

**HUMAN CAPITAL THEORY AND THE FINANCING OF HIGHER
EDUCATION IN OMAN**

Amur Sultan Al-hajry

**A thesis submitted for the degree of Doctor of Philosophy in the
Department of Economics, the University of Sheffield.**

January 2002

Abstract

The current and future level of demand for higher education in Oman far outweighs the ability of the economy to satisfy it under current financing arrangements. Oman's economy is based on oil and thus there is no guarantee that it will be able to sustain the current level of resourcing for higher education in the future. About half of the population is under the age of 15 and therefore future demand is likely to grow rapidly and the option of buying higher education abroad becomes less attractive in these circumstances. The economy needs an educated workforce in order to grow and to maintain its position in the modern world, not least if it is to cease to rely on expatriate professionals and to expand education in general. Reliance on foreign governments for higher education leaves Oman vulnerable to foreign education policies and to the vagaries of the foreign exchange markets. The Omani Government has responded to these problems by founding the first university in Oman and by encouraging private higher education. However, thought also needs to be given to the nature of funding arrangements.

The main aim of this research is to review alternative funding mechanisms for the future development of higher education by evaluating and analyzing social and private rates of return to investment. The study is based on the human capital concept which views education as a form of economic investment. The main motive assumed for public and private investments is the expectation of higher returns (benefits). Cost-benefit and rates of return analysis are used in order to achieve an efficient utilization of resources. To achieve maximum benefits it is also necessary for the system to be equitable, i.e. to maximize access to higher education irrespective of income and social class. .

The results indicate that the public cost of higher education in Oman is much higher than the cost to the individual. This is explained by the fact that most of the direct cost in public higher education (the Sultan Qaboos University) is fully subsidized by the Government, and that individual students do not incur any direct cost. Consequently, the estimates of

public rates of return to investment are low in comparison to the private rates. Accordingly, the allocation of additional public resources for higher education is not justified economically, and a form of private (contribution) towards the cost of education is required to reduce public cost and improve social rates of return.

A practical mechanism to enable individual students to contribute towards the cost of their education without affecting their access to higher education has to be established. After analyzing and evaluating several policy instruments, it was found that the most appropriate mechanism of funding would be to recover the cost of education by deducting from the individual's income after graduation and during the first twenty years of employment. This might be seen as a first step towards a graduate income tax method of funding. It is emphasized that the funding of higher education is a complex business which is not susceptible to solution by using a single policy instrument. The present analysis should be seen as a first step towards achieving a different approach to the funding of higher education in Oman.

Acknowledgements

I would like to thank many people and institutions in my beloved Country, the Sultanate of Oman, and here at the University of Sheffield for their generous help to me and valuable contributions to my research. They are many and I am forever grateful to all of them.

First, I am very grateful to my supervisor, Professor R K Wilkinson, Professor of Economics at Sheffield University for his excellent supervision. His wisdom, knowledge, and kindness were an inspiration to me. He started advising and guiding me before I formally start this research and he was with me all the way. Without his constructive comments and excellent support, and continuous encouragement and motivations I would not be able to complete this work. He gave me a lot of his time and contributed so much to my knowledge. I thank him very much and I will always have every respect for him. I also appreciate all the help and support I received from staff and colleagues at the Department of Economics at Sheffield University, especially those who advised me and commented on my work which I presented three times in the Department. Personal thanks are dedicated to my friend Dr Ishaq Yussof from Malaysia who came to do his PhD at the same time as me and in a similar subject. The discussions I had with him on our work and his useful comments and advices were of great support to me.

My Special thanks are dedicated to His Majesty Sultan Qaboos bin Said the Sultan of Oman who gave me the chance to go to schools and universities free of charge. Without him I would not be able to read and write. I also thank His Excellency Dr Yahya bin Mahfood Al-Manthary the Minister of Higher Education in Oman and His Excellency Shaik Salim bin Mustahail Al-Mashani the Advisor in the Diwan of the Royal Court for their great help and support to me with all means.

My appreciation goes to all my colleagues and friends at work at the Ministry of Higher Education in Oman for their valuable support and encouragement to me to complete this research. I also thank the staff at the Sultan Qaboos University and the Ministry of Civil Service who provided me with the data I needed in my empirical study.

My deepest gratefulness is to my dear Mother Raya bint Hilal Al-hajry and my dear father Sultan bin Amur Al-hajry who worked hard and struggled and suffered a lot to give me everything I want and to show me the best examples in this life. I also thank my brother Salim and my sisters Najeyah, Yasah, and Salmah for their family support and motivations to me.

I dedicate this work to my beloved wife Samirah bint Salim Al-hajry and my adored children Abdullah, Mohammad, and Ali. They motivated and inspired me to do this work. They suffered a lot while I was away for moths at Sheffield University and they struggled by themselves to face all the daily problems. I love them, I thank them, I respect them a lot, and I dedicate this study to them.

