + \gamma_2 X_i^2 + \mu_i \dots \dots \dots \text{(model.1)}$$

where:

Ln Y: the natural log for wage (basic and social in our case).

S: the years of schooling.

X: the years of experience.

$\mu$ : the random error that captures the other variables that have an impact on earnings, but were excluded from model.

We realized here that  $\beta$  is the coefficient for the years of schooling, which is the average return for each year of schooling.

Subsequent to the above regressions, and to estimate the proportion of the variance in earnings that are attributable to human capital, we regressed separate regressions of earnings on schooling for various experience groups of 146,499 Kuwaitis (83,448 female; 63,051 male) who received

their qualifications from Kuwaiti based public/private schools/universities out of 195,027 Kuwaiti employees; following the approach of Mincer (1974) and Psacharopoulos and Layard (1979).

In this research we are going to test and compare the results of Basic model and Mincerian (model-1) to find best fitted model for Kuwait as a case of high-income developing countries.

Applying the above models by regressing a natural log of earnings on the number of years of schooling, the number of years of experience, and its square term, for the all data using the least square method by the E-Views package and SPSS.

The resulted estimated regression models are as follows:

Estimation Equation:

$$\text{LOG (BASIC+SOCIAL)} = \alpha + \beta_1(\text{YEARS\_SCHOOLING}) + \beta_2(\text{YEARS\_EXPERIENCE}) \dots (\text{Basic model})$$

$$\text{LOG(BASIC+SOCIAL)} = \alpha + \beta_1(\text{YEARS\_SCHOOLING}) + \beta_2(\text{YEARS\_EXPERIENCE}) + \beta_3(\text{YEARS\_EXPERIENCE})^2 \dots (\text{model.1})$$

Applying the above models for Kuwaiti employees who received their qualifications from Kuwait, the Basic and Mincerian regression model-1 estimation for 146,499 out of 195,027 male and female employees reported in Table 5.9.

*Table 5.9: The results of Basic and Model-1 regression estimation for all Kuwaiti employees received their education qualification in Kuwait.*

Independent Variable	Dependant Variable (W)					
	Basic Model			Model 1		
	Overall	Male	Female	Overall	Male	Female
Constant (Intercept)	5.33 (2904.527)	5.42 (2089.247)	5.18 (2336.335)	5.31 (2555.626)	5.38 (1777.926)	5.13 (2104.491)
Schooling	0.048 (383.679)	0.051 (265.918)	0.057 (379.888)	0.048 (384.065)	0.051 (267.794)	0.057 (383.334)
Experience	0.026 (476.252)	0.024 (292.783)	0.026 (386.454)	0.033 (168.943)	0.0314 (109.613)	0.035 (160.368)
Experience <sup>2</sup>	----- -----	----- -----	----- -----	0.0002 (-33.12)	-0.0002 (-27.998)	-0.0003 (-45.50)
R <sup>2</sup>	0.713	0.723	0.778	0.715	0.726	0.783
Adjusted R <sup>2</sup>	0.713	0.723	0.778	0.715	0.726	0.783
# Observations	146499	63051	83448	146499	63051	83448

*Source: Author's estimation*

*Note - Numbers in parentheses are t-statistics.*

By looking at the results of the two models, we recognize that the average rate of return to schooling for Kuwait is 0.48 percent with the corresponding t-value and goodness of fit  $R^2$  being highly significant. The estimation regression for Basic model and model-1 for 63,051 male employees gives a rate of return to schooling of 5.1 percent, and the corresponding t-value and  $R^2$  are highly significant. The estimation regression for Basic and model-1 for 83,448 female employees gives a rate of return to schooling of 5.7 percent, and the corresponding t-value and  $R^2$  are highly significant. As expected, the experience squared term showed a negative sign for the square term which indicates the impact of over-experience.

For studying the comparison of RORE based on the individual level of income, we have applied the same regression (model.1) by regressing a natural log of earnings on the number of years of schooling, the number of years of experience, and its square term, for the total (all Kuwait employees) sample based on dividing the dataset to three income bands (high income, medium income and low income) and this regression will reveal how much the rate of return to one extra year of schooling depends on the level of individual income. The resulting estimation regression model is as follows:

Estimation Equation:

$$\text{LOG}(\text{BASIC}+\text{SOCIAL})= \alpha+ \beta_1\text{Y(EARS\_ SCHOOLING)}+ \beta_2(\text{YEARS\_ EXPERIENCE}) +\beta_3(\text{YEARS\_ EXPERIENCE})^2$$

For each of the three income bands, Table 5.10 shows the rate of return on education based on income, where the highest was for medium income (3.6 percent), and the corresponding t-value and goodness of fit  $R^2$  are highly significant.

Table 5.10: The comparison rate of return to education; for all Kuwaiti employees based on their level of Income in K.D.

Income Band	Average rate of return %					
	# Observations	Overall	# Observations	Male	# Observations	Female
High income Income $\geq$ 750	16574	3.2	12922	3.8	3652	3.3
Medium income 350 < Income < 750	120116	3.6	46988	4.5	73128	3.9
Low income Income $\leq$ 350	9809	1.3	3141	2.5	6668	0.12
Over all	146499	4.8	63051	5.1	83448	5.7

Source: Author's estimation

## 5.2.2 Results of Model 2

In the first model, as shown in figure 5.5, the researchers use only three variables. The dependent variable is the log of monthly earnings which includes the basic salary and various allowances where the allowances are a significant part of the total earnings.

The empirical approximation of the human capital theoretical framework is the familiar functional form of the earnings equation (see Mincer, 1974):

$$\ln Y_i = \alpha + \beta S_i + \gamma_1 X_i + \gamma_2 X_i^2 + \mu_i \dots\dots\dots(\text{model.1})$$

Subsequent to (model.1) (basic regression), an interaction term is successively added in (model.2). Only two independent variables are used in this model, namely, education and experience.

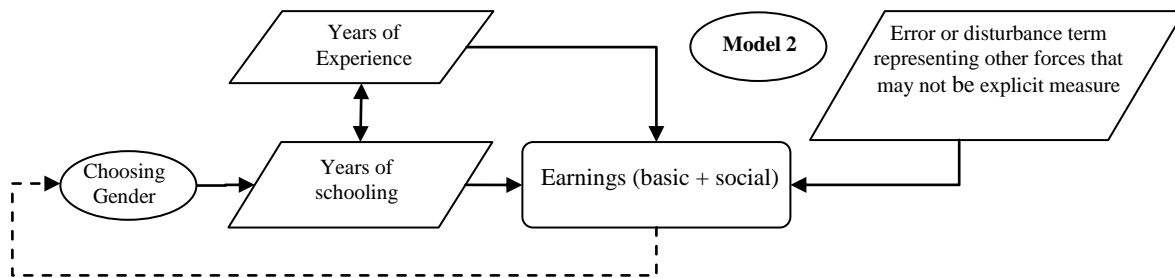


Figure 5.6 : flowchart of Illustration of the regression model 2  
Source: Author's

The empirical approximation of the human capital theoretical framework is the familiar functional form of the earnings equation:

$$\ln Y_i = \alpha + \beta_1 S_i + \beta_2 S_i * X_i + \gamma_1 X_i + \gamma_2 X_i^2 + \mu_i \dots\dots\dots(\text{model.2})$$

where:

Ln Y: is natural log for wage (basic and social allowance in our research).

$\alpha$ : is the intercept

S: is years of schooling.

X: is years of experience.

$\mu$ : is the random error that captures the other variables that have an impact on earnings, but unobservable factors that excluded from model.