<i>Abstract</i>	<i>i</i>
<i>Acknowledgement</i>	<i>iii</i>
<i>Table of contentes</i>	<i>iv</i>
<i>list of tables</i>	<i>x</i>
<i>list of figures</i>	<i>xii</i>
<i>Abriviations</i>	<i>xiii</i>

Table of contents Page number

CHAPTER ONE

THE RESEARCH BACKGROUND

1.1.Introduction.....	1
1.2. The need for this research and its objectives	4
1.3. Theoretical framework.....	8
1.4. The empirical analysis	11
1.5. The contributions and limitations of this research.....	12
1.6. Conclusions.....	14

CHAPTER TWO

THE SOCIO-ECONOMIC DEVELOPMENT OF OMAN

2.1. Introduction.....	16
2.2. Socio- economic indicators.....	17
2.3. Population, education and training, and employment.....	22
2.3.1. Population structure.....	22
2.3.2 Education and training.....	27
2.3.3. Employment and the labour market.....	29
2.4. Public finance	36
2.5. Oil production and export	40
2.6. Conclusions.....	43

CHAPTER THREE

THE DEVELOPMENT OF HIGHER EDUCATION IN OMAN

3.1. Introduction.....	46
3.2. The development of higher education in Oman.....	47
3.2.1. The current system of higher education	47
3.3. The Institutional structure	51
3.3.1. The Higher Education Council.....	52
3.3.2. The second and third levels.....	55
3.3.2.1. Scholarships.....	67
3.3.2.2. The Sultan Qaboos University.....	68
3.3.2.3. The Colleges of Education	69
3.3.2.4. The College of Sharia and Law	60
3.3.2.5. The Industrial Technical Colleges.....	60
3.3.2.6. The Health Institutes.....	61
3.3.2.7. The Institute of Banking and Financial Studies.....	61
3.3.2.8. The private colleges	62
3.4. Conclusions.....	64

CHAPTER FOUR

THE MARKET FOR HIGHER EDUCATION IN OMAN

4.1. Introduction.....	65
4.2. The Demand for higher education	66
4.3. The capacity of the higher education system	69
4.4. International comparisons	72
4.5. Different scenarios for future development.....	74
4.6. Other influences on the supply and demand	77
4.7. Conclusions.....	80

CHAPTER FIVE

THE DEVELOPMENT OF THE HUMAN CAPITAL APPROACH TO EDUCATION

5.1. Introduction.....	82
5.2. Historical origins	83
5.3. Modern developments	85
5.4. Education as an investment	89
5.4.1. Private and public investment in higher education	92
5.4.1.1. Private investment in higher education.....	94
5.4.1.2. Public investment in higher education	97
5.4.2. Higher education and economic growth	101
5.4.3. Externalities and spillovers	106
5.4.3.1. Education and income distribution.....	108
5.4.3.2. Other spillovers.....	109
5.5. Conclusions.....	111

CHAPTER SIX

COST-BENEFIT ANALYSIS AND RATES OF RETURN TO INVESTMENT IN HIGHER EDUCATION

6.1. Introduction.....	113
6.2. The definitions and functions of cost-benefit analysis	113
6.3. Estimation procedures for rates of return	116
6.3.1. Measuring the costs of education.....	119
6.3.2. Measuring the benefits of education.....	122
6.4. Rates of return analysis and educational investment	124
6.5. The weaknesses of rates of return analysis	128
6.5.1. The effect of consumption benefits of education	129
6.5.2. The effect of externalities and spillovers.....	129
6.5.3. The effect of the screening and filtering hypothesis	130
6.5.4. The link between education and productivity.....	131
6.5.5. The link between productivity and earnings.....	132
6.6. The advantages of using rates of return analysis	133

6.7. Conclusions.....	134
-----------------------	-----

CHAPTER SEVEN

THE FINANCE OF HIGHER EDUCATION INVESTMENT

7.1. Introduction.....	135
7.2. Present trends of financing higher education	135
7.3. The public and private financing of higher education	138
7.4. Funding sources and mechanisms.....	143
7.4.1. Government funding mechanisms.....	145
7.4.1.1. Funding by negotiated budgets	147
7.4.1.2. Input funding.....	149
7.4.1.3. Output funding.....	152
7.4.1.4. Student based funding.....	152
7.5. Conclusion.....	154

CHAPTER EIGHT

THE ESTIMATED COST OF HIGHER EDUCATION IN OMAN

8.1. Introduction.....	156
8.2. Cost estimates and data sources	157
8.2.1. Estimates of private cost	159
8.2.1.1. Direct private cost.....	159
8.2.1.2. Indirect private cost	160
8.2.2. Estimates of social cost.....	162
8.2.2.1. Direct social cost	163
8.2.2.2. Indirect social cost.....	170
8.2.2.3. Total social cost.....	170
8.3. International comparisons of the cost of higher education.....	171
8.3.1. International comparisons of private cost	171
8.3.2. International comparisons of public cost.....	173
8.4. Conclusions.....	176

CHAPTER NINE

ESTIMATES OF RATES OF RETURN TO HIGHER EDUCATION IN OMAN

9.1. Introduction.....	178
9.2. Data sources and reliability	178
9.2.1. Direct public cost	178
9.2.2. Indirect costs: private and public	179
9.2.3. Direct benefits: private and public	180
9.2.4. Civil Service incomes as a representative of other occupations	180
9.3. Estimation method.....	181
9.3.1. The internal rate of return	182
9.3.1.1. Private internal rates of return	183
9.3.1.2. Social internal rate of return	185
9.4. Other influences on rates of return	185
9.4.1 Internal factors.....	186
9.4.2. External factors	188
9.5. The results.....	190
9.5.1 Private rates of return	193
9.5.2. Social rates of return	195
9.5.3. Comparison with other countries	196
9.6. Non monetary benefits	198
9.7. Conclusions.....	199

CHAPTER TEN

ALTERNATIVE POLICY OPTIONS

10.1. Introduction.....	202
10.2. Public investment in higher education	204
10.3. Sources of higher education funding	206
10.4. Funding mechanisms for higher education.....	208

10.5. Policy instruments and options for Oman.....	208
10.6. Analysis and evaluation of policy options	212
10.6.1. Policy (A): the current situation.....	214
10.6.2. Policy (B): the introduction of 2000 Omani Rials annual fees..	216
10.6.3. Policy (C): direct student subsidies.....	217
10.6.4. Policy (D): interest free loans	218
10.6.5. Policy (E): cost repayment based on 5 per cent of total cost.....	
deducted annually graduate income.....	221
10.7. Conclusion.....	223

CHAPTER ELEVEN

SUMMARY, FINDINGS, AND RECOMMONDATIONS

11.1. Introduction.....	227
11.2. Summary of the research	227
11.3. Main findings	232
11.4. Policy recommendations	233
11.5. Future research	234
Bibliographic References	236
Appendixes to Chapter 4.....	252
Appendixes to Chapter 8.....	257
Appendixes to Chapter 9.....	268
Appendixes to Chapter 10.....	285

List of Tables	Page
.....	
Table 2-1: Main social indicators (1970- 1999)	18
Table 2-2: Main economic indicators (1970- 1999)	19
Table 2-3: Enrolment in different levels of education in Oman, 1993	20
Table 2-4: The annual budget deficit in Oman 1991-1999.....	21
Table (2-5): Estimates of the Omani population in 1971	23
Table 2-6: Estimated age structure for Omani population in 1971.....	23
Table 2-7: Population of Oman by region and origin in 1993.....	25
Table 2-8: Age structure of the Omani population, 1993	26
Table 2-9: Number of students in Oman by level of education in 1972/73	27
Table 2-10: Public expenditures on education in Oman in 1972	28
Table 2-11: Development of Oman's education system, 1973-1999.....	29
Table 2-12: The distribution of active labour force in Oman in 1974	30
Table 2-13: Occupational distribution of the Omani labour force in 1974 .	30
Table 2-14: The distribution of the labour force in Oman in 1993.....	32
Table 2-15: Occupational distribution of the labour force in Oman, 1993.	33
Table 2-16: Estimated labour market requirements in the year 2020	34
Table 2-17: Public revenues and expenditures	37
Table 2-18: The main components of public revenues and expenditures	38
Table 2-19: The structure of Government expenditures	39
Table 2-20: Government expenditures	41
Table 2-21: Oman's oil production, prices and proved reserves.....	42
Table 3-1: General secondary school graduates in Oman	57
Table 3-2: Student enrolment in higher education institutions.....	58
Table 4-1: Students enrollment in public education in Oman	71
Table 4-2: Annual admission to higher education.....	72
Table 4-3: Enrollment in tertiary education in some countries.....	73
Table 4-4: The impact of admission on graduate supply and demand	76

Table 7-1: Real public expenditures and enrolment higher education	137
Table 7-2: Student enrolment and expenditures in Arab universities	138
Table 7-3: Allocating public resources for higher education	147
Table 8-1: Annual wages for secondary school graduates in Oman	161
Table 8-2: Estimated income-foregone by Omani students	162
Table 8-3: Direct social cost per student in higher education in Oman	164
Table 8-4: Average public expenditures at SQU by department of common services	165
Table 8-5: Average public expenditures by academic department	166
Table 8-6: Students enrolled at SQU	166
Table 8-7: Direct public cost of higher education in Oman	168
Table 8-8: Total social cost of higher education in Oman	171
Table 8-9: Average private cost of higher education in Oman, Iraq, and Malaysia	172
Table 8-10: Higher education expenditures in some selected industrial countries	174
Table 8-11: Higher education expenditures in the Arab Countries	175
Table 9-1: Sample size of Omani graduates in the Civil Service	182
Table 9-2: Simple Linear regression equations used to estimate expected income	184
Table 9-12: Private and social internal rates of return to investment in higher education in Oman	194
Table 9-13: Rates of return to investment in higher education, regional averages	197
Table 9-14: Rates of return to investment in higher education in Some Asian countries	198
Table 10-1: Estimated rates of return to investment in higher education in Oman under different methods of funding	213

Lisat of Figures	Page number
Figure 2-a: The Structure of general education in Oman	48
Figure 2-b: The structure of basic education in Oman	49
Figure 2-c: The institutional structure of higher education in Oman	53
Figure 5-a: The human capital concept	84
Figure 9-a: Private cost and benefits of higher education in Oman	192
Figure 9-b: Social cost and benefits of higher education in Oman	192
Figure 9-c: Average growth rates of salaries for Omani employees	193
Figure 9-d: Rates of return to investment in higher education in Oman	194

Abbreviations

CBA=	Cost Benefit Analysis
CEA=	Cost Effectiveness Analysis
GCC =	Gulf Cooperation Council
GDP=	Gross Domestic Products
GNP=	Gross National Products
IRR=	Internal Rates of Return
LDC=	Less Developed Countries
PIRR=	Private Internal Rates of Return
OECD=	Organization for Economic Cooperation and Development
SIRR=	Social Internal Rates of Return
SQU =	Sultan Qaboos University
UNESCO=	United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