Model-2 expanded the Mincerian earning model to include the interaction (multiplication) between years of schooling and years of experience term (i.e. S\*X), where the  $\beta_2$  coefficient of this term (S\*X) would indicate whether the slope of the experience-earnings profile depends on the level of education. Because human capital theory implies that those employees with higher levels of education are likely to be tending to seek for job opportunities with steeper profiles. Therefore, the interaction term is expected to take a negative sign. When applying regression model-2 (Table 5.11) by using the E-Views package and SPSS, the results of the estimated regression model are as follows:

*Table 5.11: Kuwaitis employees' private RORE for Model-2 (testing the years of schooling and years of experience interaction).*

Independent Variable	Dependant Variable (W)		
	Overall	Male	Female
Constant	5.26 (-1539.905)	5.33 (-1100.603)	5.00 (-1162.704)
Schooling	0.052 (-209.265)	0.055 (-144.010)	0.067 (-220.0302)
Experience	0.036 (-133.470)	0.034 (-94.250)	0.046 (-129.122)
Schooling * Experience	-0.0003 (-18.00)	-0.0003 (-12.959)	-0.001 (-37.845)
Experience <sup>2</sup>	-0.0002 (-32.342)	-0.0002 (-26.530)	-0.0003 (-44.547)
R <sup>2</sup>	0.715	0.727	0.787
# Observations	146499	63051	83448

*Author's estimates*

*Note - Numbers in parentheses are t-statistics.*

### 5.2.3 Results of Model 3

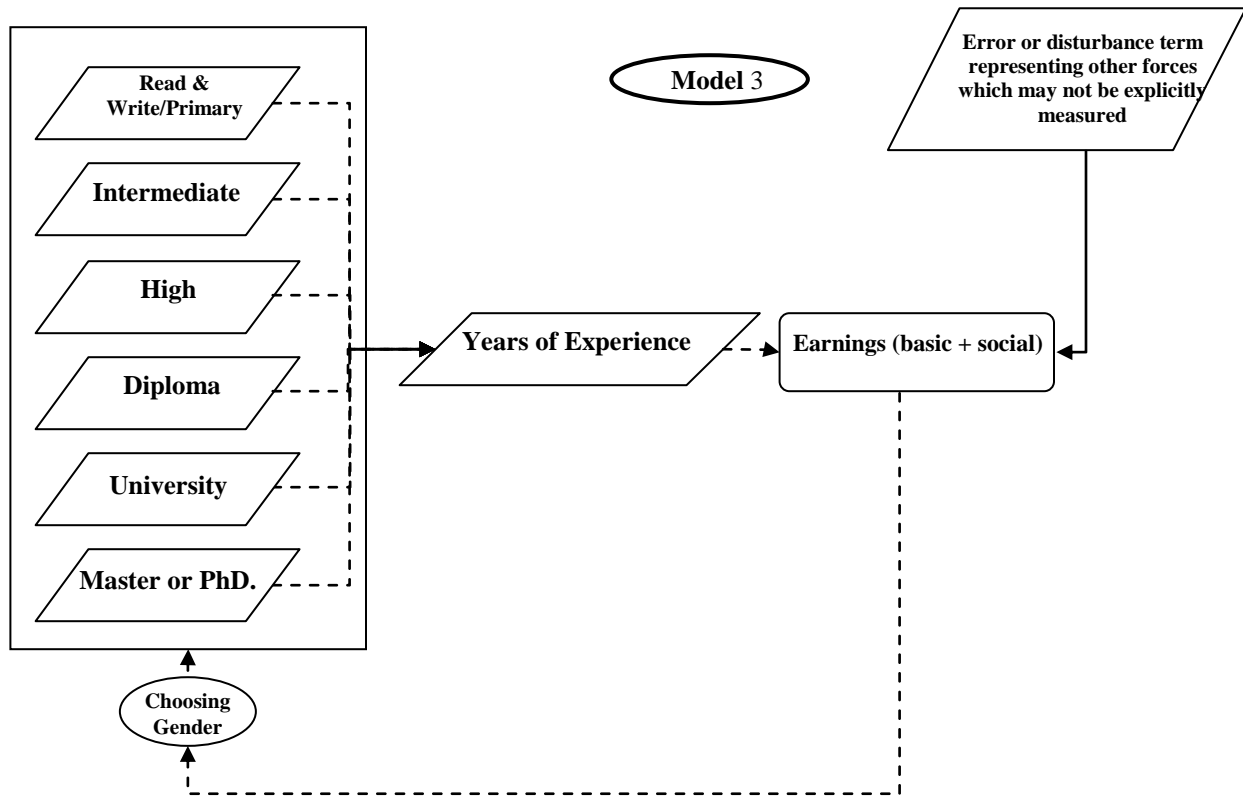


Figure 5.7: flowchart of Illustration of the regression model 3  
 Source: Author's

Adaptation of Expanded Mincerian function in which log earnings are regressed on level of education, work experience and experience squared. The Expanded earning function as shown in model-3 For the purpose of this study, different levels of education attainment are used. Since we intend to estimate the private rate of returns to different levels of education, the basic earnings equation becomes:

$$\ln Y_j = \alpha + \sum b_j D_j + \gamma_1 X_j + \gamma_2 X_j^2 + u_i \dots\dots\dots(\text{model.3})$$

where:

Ln Y: is natural log for wage (basic and social allowance in our research).

D: are Dummy variables for level of schooling.

X: is years of experience.



$\mu$ : is the random error that captures the other variables that have an impact on earnings, but unobservable factors that excluded from model.

From the above earnings function, one can calculate the rate of return of investment in education after acquiring an additional years of schooling. This is given as:

$$r_j = \frac{b_j - b_{(j-1)}}{S_j} \dots\dots\dots(\text{eq.5})$$

where:

$r_j$ : is private rate of return.

$b_j$ : is Coefficient for the level of education.

$b_{(j-1)}$ : is Coefficient of the previous level of education.

$X_j$ : is years of experience.

The rate of return to the  $j$ th level of education ( $r_j$ ) is estimated by subtracting the coefficient of  $b_{j-1}$  from that of  $b_j$  and dividing by the number of years of schooling  $S$  at the  $j$ th level. Optimal investment decision-making would imply that one would invest in the  $S^{\text{th}}$  years of schooling if  $r > i$ , the market rate of interest.

The Categories of education level (Dummy Variables) shown in (Table 5.12).

Table 5.12: Coding and Categories of education level (Dummy Variables)

Dummy Variables	School Category
D1	read and write only/Primary (4 years)
D2	Intermediate (8 years)
D3	High (12 years)
D4	Diploma
D5	Bachelor (16 years)
D6	Post Graduate (> 18 years)

Source: Author's

Applying the regression model.3 by regressing a natural log of earnings on the level of education, the number of years of experience, and its square term, for the all data using the least square method by the E-Views software package and SPSS.

The resulted estimated regression model is as follows:

Estimation Equation:

=====

$$\text{LOG}(\text{BASIC}+\text{SOCIAL}) = \alpha + b_1D_1 + b_2D_2 + b_3D_3 + b_4D_4 + b_5D_5 + b_6D_6 + \gamma_1X + \gamma_2X^2$$

Table 5.13: All Kuwaitis employees' private rates of return to education Model-3

Independent Variable		Dependant Variable (W)		
		Overall	Male	Female
Constant	$\alpha$	5.50	5.57	5.31
	$T$	-1407.69	1167.63	778.23
read and write only/Primary (4 years)	$b_1$	-0.80	-0.82	-0.92
	$T$	-173.84	-140.11	-124.39
	RORE	0.450	0.454	0.481
Intermediate (8 years)	$b_2$	0.21	0.23	0.25
	$T$	-54.38	51.10	36.15
	RORE	0.252	0.261	0.292
High (12 years)	$b_3$	0.39	0.40	0.53
	$T$	-104.07	88.97	78.56
	RORE	0.047	0.044	0.071
Diploma (14 years)	$b_4$	0.47	0.50	0.58
	$T$	-122.27	106.29	85.59
	RORE	0.041	0.049	0.027
Bachelor (16 years)	$b_5$	0.59	0.65	0.72
	$T$	157.47	142.09	107.78
	RORE	0.050	0.061	0.049
Post Graduate (> 18 years)	$b_6$	0.80	0.82	0.92
	$T$	173.84	140.11	124.39
	RORE	0.450	0.454	0.481
Experience	$\gamma_1$	0.03	0.031	0.035
	$T$	166.48	109.44	159.48
Experience <sup>2</sup>	$\gamma_2$	-0.0002	-0.0002	-0.0003
	$T$	-32.33	-27.73	-45.59
R <sup>2</sup>		0.715	0.727	0.787
# Observations		146499	63051	83448

Source: Kuwait Civil Service Commission, 2010. Author's estimates

(Table 5.13) the results of the expanded Mincerian earnings function that has education as a non-continuous variable. We now have 1–0 dummies for the six schooling level (Table 5.12). All coefficients are significant at the 1% level and have the right signs. (Table 5.14) is a summary of the private rates of return to the different education level, which are derived from (Table 5.13)

The rate of return is highest for Primary (45%), then Bachelor (5%) and lowest for intermediate and Diploma education (4.1%).