THE RESEARCH BACKGROUND

1.1. Introduction

The massive expansion of higher education systems that took place worldwide during the last fifty years was financed mainly from public resources. This expansion was a response to increasing social and economic demands derived from increase in secondary school graduates. At the same time, the demand for qualified manpower increased as economies developed. While industrialized countries sought through education in general, and higher education in particular, the means to continue and advance their industrial revolutions, the newly independent nations believed education to be the key for political, social, and economic prosperity and development. Those objectives are the justifications for the use of public revenues to finance higher education systems directly and indirectly. There are many examples of expansion of publicly financed higher education systems.

“In all OECD countries there was a massive expansion of higher education at some time during the 1960s and early 1970s, and in most this expansion had slowed down by the late 1970s and early 1980s, to be followed by renewed pressures for growth in the late 1980s. Two main policy priorities contributed to the expansion. The first was primarily egalitarian: higher education institutions provided opportunities for the rapidly growing number of young people who were completing their secondary education. The second was economic: they trained the highly-qualified workforce that was needed by the economies of the industrialized world. Both sources of growth emphasized the instructional role of higher education, and both stressed the necessity of public expenditures to fuel the expansion” (OECD 1990, P. 8).

A similar pattern was experienced in most developing countries in later years. Most of the Arab countries have started to establish and expand higher education institutions during the last forty years. For example, the number of students enrolled in Arab universities has risen from 0.7 thousands in 1980 to 3.85 millions in 2000 (GCC 2001, P. 31).

However, this expansion is now threatened by the problem of inadequate financial resources in almost all countries. Public finance, the main source of higher education funding, was unable to continue its traditional role of providing all the financial requirements of the system under the same methods and mechanisms. The sharp increase in student enrollment in response to continuing social demand resulted in an increase in the cost of higher education which was beyond the resources of many countries, especially those experiencing economic difficulties such as fluctuations of public revenues, the expansion of public spending, and budget deficits.

“...in several OECD countries, public expenditures on higher education failed to keep pace with the growth in student numbers from the middle of the 1970s up to the mid-1980s” (OECD 1990, p. 8).

As a result, the cost per student has fallen dramatically and this has led to a deterioration in the quality of higher education. The same problem was faced by the Arab universities where the average cost per student has fallen from 2060 US Dollars in 1980 to 1590 US Dollars in 2000 (GCC 2001, p. 31).

It is not only the quality of higher education which suffered from the lack of adequate funding but the quantity as well. Despite the fact that most countries have made significant progress in the number of students enrolled in higher education, gross enrollment ratios in some countries are still below the world average. According to the UNESCO (2000), the world average enrollment ratio in higher education was 17.4 in 1996. Examples of countries that are below this ratio include; Botswana at 5.8 per cent, Mauritius at 6.1 per cent, Gabon and Oman at 8 per cent, Malaysia at 11.7 per cent, Brazil at 14.5 per cent, Mexico at 16 per cent, and Saudi Arabia at 16.3 per cent (UNESCO 2000, table 8, p. 1-8).

In the planning and budgeting process it is assumed that public resources are invested with the objective of maximizing social welfare by ensuring equity and efficiency in the provision of public goods and services. Public investment in higher education is subject to the same criteria.

Planners and policy makers are faced by difficult choices. Increasing enrollment in higher education to satisfy social and economic demands will require the provision of sufficient financial resources. But subsidizing all higher education from public revenues could have negative consequences for the national economic performance so that society's social welfare is reduced.

Using economic theories and empirical research, economists in many countries have tried to find practical solutions to the problem of financing higher education without imposing a burden on other sectors. There has been a common agreement among economists since the time of Adam Smith that investment in education in general (and higher education in particular) entails both public and private elements. It is a public investment in the sense that societies allocate resources for the provision of education in return for social benefits such as qualified manpower which contribute positively to national productivity and the overall economic development. At the same time, it is a private investment where individuals bear some of the cost of their education to obtain private benefits of which higher lifetime earnings is the most significant. However, disagreement exists as to the appropriate balance between the two. This balance is crucial to the extent that its identification helps to draw the line between the amount of public and private resources that should be invested.

In reality, the issue is not as simple as it might look. It is very difficult to balance the private costs and benefits of education. The lack of adequate methods and tools that can capture all public and private costs and benefits of education makes it difficult to identify and measure those costs and benefits precisely.

Economists have developed methods of cost-benefit and rates of return analysis to estimate the social and private rates of return to investment in education. The main inputs for these estimates are the measurable costs and benefits, such as the relationship between the level of education and productivity and earnings. Even though, some adjustment can be made to include other non-measurable costs and benefits, they cannot be precisely

valued in monetary terms. For example, it is difficult to identify and to value all the consumption externalities, and spillover benefits of education that accrue to individuals and societies in the short-and long-terms. Therefore, such estimates do not precisely represent the overall rates of return to private and public investment in education; however, they can be used as approximate indicators. An important issue to mention is that, in many cases, the allocation of public resources, including educational allocations, is not based on cost-benefit and rates of return analysis only, non-economic factors are taken into account. There are other political, social, and cultural factors that influence governmental decisions with regard to public investment policies. Nevertheless, the economic rationale is the corner stone in public finance, and cost-benefit and rates of return analysis are the most popular tools used by researchers to evaluate public and private investment.

Cost-benefit and rates of return analysis will be used in this study to evaluate public and private investment in higher education in Oman. The results can provide some indicators to the profitability of public and private investment which, in turn, will be useful to identify, and evaluate future funding policies.

1.2. The need for this research and its objectives

The Sultanate of Oman has witnessed total transformation in all aspects of life during the last thirty years. In 1970 His Majesty Sultan Qaboos bin Said took over the leadership and started a new era of massive social and economic development and growth. Education and training was one of the core sectors that were given the highest priority in the development process. A large amount of public resources were allocated to establish and develop a modern education system that would educate all Omanis all over the country free of charge. In doing so, the Government was guided by three fundamental factors. First, there was no formal education system in Oman prior to the 1970s and the illiteracy rate was very high at that time. For example, in 1970, the total number of 'students' enrolled in education all over the country was only 7,000, and all of them were

enrolled at the elementary level (Ministry of National Economy 2000, p.33). Second, the standard of living in Oman was one of the lowest in the world, and most of the population was living below the poverty line. Third, the need for educated manpower to meet the demand of the labour market which is essential to fulfill the objectives of the social and economic development in the country.

The Government initiatives were focused on providing free access to all levels and types of education and training, especially at the lower levels where the demand was greater. Accordingly, student enrollment increased sharply in elementary, intermediate, and secondary levels during the 1970s and the 1980s. According to the Ministry of National Economy (2000, p. 33-34), the number of students enrolled in elementary level of education increased from 7,000 in 1970 to 92,000 in 1980 and reached a total of 258,000 in 1990. Total enrollment at the elementary level was 14,000 thousands in 1980 and increased to 72,000 thousands in 1990. The total number of students enrolled in secondary education was 2,000 in 1980 and it had increased to 26,000 by 1990.

The allocation of public expenditure to the education sector has also been increasing over these years in order to provide sufficient resources to facilitate this expansion. For example, public expenditure on education as a percentage of all Government expenditures has risen from 4 per cent in 1980 to 7.2 per cent in 1990 and it reached 9.2 per cent in 1999 (Ministry of National Economy 2000, p. 33).

The smaller number of secondary school graduates during the 1970s and 1980s has meant that most of them were admitted to higher education. However, since the mid-1980s this pattern has started to change as larger numbers of students started to proceed up the education ladder, and the number graduating from secondary school has been increasing sharply every year since then. For example, the total number of secondary school graduates was 13,300 in 1994 of which 5,700 (44 per cent) were admitted to some form of post-secondary education. By the year 1999 the total of

secondary school graduates had increased to 27,000 and the number of those admitted in post-secondary education was 7,9000 (29.5 per cent).

It is expected that this trend in the social demand for education and training, at all levels and of all types will continue for many years to come. The improvement in the standard of living as a result of the socio-economic development programs that were implemented by the Omani Government during the last three decades have contributed positively to the sharp increase of population growth rate. According to the 1993 population census, annual population growth in Oman was 3.7 per cent which is one of the highest in the world.

This social demand will have to be met by the expansion and development of the education and training systems that will require the allocation of more public resources. All levels and types of education and training will require additional resources, thus the allocation of sufficient funding for higher levels of education will become more urgent. This urgency comes from the fact that the current capacity of higher education is small in comparison with other levels of education as indicated above, as well as, in comparison with higher education enrollment in other countries. This will be explained in more detail in Chapters 2, 3, and 4. The focus on developing lower levels of education in the early years of social and economic development was a wise and rational policy to eradicate illiteracy and provide the basic infrastructure for the overall education system. These policies were very successful in making elementary, intermediate, and secondary levels accessible to all Omani children all over the country. Similar initiatives are needed at present to develop the capacity of higher education in order to increase the enrollment levels. As will be shown in Chapter 4, to ease some of the pressure of the social and economic demands, it will be appropriate to increase the enrollment rate to four years higher education programs from 16.4 per cent as it was in 1998 and 1999 to 40 per cent. This would mean that the current capacity has to be increased by more than 100 per cent. The achievement of this target will require an increase in the resources available to the education sector.

Further more, assuming that the current resources that are allocated to higher education are fully utilized, an increase in the financial resources similar to that proposed for the level of enrollment will be required if the quality of education is to be maintained on the same standards. (In the short-term there is little scope for significant scale economies.) Therefore, future development will be determined by the availability of sufficient financial resources.

Traditionally, the Government is the main source of funding higher education in Oman as is the case in many countries. However, as explained in Chapter 2, increasing financial allocations by more than 100 per cent will be a challenge for the Government for macro economic and fiscal reasons. The dependency of the Omani economy on oil production and exports as the main source of revenue for public finance makes the economy vulnerable to fluctuations in oil prices and consequently it will be difficult to forecast and control the level of public spending. For example, in times of low oil prices public spending has to be kept at its level or cut down otherwise budget deficits will increase as a result of borrowing. This phenomenon imposes challenges to secure sufficient financial resources to fund the desired expansion of higher education and to keep the allocation at its level unaffected by macro economic and fiscal constraints. Therefore, there is an urgent need to reform the current funding method by introducing alternative mechanisms that would guarantee the availability of the required financial resources. The formulation of an appropriate policy needs an extensive research that should cover the theoretical developments in the financing of higher education and an empirical analysis of the case of Oman. To be more precise, the following issues need to be addressed.