Table 5.14: summarizes the results of the expanded Mincerian earnings function model-3 for all Kuwaitis employees

Independent Variable	# of observations	Private RORE (%)Overall	# of observations	Private RORE (%)Male	# of observations	Private RORE (%)Female
Read and write only/Primary school (4 years)	1900	45	1570	45	330	48
Intermediate school (8 years)	31567	4.1	20985	4.9	10582	2.7
High school (12 years)	39853	4.7	15826	4.4	24027	7.1
Diploma degree (14 years)	18615	4.1	8309	4.9	10306	2.7
Bachelor degree (16 years)	51206	5.0	14424	6.1	36782	4.9
Post Graduate (> 18 years)	3358	4.5	1937	4.5	1421	4.8

Source: Based on Table 5.13

The general results from the previous analysis are that the rates of return to education do not decline by level of education. They are highest for primary education, and lowest for intermediate and diploma education. The general trend, based on Psacharopoulos, (1994) is for the rates of return to be highest for primary followed by secondary and lowest for tertiary education. Our results also show that the highest rates of return for female in high school where for male in bachelor degree.

### 5.3 Discussion of the Results

The aimed of this research is to shed light on the influencing variables and factors which affecting the investment of education and their relationships in order to assist education decision makers to achieve a better return on investment in education. In particular, a framework based on RORE model constructed and verified it by estimating the rate of return on education focusing on high-income economies countries; the framework will be tested by using Kuwait as a case study.

Estimating rate of return on education is not considered quality of education but instead is consideration as signs which suggest fields of concentration. An interesting example is the



$R^2 = 0.726$  is highly significant

Adjusted  $R^2 = 0.726$

For female Sample only:

Basic  $\text{Ln } Y = 5.13 + 0.057 * S + 0.026 * X$   
(379.888) (386.454)

$R^2 = 0.778$  is highly significant

Adjusted  $R^2 = 0.778$

Mincerian model-1  $\text{Ln } Y = 5.13 + 0.057 * S + 0.035 * X - 0.0003 * X^2$   
(2104.491) (160.368) (-45.50)

$R^2 = 0.783$  is highly significant

Adjusted  $R^2 = 0.783$

The results of implementation both Basic model and Mincerian regression model-1 for Kuwaiti public employee dataset who received their qualifications from Kuwait, the estimation for 146,499 out of 195,027 employees reported in Table 5.9.

In Kuwait case the average private RORE to one year of schooling is found to be 4.8%, 5.1% for male and 5.7% for female to both regression models. Because of no changes between  $R^2$  and adjusted  $R^2$  we can conclude that there wasn't any influence on private RORE if adding the quadratic to experience ( $X^2$ ) term as an independent variable particularly in this research case; however adding this variable provide an evidence of the concavity of more experience on earnings and as expected the negative sign showed for the coefficient of years of experience squared.

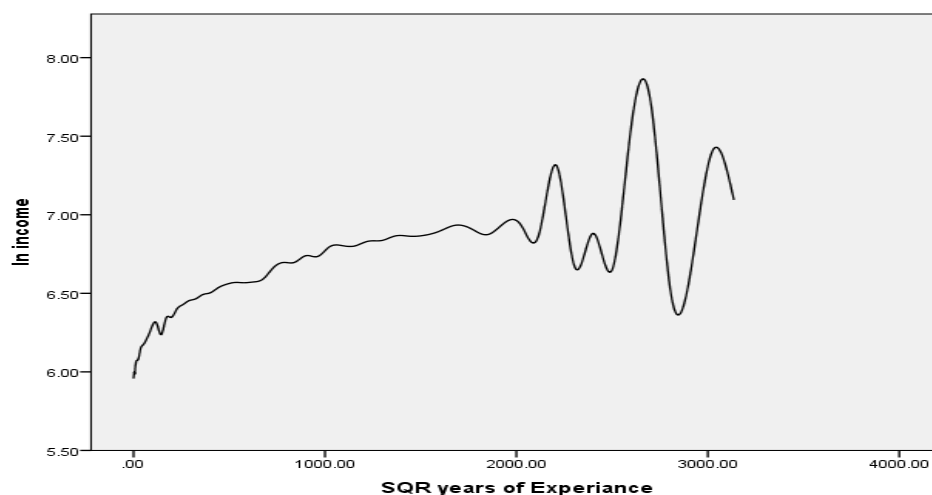


Figure 5.8 : Experience squared profiles of Earnings  
Source: Author's

From Table 5.15 the results point out that the rate of return on education in Kuwait as High Income developing countries is somewhat lower than what has been estimated in other High Income as well as Low Income Countries also based on the literature most of the studies found that the rate of return on education in advanced countries to be close to 10 percent as a benchmark.

Based on the evidence the average private RORE in high-income petroleum based developing countries are not consistent to the empirical findings of neither developing nor developed countries. Therefore, we reject the null  $H_0$  hypothesis for H2:

Where: H2 = the average private RORE in high-income petroleum based developing countries are consistent to the empirical findings of either developing or developed countries.

*Table 5.15: Comparison of rate of return on education between average Kuwaiti employee with average high and low income countries*

Country	Year	Average Private % RORE	Source
Kuwait	2010	4.8	Alqattan, 2010
High-Income Countries	2006	7.4	<i>Psacharopoulos ,1994 &amp; Psacharopoulos &amp; Patrinos ,2004</i>
Low-Income Countries	2006	10.9	<i>Psacharopoulos ,1994 &amp; Psacharopoulos &amp; Patrinos ,2004</i>

On the other hand, from Table 5.16 and model-1 findings raises several important observations; the results indicate that the private rate of return on education in Kuwait for male and female employee is somewhat lower than what has been estimated in other developed countries and higher than what has been estimated in other developing countries. For instance, Fathollah B. & Orhan K. (2005) reported Mincer-type returns to schooling to be 3.26 percent for men and 4.32 for women in Turkey and Colm H. et. al. (2000) found it to be 7.5 percent for men and 9.2 for women in Japan.

Table 5.16: Private RORE for male and female cross countries

Country	Year	Private - RORE				Source
		Male %	Standard Errors	Female %	Standard Errors	
Kuwait	2010	5.1	0.000190	5.7	0.000148	Alqattan, 2010
<i>Developing Countries</i>						
Turkey	2005	3.26	-----	4.32	-----	Fathollah B. & Orhank K. , 2005
Ghana	1992	4.4	N.A	4.2	N.A	Schultz ,1994
Bulgaria	1995	4.9	0.0100	6.2	0.0091	Colm H. et. al. ,2000
<i>Developed Countries</i>						
UK	1995	12	0.0057	14	0.0069	Colm H. et. al. ,2000
USA	1995	7.8	0.0045	9	0.0058	Colm H. et. al. ,2000
Japan	1995	7.5	0.0066	9.2	0.0151	Colm H. et. al. ,2000

The majority of researchers conclude that the private RORE of female higher than the private RORE for male; as well as Kuwait private RORE estimated it is shown 5.1% for male and 5.7% for female. Therefore, based on the evidence we fail to reject the null  $H_0$  hypothesis for  $H_3$ :

$H_3$ : The female private RORE is higher than male private RORE.

Psacharopoulos and Patrinos, (2004), reported that the private RORE's decline when a group's income increase (see Table 2.12), Table 5.17 shown a summary of Private RORE results for the Kuwait employee dataset based on three individual level of income groups.

Table 5.17: Private RORE comparison depend on level of income group percentage (%)

income group	Private RORE Kuwait Results		
	overall	Male	Female
High Income	3.2	3.8	3.3
Middle Income	3.6	4.5	3.9
Low Income	1.3	2.5	0.12

Based on the above table (Table 5.17), it appears that there is no specific trend for the three levels of income groups for the Kuwait dataset, whereas Psacharopoulos and Patrinos (2004) estimation found an approximately declining trend, starting from the low income level to high income level. Therefore based on this evidence, we reject the null  $H_0$  hypothesis H4: The private RORE for low income group's higher than the private RORE higher income group's.

In addition to that the Kuwait results showed a huge gap between the private RORE based on level of income for instant 1.3% for low income group and 3.2% for high income group (almost triple) also, 0.12% for female low income group and 3.3% for female high income group (almost thirty times higher). One can reasonably hypothesise that these results reflect three underlying reasons: 1<sup>st</sup>. Kuwait government salary scale. 2<sup>nd</sup>. Most of Kuwaiti employees received a high education qualification (particularly the female population). 3<sup>rd</sup>. Most of the low-income employees are illiterate or 'read and write' level only.

### 5.3.2 Discussion of Model-2 Results

In further expanding (model-1) (basic regression), an interaction term is successively added in (model-2). Only two independent variables are used in this model, namely, education and experience. The empirical approximation of the human capital theoretical framework is the familiar functional form of the earnings equation:

$$\ln Y_i = \alpha + \beta_1 S_i + \beta_2 S_i * X_i + \gamma_1 X_i + \gamma_2 X_i^2 + \mu_i \dots\dots\dots(\text{model.2})$$

where:

Ln Y: is natural log for wage (basic and social allowance in our research).

$\alpha$ : is the intercept

S: is years of schooling.

X: is years of experience.