- i. The analysis of the social and economic development of Oman during the last thirty years, especially the development of the education system.

- ii. The review and analysis of the theories on which the methods of financing higher education is based viz. the concept of human capital.
- iii. The review and analysis of the tools and methods that are used in the empirical analysis of investment in higher education of which cost-benefits and rates of return analysis are the most important.
- iv. The identification and measurement of the public and private costs and benefits of higher education in Oman.
- v. The estimation of the rates of return to investment in higher education in Oman.
- vi. A consideration of alternative policy options and an evaluation and analysis of their impact on efficiency and equity in higher education provision.

1.3. Theoretical framework

Education in general is regarded as an investment from an economic point of view. Individuals, and governments, on behalf of societies, allocate resources in return for immediate and long-term pecuniary and non-pecuniary benefits. Economists have compared investment in education with that of physical projects and, therefore, have used similar methods and tools to identify and measure the return to this investment (see for example, Hansen 1963, Becker 1964, Marenbach 1973, Psacharopoulos 1973 1981 1985 1994, Carnoy and Marenbach 1975, Williams and Gordon 1981).

In this investment process, direct and indirect expenses are sacrificed by individual students and governments. Direct expenses are the sum of expenditures allocated to education, whereas indirect costs are the production foregone during years of education. It is expected that education improves the level of skills and knowledge which are regarded as essential elements to increase the level of productivity. This in turn leads to higher lifetime earnings for the individual and to the increase of overall national productivity and economic growth. These are described

as the pecuniary or tangible benefits of education which can be identified and measured in monetary terms. However, there are many non-pecuniary or intangible private and public benefits that are difficult to identify and measure and which might constitute a large portion of educational benefits. The most popular examples of these benefits are the consumption values of education and the externality and spillover benefits that accrue to individuals and societies in the short and long-terms.

The economic analysis of financing educational investment is often based on the concept of human capital viz. that education is an economic investment and that the main objective of allocating resources to education is to gain the pure economic benefits that can be measured and valued in monetary terms. When individuals spend financial resources and time to pursue a certain level or type of education they may be said to be mainly motivated by the expectation of higher lifetime earnings in comparison of not being in that level or type of education. Similarly, when governments decide to allocate resources to education in general or to a certain level or type of education they expect that the resources invested will have a positive contribution to economic growth. The rationale of this approach is that education develops and enhances the cognitive labour skills and abilities which lead to an increase in the quantity and quality of individual's production. In other words, the variation of individual's labour quality and production are due mainly to the level of education. It is assumed that workers are rewarded by their wages and salaries according to the value of their extra production and, therefore, the variation of wages and salaries is expected to be a true reflection to the variation in the marginal production attributed to the level of education. This relationship between education and productivity on the one hand, and between productivity and wages and salaries on the other, provides the justification for level of education based wage and salary scales that are implemented by different public and private organizations in many countries.

The validity of this hypothesis has been the subject of debate among economists for a long time. The most critical issues under discussion are

focused on two questions. First is the nature of the relationship between education and productivity on the one hand, and the relationship between productivity and earnings on the other. Some economists argue that the empirical evidence of a positive relationship cannot be generalized (Blaug 1983), (Gould and Ruffin, 1995), (Pissarides, 1996), (Preston 1997). Second, is the presence of a wide-spectrum of benefits that are difficult to identify and measure in monetary terms such as the consumption values and externalities and spillover benefits of education that accrue to individuals and societies. These benefits are not included in most cost-benefits analyses of educational investment which causes a biased estimation of the true rates of return to this investment. Any adjustments to include these benefits will always have a positive impact and will increase estimates of the overall benefits. This means that the problem of excluding some of the benefits of education in the estimates of rates of return will not undermine their validity.

Most of the theoretical and empirical studies in the economics of education, to be reviewed in the next chapters, have focused on the pecuniary benefits. This is due to the availability of better tools and methods to identify and measure these benefits in monetary terms, as well as, to the availability of more appropriate and accurate data in most countries.

The identification and measurement of the cost and benefits of education are the corner-stone for the development of educational policies in which the finance of education is the most important. Public and private rates of return to investment in education have been used by individuals, governments, and national and international organizations as main indicators to the process of allocating financial resources to education. On the international level, the World Bank has been using this method to analyse the finance of educational projects since the 1960s (Psacharopoulos and Woodhall 1985). At the national level, both the Robins and Dearing reports of the 1960s and the 1990s on higher education in the UK have made use of the rates of return analysis to

investment in higher education to advise the Government on future funding policies of the system. Empirical studies in some countries have shown that the expectations of higher lifetime earnings are the main motive for individuals to continue to their higher education (Williams and Gordon 1981), (Al-Maskary 1992).

1.4. The empirical analysis

The empirical analysis will focus on the assessment and evaluation of the public and private costs and benefits of higher education in Oman and the estimation of the rates of return to investment. These will be compared with popular forms of long-term investment options as well as with similar results from other countries. The main objective is to derive some indicators of the profitability of investing in higher education from public (government) and private (individual) points of view which will be utilized in formulating an appropriate alternative funding policy.

In order to undertake this empirical research, two types of data are required. First is the data set which is required to estimate the private (individual) and the public (government) costs. In the education process, both the public and individuals incur direct and indirect costs. The direct costs are all the expenditures that are made for the provision of education such as staff wages and salaries in the case of direct public cost, and fees as a direct private cost. The indirect cost is the opportunity cost of student's time while in education and can be measured by the earnings (income) foregone. This is regarded as an indirect cost for both the individual and the society in the sense that if the student was employed during the years of education he or she would have earned an income and contributed to the national productivity. The source of data on direct cost was the financial expenditures at the Sultan Qaboos University (SQU), and the indirect cost was estimated from wages and salaries data of Omani employees which was obtained from the Ministry of Civil Service in Oman. The latter represented the second type of data which are required to estimate the public and private pecuniary (monetary) benefits of higher

education. The methodology issues and the choice of data sources will be explained in Chapters 6, 8, and 9.

1.5. The contributions and limitations of this research

The theoretical and empirical analysis of financing higher education has been the subject of research in many countries, especially in the developed world, for a long time. However, this issue has not received enough attention by researchers in the developing countries such as the Arab Gulf States. As far as we can recall, this is the first initiative in the case of Oman. Al-Maskary (1992) used the concept of human capital to analyse the motives of Omani students at the Sultan Qaboos University (SQU) to continue their higher education, but this is a different problem. The main objective of that study was to investigate the factors that influence or determine individual student decisions to enroll in higher education. He found that the economic factor (higher lifetime earnings) was the most important motive.

This research will utilize human capital theory to tackle the problem of financing higher education by evaluating social and private rates of return. It is the first attempt to try to evaluate social and private rates of return in Oman in order to formulate an alternative policy for funding higher education. Accordingly, this can be regarded as an original contribution to the theoretical and empirical research in this field.

The results of this research should be applicable to other countries that share similar social, cultural, economic, and political values as Oman, such as the other Arab Gulf States. These countries too are facing similar problems in the funding of their higher education systems. The contributions that will be gained from this research towards providing alternative funding mechanisms for higher education can be universally applied to other countries, especially Arab Gulf States.

This first attempt inevitably has some shortcomings and limitations. First, the estimation of a more accurate and precise social and private rates of

return to investment in higher education requires the availability of a large volume of cross sectional data both in terms of national coverage and time span. Such data are often collected periodically through the population census and household income and expenditure surveys. This task is often assigned to public authorities responsible for national statistics and information. At the time of this research no such data were available for Oman other than the results of the National Population Census of the 1993 which did not provide enough data in relation to individual's expenditure on education and income by level of education, years of work experience, and gender. To tackle this problem we relied on data that we obtained from the Sultan Qaboos University (SQU) for public expenditures on higher education, and the Ministry of Civil Service for data on income by level of education and years of experience. The SQU was chosen as a representative for higher education in Oman because it was the only university and the largest higher education institution in the Country. The Ministry of Civil Service provided accurate and most up to date data on the income of Omani employees in the civil service system classified by level of education and years of work experience. The fact that the majority of Omani graduates work in the civil service makes it possible to assume that income in the Civil service is a good indicator of the average income in the overall labour market. These issues are explained in detail in Chapter 8.

Obviously, it would be more useful to have a larger set of data both in terms of national coverage and time span but the results obtained from as will be shown are plausible and consistent with expectations. It is important to point that the Omani Government has undertaken a household income and expenditures survey in the last few years and the results might be available for researchers in the near future. Further more, the Ministry of National economy is preparing at present to undertake a second population census in the 2003. It is expected that these projects will provide enough data for future research in this field as well as in other socio-economic development areas.

1.6. Conclusions

The main questions for this research concern how to secure sufficient financial resources to fund future developments of higher education in Oman and what are the sources and mechanisms of funding to use. In introducing this subject we have pointed briefly to the fact that this problem is one that confronts most countries in the world at present. The social and economic developments of the last thirty years have created increasing social and economic demands for higher education so that the capacity has to be expanded dramatically to absorb the desired increase in the level of enrollment. It is expected that public finance, as the main source of funding, for macro economic and fiscal reasons will not be able to provide all the financial resources under the current method of funding. Therefore, alternative funding mechanisms must be formulated. We decided to utilize the human capital theory and the cost-benefit and rates of return techniques to address this issue.

The rest of this thesis is organized as follows. Chapter 2 will be devoted to review and analyse the social and economic development in Oman during the last thirty years, especially in the education sector. The aim is to provide some country background and explain the historical achievements in education and point to the future challenges from an economic point of view. Chapter 3 will focus on the development of the higher education system in Oman with more attention focused on the institutional structure. Chapter 4 deals with the market for higher education in terms of past and present enrollments and future supply and social and economic demands. The main objective is to analyse the limitations of the present capacity of higher education and the desired level of future expansion. Chapters 5, 6, and 7 will review and analyse the theoretical and methodological frameworks. In this respect, Chapter 5 will review the literature on the development of the human capital theory which established the basis for the concept of investment in human beings. Chapter 6 will explore the use of cost-benefit and rates of return methods and tools in the evaluation and measurement of the cost and benefits of education and the rates of return to public and private investment. Chapter 7 reviews funding methods and

mechanisms developed in other countries. Chapters 8, 9, and 10 are devoted to the empirical research. In Chapter 8 we analyse and evaluate the private and public costs of higher education in Oman, and in Chapter 9 the estimates of the social and private rates of return to investment are presented and analysed. In Chapter 10 we will examine several policy instruments which can be considered as alternative funding mechanisms. Finally, a summary of the results of this research is given in Chapter 11.