$\mu$ : is the random error that captures the other variables that have an impact on earnings, but unobservable factors that excluded from model.

Model-2 expanded the Mincerian earnings model to include the term of the interaction (multiplication) between years of schooling and years of experience (i.e. S\*X); where the  $\beta_2$



coefficient of this term ( $S*X$ ) would indicate whether the slope of the experience-earnings profile depends on the level of education. Because human capital theory implies that those employees with higher levels of education are likely to be tending to seek for job opportunities with steep profiles. Therefore, the interaction term is expected to take a negative sign. When applying regression model-2 (Table 5.18) the results of the estimated regression model are as follows:

Table 5.18: Kuwaitis employee private RORE for Model-2; (testing the multiplication between years of schooling and years of experience).

Independent Variable	Dependant Variable (W)		
	Overall	Male	Female
Schooling	(model-1)		
	0.051 (267.794)	0.057 (383.334)	0.048 (384.065)
Schooling	(mode-2)		
	0.052 (-209.265)	0.055 (-144.010)	0.067 (-220.0302)
Schooling * Experience	-0.0003 (-18.00)	-0.0003 (-12.959)	-0.001 (-37.845)

Author's estimates

Note - Numbers in parentheses are t-statistics.

In model-2 as expected the negative sign showed for the coefficient of years of schooling and years of experience interaction term ( $S*X$ ) indicates a very small negative impact between years of schooling and years of experience. This interaction term allows the level of years of schooling to influence the slope of the earning-experience profile; the inclusion of the interaction term resulted in a very small increasing for the average of private RORE but further increase in the private RORE to schooling for female of up to 6.7 percent which indicate the significance influence of getting more years of both schooling and experience for female in case of Kuwait.

### 5.3.3 Discussion of Model-3 Results

The Expanded Mincerian function modified for the purpose of this study, in which log earnings are regressed on level of education, work experience, experience squared and different levels of

education attainment term is used. Since we intend to estimate the private rate of returns to different levels of education, the basic earnings equation becomes:

$$\ln Y_j = \alpha + \sum b_j D_j + \gamma_1 X_j + \gamma_2 X_j^2 + u_i \dots\dots\dots(\text{model.3})$$

where:

Ln Y: is natural log for wage (basic and social allowance in our research).

D: are Dummy variables presenting level of schooling.

X: is years of experience.

$\mu$ : is the random error that captures the other variables that have an impact on earnings, but unobservable factors that excluded from model.

From the above expanded earnings function, we can estimate the rate of return of investment in education after acquiring an additional qualification degree. This is given as:

$$r_j = \frac{b_j - b_{(j-1)}}{S_j} \dots\dots\dots(\text{eq.5})$$

where:

$r_j$ : is private rate of return.

$b_j$ : is Coefficient for the level of education.

$b_{(j-1)}$ : is Coefficient of the previous level of education.

$X_j$ : is years of experience.

The rate of return to the  $j$ th level of education ( $r_j$ ) is estimated by subtracting the coefficient of  $b_{j-1}$  from that of  $b_j$  and dividing by the number of years of schooling  $S$  at the  $j$ th level. Optimal investment decision-making would imply that one would invest in the  $S^{\text{th}}$  years of schooling if  $r > i$  ( the market rate of interest ).

Applying the regression model-3 resulted estimated regression model is as follows:

Estimation Equation:

=====

$$\text{LOG}(\text{BASIC}+\text{SOCIAL}) = \alpha + b_1 D_1 + b_2 D_2 + b_3 D_3 + b_4 D_4 + b_5 D_5 + b_6 D_6 + \gamma_1 X + \gamma_2 X^2$$

(Table 5.19) is a summary of the private rates of return to the different education level, which are derived from (Table 5.14).

Table 5.19: summarizes the comparison results of the expanded Mincerian earnings function model-3 between Kuwaitis employees and cross countries based on level of education.

Independent Variable	Private RORE (%)Overall	Private RORE (%)Male	Private RORE (%)Female
read and write only/Primary school (4 years)	45	45	48
Intermediate school (8 years)	4.1	4.9	2.7
High school (12 years)	4.7	4.4	7.1
Diploma degree (14 years)	4.1	4.9	2.7
Bachelor degree (16 years)	5.0	6.1	4.9
Post Graduate (> 18 years)	4.5	4.5	4.8

Source: Based on Table 5.14

The private RORE is highest for Primary (45%), then Bachelor (5%) and lowest for intermediate and Diploma education (4.1%). The highest Private RORE for male if Bachelor degree 6.1% whereas for female 7.1% if High school; suppose that because of the demand of labour market mostly the employer for female looking for high school qualification while for male looking for bachelor degree.

Table 5.20: Comparison of private RORE based on level of schooling in percentage (%).

Region	Private			Sources
	Primary	Secondary	Higher	
Asia*	20.0	15.8	18.2	<i>Psacharopoulos and Patrinos, (2004)</i>
Europe/Middle East/North Africa*	13.8	13.6	18.8	<i>Psacharopoulos and Patrinos, (2004)</i>
Latin America/Caribbean	26.6	17.0	19.5	<i>Psacharopoulos and Patrinos, (2004)</i>
OECD	13.4	11.3	11.6	<i>Psacharopoulos and Patrinos, (2004)</i>
Sub-Saharan Africa	37.6	24.6	27.8	<i>Psacharopoulos and Patrinos, (2004)</i>
World	26.6	17.0	19.0	<i>Psacharopoulos and Patrinos, (2004)</i>
Kuwait	45	4.7	5.0	<i>Alqattan,2010</i>

Source: figures computed from individual country estimates.

\* Non-OECD

The research results for estimating RORE by level of education based on the available dataset for case of Kuwait do not decline by level of education raise, it shown highest for primary education, and lowest for intermediate and diploma education. Whereas the general trend presented by Psacharopoulos, (1994) for the private RORE on level of education is to be highest for primary

followed by secondary and lowest for tertiary education. Therefore based on this evidence we reject the null hypothesis H5: The Private RORE is negatively correlated with the level of education.

Research results also showed that the highest rates of return for females were at high school level, whereas for males at bachelor degree level. There are several possible explanations for this finding. First, there aren't any differences in wages between “read and write” only and primary levels of employee qualifications. Second, the government pay scales are determined largely on the basis of the number of years of schooling with little consideration of the area of specialization. Third, the average education level of women in Kuwait is higher than that of men.

## **5.4 Summary**

This research discussed the origins and history of estimating of RORE depending on the Mincerian model, both the simpler version and an expanded model, which appears to give an approximate value for the private rate of return on education. Based on this, this study adapted three incrementally developed models that include three main variables that affect the RORE in Kuwait's case.

Kuwaiti workers had an average of 12.9 years of schooling and male workers had approximately the same average years of schooling; while female workers have 13.6 years of schooling, male workers have on average 3.2 years more than females for labour market experience (14.4 years to 11.2 years). When educational attainment is measured in years of schooling, the return to an additional year is found to be on average 4.8%. It is indisputable that for every Kuwaiti Dinar invested in education the individual enjoys on average about 4.8% in returns.

Female private RORE are significantly higher than male returns (5.7% compared with 5.1%). This finding agrees with the expectation that overall, the returns of female workers are higher than those of male workers. These empirical findings raise several important questions. One of the main questions is that although there is a high expenditure and investment in education in Kuwait, as it is indeed a case of High-Income petroleum country, it is still lagging behind the developed and some of the other developing countries. Also, even though the dataset has shown high average years of education in Kuwait, still it is not commensurate with productivity, particularly in the inflated public sector.

## **Chapter 6: Conclusions and Recommendations**

### **Introduction**

The use of private rate of return to investment is necessary for some individuals who have to decide about investing in education; it is also important for governments and policy makers who have to plan for resource allocation with limited resources. From an individual's point of view, the private rate of return can help conclude if an individual should continue with his/her education and to what level. From the state's point of view, investing based on rate of return to education allows government officials to efficiently allocate, manage and distribute resources among different levels and types of education.

As Psacharopoulos and others at the World Bank went on estimating RORE in various countries and became strong proponents of its importance and championed a rather exclusive reliance on RORE in policy formulation, researchers and policy makers from developing countries joined their critics and strong attacks been launched on the very importance or even usefulness of the method of RORE. But given the overall influence of the World Bank on developing countries, many governments felt pressurized to change their policies of investment in education, particularly by giving high priority to primary education at the cost of secondary and higher education. And it is notable that very few governments did so, due to lack of certainty on the relevance of the estimates of rates of return on education.

### **6.1 Contributions of the research**

Millions of people all over the world have found that earning an education degree has led them to a comfortable, middle-class lifestyle. As Kuwait has natural petroleum reserves and a wealth economy, it seeks to be one of developed countries, a high priority and focus is placed on the Kuwaiti education system for preparing a highly skilled workforce to meet the requirements of its national vision. This research endeavours to contribute to this, by way of providing decision makers with a useful tool for quantifying the benefits of 'years of education'. Thus the

contributions of this research are of two types: I- Contribution to methodology. II- Contribution to knowledge.

Type I: Contribution to methodology:

- Formulated 5 hypotheses based on the literature review.
- Investigation of application and appropriate uses of the Mincerian regression model.
- Examine critically previous work based on the Mincerian equation, such as by Psacharopoulos and others.
- Proposed a new framework model which applies Mincerian equation to different categories at different level of income.
- Proposed a new framework model which applies Mincerian equation to different categories at different level of education.

Type II: Contribution to knowledge:

- Contributed to knowledge about private RORE in the world, with a special focus on Kuwait as a case of high income petroleum based economy.
- Contributed to knowledge about private RORE for Kuwaiti individuals where they can either decide to continue their education further or stop.
- Contributed with new knowledge for governments around the world, demonstrating the importance of private RORE as a best practice for resource allocation decisions.
- Contributed with new knowledge about the uniqueness of high income developing countries with regard to estimating the private RORE.

## **6.2 Conclusions**

The research presented in this thesis analysed, in a quantitative way, the relationship between the main affecting variables that impact RORE estimation for Kuwaiti individuals to demonstrate a case of petroleum based economic countries. It was hoped that this would compel the ministries of finance to treat education with due respect in the matters of allocation of resources, rather than providing resources as a charity and/or on a residual basis, i.e., allocating to education the resources that remained after allocating to all other sectors.

The conceptual framework developed in this research is a continuation of past efforts of estimating RORE, where the researcher explained the relationships between the main variables/factors that influence the ROR on investment to education and suggested possible alternative solutions to research problems in the areas under discussion. Basic and expanded versions of RORE estimation methods have been developed to assist the top management in the field of human capital investment on education, and to help in monitoring the education system during the planning period. The framework proposed in this research was verified by implementing an empirical study to validate the modified models in the context of Kuwait, as a case of high-income petroleum based developing countries.

### **6.3 Policy Implementation and Recommendations on educational plan for Kuwait**

According to studies available in education economics, investment in education can be equated with investment in physical capital. In most developed industrial nations, the returns resulting from investment in education and physical capital tend to be similar.

In terms of policy implications, the rate of return to investment in education seems to be quite good in our case of Kuwait and found to have more advantages over some other investment types; moreover, with continuing government expenditure, student aid, grants and various other subsidies, education will remain a good private investment; also the risk connected with the investment in education is much smaller than other investments.

El-Erian, Helbling and Page (1998) and Ridha (1998) maintain that one of the major drawbacks present in education in the Arab region is that it concentrates more on the knowhow of different concepts rather than research, critical thinking and problem solving. According to them it's one of the main reasons why the labour class in the region is unable to enhance their output and contribute towards economic growth.

Governments such as Kuwait's are seeking to resolve the education problems with the allocation of human capital and a fixed payroll scale, but still the relationship between education and return

to education presents limited opportunities for a high skilled, educated worker to be able to find an appropriate working position, due to the lack of available and limited jobs offered by inefficient public sector. The chances that highly educated or skilled labour will be able to play a critical role in creating advanced technologies and improving the existing ones are greatly reduced because of government jobs are their only option where productivity is mostly low and the payroll system do not differentiated between the labours qualities and abilities. Therefore it can be concluded based on the results on private RORE by level of qualification that as compared to other countries the returns to education in Kuwait are low.

There are several possible explanations for the finding. First, there aren't any differences in wages between read and write only and Primary level of qualifications employees. Second, the government payroll scale is determined largely on the basis of the number of years of schooling with little consideration to the area of specialization or abilities. Third, the average education of women in Kuwait is higher than that of men. Fourth, public funding should be provided with the goal of improving the quality of education, instead of spreading the funding across multiple years for individuals of different age-groups as, in our case of Kuwait, 12 years for male and 14 years for female.

Kuwait spending on education sector is approximately the same as or more than the spending of developed countries, but still the rate of return to education lags behind the developed countries. This possibly due to a mismatch between demand and supply for labour, and if supply continues to exceed demand we would expect the rates of return to fall further in the future.

Looking at the results of the RORE based on level of education, we find that returns to education in Kuwait are low in comparison with developed countries; and for this reason we believe that the Kuwaiti government has to present a new paradigm and reform for education system which focuses more on competition, high educational standard and service quality. Implementing a high quality educational system implies at every state level a lot of funding therefore, in fact the governments cannot afford sufficient resources for foundation education, there should be more concern for increasing the role of public and private donors, Kuwait has to determine the proper distribution of funds between the various levels of education giving priority to low and middle



levels of education since students in the higher levels are able mostly to fund their education, making subsidies unnecessary, since students completing advanced level of education will have a greater chance of earning high wages.

Upon deciding on the level of education, financing policy decision-makers should take into consideration the fact that investing in the human resource could have a great contribution to the increase of productivity, development and progress as a whole. The well-educated human resource may make the difference in the way a country or an organization functions, since human resource investments significantly contribute to productivity growth and constitute the linkage of investments at microeconomic and social level.

An efficient and productive way to fund higher education may be to finance student loans. Providing student loans can be an effective method as they force the student to work harder and major in areas which lead to better earnings so that their loan can be paid off; more quickly/easily. Also with higher wages the employee will be able to fund any future education or training themselves without having to rely on government funding or loans.

Finally, the findings of this study have shown that more work needs to be done in support of reforming education system in Kuwait, by adapting a comprehensive long-term development framework within the context of education reform for improving the education efficiency, by developing monitoring indicators and attracting/increasing the participation of the private sector in the funding and delivery of education services.

## **6.4 Study Limitations**

However, the method of rate of return has not been free from criticism. The method has been the subject of severe criticism on the grounds that it assumes differences in productivity of people are reflected in their earnings; also the most important weakness of the method that still remains unaddressed relates to the incapability of the method to account for non-economic benefits; it simply considers the earnings of the individuals', pre-tax earnings as the total social benefits; and

post-tax earnings as private (or individual) benefits. The criticism becomes stronger and more valid in the case of social rate of return, which is not a true social rate of return, as the social rate of return is also confined to considering earnings, that is pre-tax earnings of the individuals, and does not consider any non-economic benefits (e.g. social, political, cultural, health, crimes, etc.), that accrue to the society as a whole and which are generally referred to as externalities or spill-over in education. Though many economists of education do take note of the externalities, these externalities are rarely brought into the estimation of rate of return, basically because they are not measurable with any acceptable level of accuracy. As the externalities cannot be captured in the estimation, the efficiency of the principle of the rate of return is restricted in resource allocation.

Another major issue arising in estimating the RORE is the impact of any ability biases on the findings. In the RORE literature, the usual concern is that education is an endogenous variable, positively correlated with the earnings residual due to unobserved ability. It is also possible that there is heterogeneity in the returns to education at given levels of education, and that unobserved ability is correlated with the returns (see e.g. Belzil, 2004). However, many US studies, as summarised by Card (1999 and 2001), show that ability biases to estimates of the return to education are not large. For our purposes, we are not concerned with whether or not the average returns to education are biased up or biased down, because our data set consists of employees in the public sector, and so self-selection based on unobserved factors into the sector not exist; also Kuwait government build their salary scale based on level of education which means the data do not reflect employee ability or productivity.

Finally, in conclusion, there are some major methodological problems relating to rates-of-return estimation studies. First, the results may not be reliable predictors of the future because they are based on past conditions. Second, most studies in the literature use cross-sectional data instead of time-series data. Third, the majority of RORE studies ignore some variables; for instance, the school quality, family background and ability. Fourth, most studies ignore significant non-economic benefits of education. Fifth, the assumption that the labour market is perfectly competitive is unlikely to be true in developing countries where governments are major employers. Sixth, the Earnings model (Mincerian model) does not take into account the historical data beyond S-1 (i.e. does not consider S-2, S-3, etc.).

## **6.5 Recommendation for Future Researches in the Area of Economics of Education**

At the end, one needs also to consider the relationship between micro and macro-economic evidence of the returns of education (see, for example, Pritchett 1996; and Psacharopoulos, 2006 and Krueger and Lindahl, 1998 for a different perspective). There are various other studies that can be conducted, as pointed out above, for example to conduct a study on the macro- and social benefits of schooling; or to attempt to describe some common variables for example: school quality, family background, and ability; or to conduct twin and sibling studies, which will contribute to this field of research significantly. Basically through such comparisons the return to education can be isolated from the influence of family background and ability. It will also be useful to try to analyse and describe the relationship between education and growth and the influence of education in choosing employment sectors after schooling. Finally, it could be useful to estimate RORE using Life Paths or similar simulation models.

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## **Appendixes:**

A.1

**APPENDIX Classification of economies by region and income, fiscal 2010**

East Asia and Pacific		Latin America and the Caribbean		South Asia		High-income OECD economies	
American Samoa	UMC	Argentina	LIC	Afghanistan	LIC	Australia	LIC
Cambodia	LIC	Belize	UMC	Bangladesh	LIC	Austria	LIC
China	LMC	Bolivia	LMC	Bhutan	LMC	Belgium	LMC
Fiji	UMC	Brazil	UMC	India	LMC	Canada	LIC
Indonesia	LMC	Chile	UMC	Maldives	LMC	Czech Republic	LMC
Kiribati	LMC	Colombia	UMC	Nepal	LIC	Denmark	LMC
Korea, Dem. People's Rep.	LIC	Costa Rica	UMC	Pakistan	LMC	Finland	LMC
Lao PDR	LIC	Cuba	UMC	Sri Lanka	LMC	France	LMC
Malaysia	UMC	Dominica	UMC	<b>Sub-Saharan Africa</b>		Germany	LMC
Marshall Islands	LMC	Dominican Republic	UMC	Angola	LMC	Greece	LIC
Micronesia, Fed. Sts.	LMC	Ecuador	LMC	Benin	LIC	Hungary	LIC
Mongolia	LMC	El Salvador	LMC	Botswana	UMC	Iceland	UMC
Myanmar	LIC	Grenada	UMC	Burkina Faso	LIC	Ireland	LIC
Palau	UMC	Guatemala	LMC	Burundi	LIC	Italy	LIC
Papua New Guinea	LMC	Guyana	LMC	Cameroon	LMC	Japan	LMC
Philippines	LMC	Haiti	LIC	Cape Verde	LMC	Korea, Rep.	LMC
Samoa	LMC	Honduras	LMC	Central African Republic	LIC	Luxembourg	LMC
Solomon Islands	LMC	Jamaica	UMC	Chad	LIC	Netherlands	LIC
Thailand	LMC	Mexico	UMC	Comoros	LIC	New Zealand	LIC
Timor-Leste	LMC	Nicaragua	LMC	Congo, Dem. Rep.	LIC	Norway	LIC
Tonga	LMC	Panama	UMC	Congo, Rep.	LMC	Portugal	LIC
Vanuatu	LMC	Paraguay	LMC	Côte d'Ivoire	LMC	Slovak Republic	LMC
Vietnam	LIC	Peru	UMC	Eritrea	LIC	Spain	LIC
<b>Europe and Central Asia</b>		St. Kitts and Nevis	UMC	Ethiopia	LIC	Sweden	LIC
Albania	LMC	St. Lucia	UMC	Gabon	UMC	Switzerland	LIC
Armenia	LMC	St. Vincent and the Grenadines	UMC	Gambia, The	LIC	United Kingdom	LIC
Azerbaijan	LMC	Suriname	UMC	Ghana	LIC	United States	LIC
Belarus	UMC	Uruguay	UMC	Guinea	LIC	<b>Other high-income economies</b>	
Bosnia and Herzegovina	UMC	Venezuela, R. B. de	UMC	Guinea-Bissau	LIC	Andorra	LIC
Bulgaria	UMC	<b>Middle East and North Africa</b>		Kenya	LIC	Antigua and Barbuda	LIC
Georgia	LMC	Algeria	UMC	Lesotho	LMC	Aruba	LIC
Kazakhstan	UMC	Djibouti	LMC	Liberia	LIC	Bahamas, The	LIC
Kosovo	LMC	Egypt, Arab Rep.	LMC	Madagascar	LIC	Bahrain	LIC
Kyrgyz Republic	LIC	Iran, Islamic Rep.	LMC	Malawi	LIC	Barbados	LIC
Latvia	UMC	Iraq	LMC	Mali	LIC	Bermuda	UMC
Lithuania	UMC	Jordan	LMC	Mauritania	LIC	Brunei Darussalam	UMC
Macedonia, FYR	UMC	Lebanon	UMC	Mauritius	UMC	Cayman Islands	LIC
Moldova	LMC	Libya	UMC	Mayotte	UMC	Channel Islands	LIC
Montenegro	UMC	Morocco	LMC	Mozambique	UMC	Croatia	LIC
Poland	UMC	Syrian Arab Rep.	LMC	Namibia	UMC	Cyprus	LMC
Romania	UMC	Tunisia	LMC	Niger	LIC	Equatorial Guinea	LIC
Russian Federation	UMC	West Bank and Gaza	LMC	Nigeria	LMC	Estonia	LIC
Serbia	UMC	Yemen, Rep.	LIC	Rwanda	LIC	Faeroe Islands	LIC
Tajikistan	LIC			São Tomé and Príncipe	LMC	French Polynesia	UMC
Turkey	UMC			Senegal	LIC	Greenland	LIC
Turkmenistan	LMC			Seychelles	UMC	Guam	LIC
Ukraine	LMC			Sierra Leone	LIC	Hong Kong, China	LMC
Uzbekistan	LIC			Somalia	LIC	Isle of Man	LMC
				South Africa	UMC	Israel	LMC
				Sudan	LMC	Kuwait	LIC
				Swaziland	LMC	Liechtenstein	LIC
				Tanzania	LIC	Macao, China	LIC
				Togo	LIC	Malta	LIC
				Uganda	LIC	Monaco	LIC
				Zambia	LIC	Netherlands Antilles	LIC
				Zimbabwe	LIC	New Caledonia	LIC
						Northern Mariana Islands	LIC
						Oman	LIC
						Puerto Rico	LIC
						Qatar	LIC
						San Marino	LIC
						Saudi Arabia	LIC
						Singapore	LIC
						Slovenia	LIC
						Taiwan, China	LIC
						Trinidad and Tobago	LIC
						United Arab Emirates	LIC
						Virgin Islands (U.S.)	LIC

Source: World Bank data.

Note: This table classifies all World Bank member economies and all other economies with populations of more than 30,000. Economies are divided among income groups according to 2008 GNI per capita, calculated using the World Bank Atlas method. The groups are low income (LIC), \$975 or less; lower middle income (LMC), \$976–3,855; upper middle income (UMC), \$3,856–11,905; and high income, \$11,906 or more.

**A.2**

**Table of grades, salaries and social allowance categories (Kuwaiti / non-Kuwaiti)**

Representation	Minimum stay	Children Allowance for	Cost of living	Social Allowance	Leaders award	Monthly salary (basic) And increments	Class / Group
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allowance	in class	Kuwaitis	Non-Kuwaiti	Kuwaiti	Non-Kuwaiti			Kuwaiti			Last bound	Bid increment	The number of increments	First bound			
					Married	Married	Single	Married	Married	Single							
660													1650		1650	Minister	
		Fifty K.D. Monthly Up to (7) Children only														Group leadership positions	
231			50	120			448		1500	690				790		Excellent degree	
204							425		1000	780	16	Five bonuses		700		Undersecretary of the Ministry	
174							400		670	680	16			600		Assistant Deputy Minister	
75	Four years																Public Group
66	Two years		50	120	82	368	268			580	12	Five bonuses		520		Grade (A)	
58.5			82	353	253				520	12	460		Grade (B)				
			75	328	235				460	10	410		First Grade				
			75	315	222				410	10	360		Second Grade				
			69	219	203				360	10	310		Third Grade				
		69	278	190				310	10	260	Fourth Grade						
		63	250	169				240	8	200	Fifth Grade						
		63	242	161				200	7	165	Sixth Grade						
		57	222	147				165	6	135	Seventh Grade						
		57	219	141				135	5	110	Eighth Grade						
																Group Professional assistance	
	Five years	50	120	50	282	189			295	7	Ten bonuses		225		First Grade		
				44	255	167			225	6		225	Second Grade				
				38	135	154			165	5		Five bonuses	140	Third Grade			
				38	230	149			140	4			120	Fourth Grade			
				32	215	140			120	3			105	Fifth Grade			
				32	211	136			105	3			90	Sixth Grade			
	Two years															Group Assistant jobs	
		50	120	44	253	165			210	5	Ten bonuses		160		First Grade		
		38	230	149			160	4	120	Second Grade							
	32	211	136			120	3	90	Third Grade								

- Note: In addition to the above gives the employee the Kuwaiti increase in salary (50d. k) per month with effect from 1/7/2005 the disposal of item type bonuses, allowances, bonuses and other allowances in implementation of the Council of Ministers Decision No. (698/2005) on 2 / 7 / 2005, provided that it has not granted any allowance or increase the cadre during the five years preceding the issuance of the decision (i.e. from 01.07.2000 to 07.01.2005) and by grants from increasing the transfer of this amount gives the difference.
- According to Law No. (27/2008) and the Council of Ministers Resolution No. (606 for the year 2008) and to mainstream the SAI No. (49/2008) gives the employee the Kuwaiti reward financial support terms that are net salary (1000 d. k) and maximum (50 d. k) per month with effect from 08.28.2008.

A.3

Consumer price index (2005 = 100)

Country Name	2002	2003	2004	2005	2006	2007	2008	2009	2010
Kuwait	93.93	94.84	96.02	100.00	103.06	108.71	120.21	124.99	130.01

Source: World Bank Report (World Development Indicators & Global Development Finance), 2010

Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

#### A.4

Public current expenditure and capital on the educational affairs and services and by functional classification according to major groups during the period (2005/2006-2006/2007)(Value in Million KD)

Economic and Functional classification	Current expenditure					Capital expenditure and the purchase of land			Total	
	Compensation of employees	Other procurement of goods and services	Subsidies	Other current transfers		Total current expenditure	Construction projects, plant and equipment	Capital transfers		Total capital expenditure
				Local	Foreign					
<b>2005 / 2006</b>										
<b>Education affairs and services:</b>										
Pre-primary (kindergarten)	53.40	2.49	0.00	0.00	0.00	<u>55.89</u>	0.29	0.00	<u>0.29</u>	<u>56.18</u>
Primary education	131.84	2.42	0.00	0.00	0.00	<u>134.26</u>	0.35	0.00	<u>0.35</u>	<u>134.61</u>
Intermediate education	118.18	3.23	0.00	0.00	0.00	<u>121.41</u>	0.35	0.00	<u>0.35</u>	<u>121.76</u>
Secondary education	111.88	4.64	0.00	0.00	0.00	<u>116.52</u>	0.38	0.00	<u>0.38</u>	<u>116.90</u>
University education and in form	160.15	28.67	0.00	0.00	0.00	<u>188.82</u>	34.19	0.00	<u>34.19</u>	<u>223.01</u>
Other educational services (not classified elsewhere)	79.69	10.10	0.00	64.51	0.00	<u>154.30</u>	51.29	0.00	<u>51.29</u>	<u>205.59</u>
<b>Total</b>	<b><u>655.14</u></b>	<b><u>51.55</u></b>	<b><u>0.00</u></b>	<b><u>64.51</u></b>	<b><u>0.00</u></b>	<b><u>771.20</u></b>	<b><u>86.85</u></b>	<b><u>0.00</u></b>	<b><u>86.85</u></b>	<b><u>858.05</u></b>
<b>Total general government spending and the current capitalist</b>	<b><u>2557.11</u></b>	<b><u>1065.10</u></b>	<b><u>50.07</u></b>	<b><u>1308.31</u></b>	<b><u>108.42</u></b>	<b><u>5089.01</u></b>	<b><u>576.33</u></b>	<b><u>435.38</u></b>	<b><u>1011.71</u></b>	<b><u>6100.72</u></b>
<b>2006 / 2007</b>										
<b>Education affairs and services:</b>										
Pre-primary (kindergarten)	66.79	2.45	0.00	0.00	0.00	<u>69.24</u>	0.33	0.00	<u>0.33</u>	<u>69.57</u>
Primary education	170.20	3.49	0.00	0.00	0.00	<u>173.69</u>	0.38	0.00	<u>0.38</u>	<u>174.07</u>
Intermediate education	143.07	3.77	0.00	0.00	0.00	<u>146.84</u>	0.45	0.00	<u>0.45</u>	<u>147.29</u>
Secondary education	125.21	5.03	0.00	0.00	0.00	<u>130.24</u>	0.14	0.00	<u>0.14</u>	<u>130.38</u>
University education and in form	181.48	31.91	0.00	0.00	0.00	<u>213.39</u>	44.98	0.00	<u>44.98</u>	<u>258.37</u>
Other educational services (not classified elsewhere)	105.96	12.32	0.00	78.12	0.02	<u>196.42</u>	60.03	0.00	<u>60.03</u>	<u>256.45</u>
<b>Total</b>	<b><u>792.71</u></b>	<b><u>58.97</u></b>	<b><u>0.00</u></b>	<b><u>78.12</u></b>	<b><u>0.02</u></b>	<b><u>929.82</u></b>	<b><u>106.31</u></b>	<b><u>0.00</u></b>	<b><u>106.31</u></b>	<b><u>1036.13</u></b>
<b>Total general government spending and the current capitalist</b>	<b><u>2868.39</u></b>	<b><u>1206.70</u></b>	<b><u>65.88</u></b>	<b><u>2140.72</u></b>	<b><u>129.16</u></b>	<b><u>6410.85</u></b>	<b><u>604.06</u></b>	<b><u>678.00</u></b>	<b><u>1282.06</u></b>	<b><u>7692.91</u></b>

Source: Kuwait General Secretariat of the Supreme Council for Planning and Development, 2010

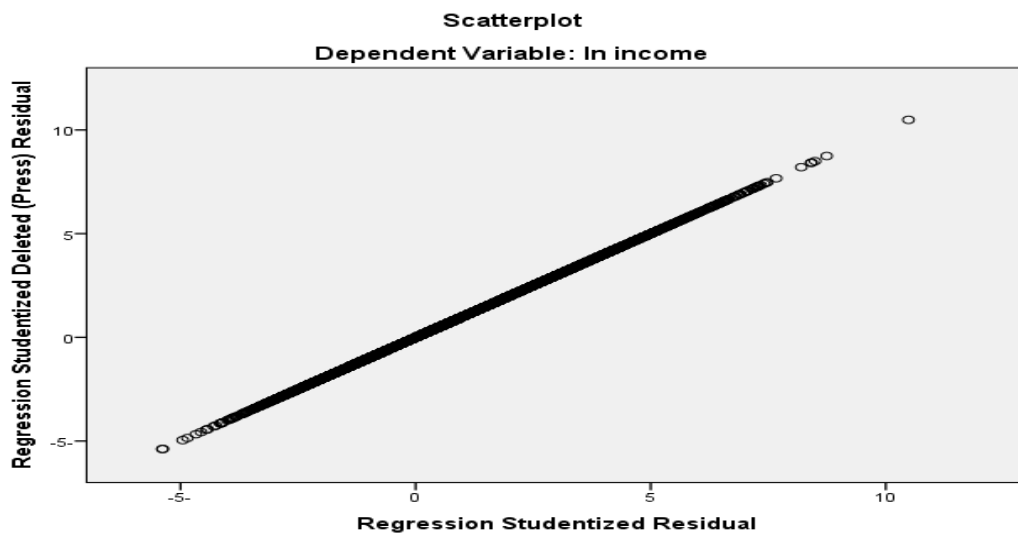
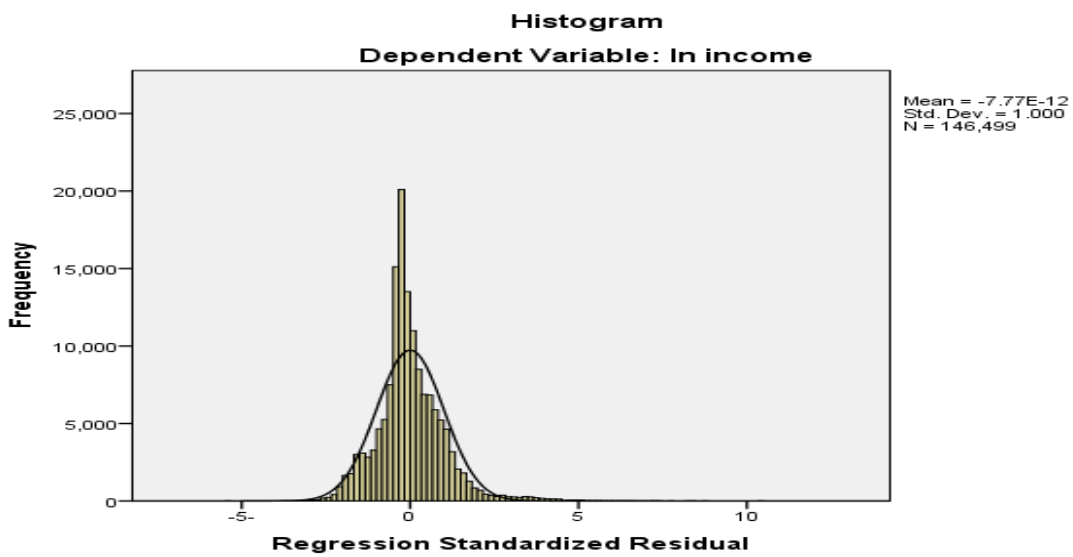
A.5

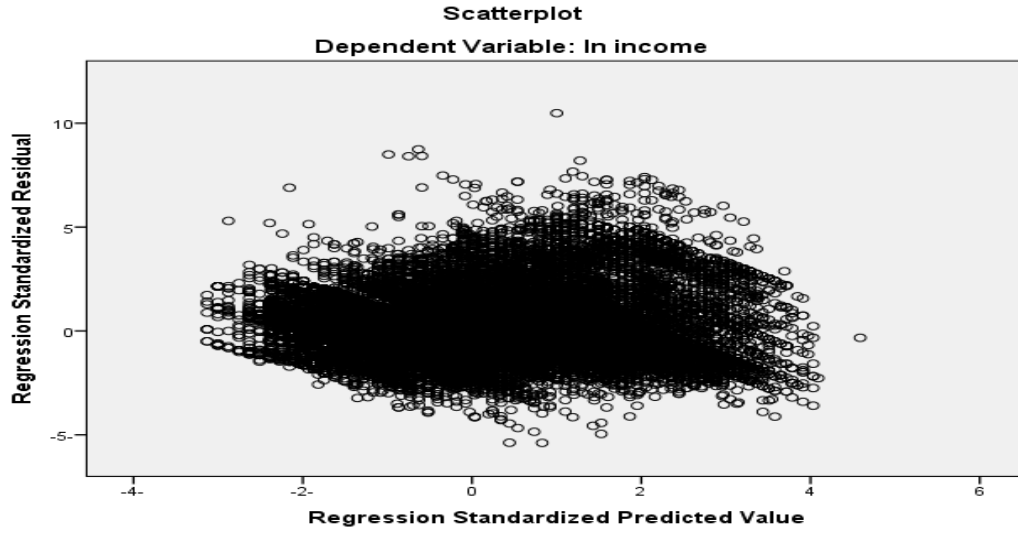
1- Frequencies for the Kuwaitis employees' dataset

**Gender**

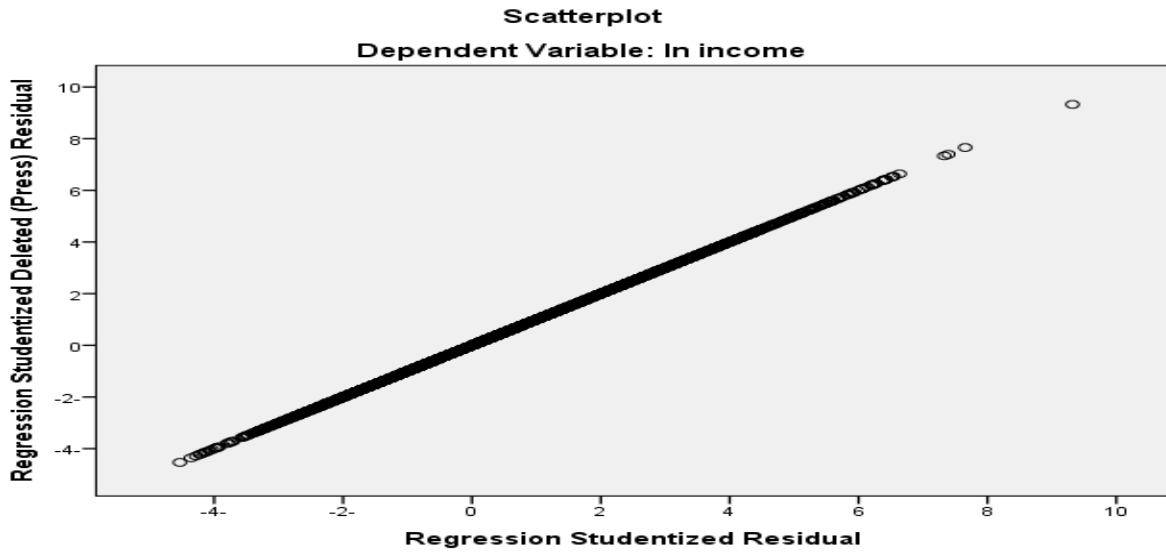
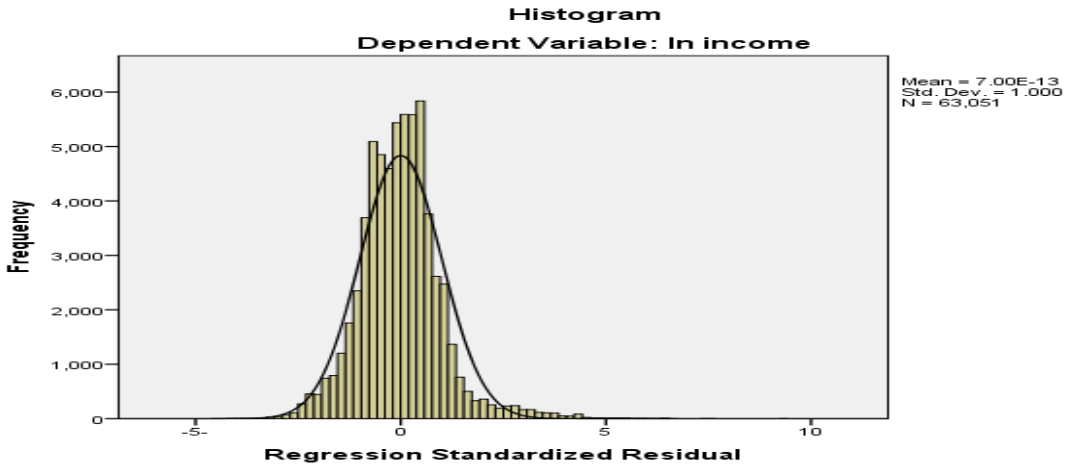
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid female	83448	57.0	57.0	57.0
Valid male	63051	43.0	43.0	100.0
Total	146499	100.0	100.0	

2- Charts presenting some statistics for Kuwaitis public sector labour force

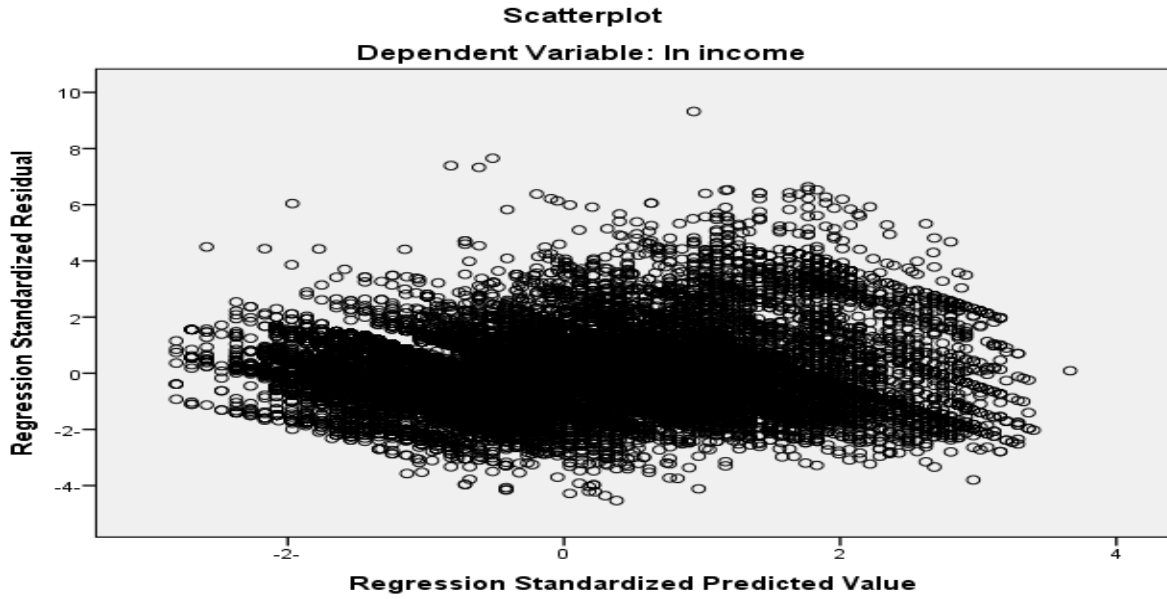




3- Charts presenting some statistics for Kuwaitis male employee in public sector labour force







- 4- Charts presenting some statistics for Kuwaitis female employee in public sector labour force