CHAPTER TWO

THE SOCIO-ECONOMIC DEVELOPMENT OF OMAN

2.1. Introduction

The year 1970 was a turning point in the history of Oman. This was the year when his majesty Sultan Qaboos bin Said took over the leadership, starting a new era of socio-economic development in the country. During the last thirty years, Oman has been transformed from a poor, backward, and an isolated country, to a developing nation.

The exploration, production, and export of oil are the main source of financial revenues to fund socio-economic development. However, the exploitation of oil resources, as well as development activities in other sectors, has been accomplished largely by foreign companies and foreign labour and management. Although this has resulted in achieving high levels of social and economic development in a short period, it is obviously important that Oman does not continue to be dependent on a foreign workforce. Education in general, and higher education in particular, has an important part to play in developing the skills of the workforce so that the economy can become self-reliant.

This chapter will provide a brief background to the social and economic development in Oman during the last three decades with the aim of explaining the need to expand the current capacity of higher education and the challenges faced. It should be explained at the outset that economic and population data on Oman are very rare before the 1990s and the data presented here come from a variety of sources and years. However, taken together they provide a broad picture of Oman's educational needs and problems.

2.2. Socio- economic indicators

A review of the indicators of social and economic development in Oman during the last thirty years shows that the country has made significant advances. A coherent socio-economic planning system was adopted to manage and organize the development. In this respect, the Government managed to implement five development plans (each of five years duration) during the last twenty five years. The establishment and provision of basic services and infrastructure have been among the first priorities of the Government. Since 1970, services such as education, health, social security, clean water, electricity, transport and telecommunications have been established and made available to all the people. These and other developments have contributed to the improvement of living standards in Oman. Examples of indicators of the level of development achieved in this period are given in table 2-1 (key social indicators) and table 2-2 (main economic indicators).

These indicators provide clear evidence of the level of development achieved. This is seen, for example, in the increase in per capita income, the increase in private consumption, and the increased availability of main public utilities and services. However, these indicators point, as well, to four important factors that have implications for the future of higher education. These are:

- (i) the high population growth rate;
- (ii) the domination of employment by expatriates;
- (iii) the dependency of public finance on oil revenues; and,
- (iv) the sharply increasing budget deficit.

To begin with, a very high population growth rate creates continuing pressure on higher education services. It was estimated that on average the annual population growth rate in Oman during the 1980s and 1990s was

Table 2-1
Main social indicators (1970- 1999)

Indicator	1970	1980	1990	1999
<u>Population</u>	-	914.0	1,321.0	1,729.0
Omanis(000)	-	3.7	3.7	3.7
Annual growth rate	-	3.7	3.7	3.7
<u>Employment (formal wage only)</u>	-	171.3	306.3	633.9
Total(000)	-	171.3	306.3	633.9
Of which Omanis (%)	-	14.3	14.8	25.5
<u>Education</u>	16.0	373.0	779.0	980.0
Number of schools	16.0	373.0	779.0	980.0
Students (000)	7.0	109.9	362.6	599.9
Total enrolment(000):				
Elementary	7.0	92.0	258.0	302.0
Intermediate	0.0	14.0	72.0	143.0
Secondary	0.0	2.0	26.0	97.0
Higher education	0.0	1.8	6.6	31.9
Expenditures (as a percentage of all Government expenditures)	-	4.0	7.2	9.2
<u>Health</u>				
Population per (000):				-
bed	54.8	0.6	0.4	-
doctor	-	1.2	1.1	-
nurse	-	0.9	0.4	-
Infant mortality (per 1000 infants born alive)	-	64.0	29.0	18.0
Life expectancy at birth	49.3	57.5	66.5	72.5
Expenditures (Per cent of all Government expenditures)	-	2.4	3.9	6.1
<u>Public services</u>				
Water connections(000)	0.5	20.0	61.0	109.0
Electricity connections(000)	1.0	53.0	241.0	418.0
Telephone line per 1000 people	1.0	14.0	66.0	N/A

Source: Ministry of National Economy (2000)

Table 2-2
Main economic indicators (1970- 1999)
 (value figures are in million Omani Rials)

Indicator	1970	1980	1990	1999
Gross domestic product	104	2,185	4493	6,000
<i>of which:</i>				
Total final consumption	32	1236	3056	4385
Gross capital formation	15	442	555	860
Balance of Payments	4	-26	-11	-473
Rates to GDP (per cent):				
Total consumption	33	57	68	73
<i>of which:</i>				
Private	-	42	41	49
Public	-	14	27	23
Capital formation	14	20	12	15
<i>of which:</i>				
Private	-	6	5.2	5
Public	-	14	6.8	10
Public finance				
<i>of which:</i>				
Net revenues	50	924	1,876	1,796
Oil revenues (percentage)	100	90	82	67
Expenditures	46	950	1,887	2,269

Source: Ministry of National Economy (2000).

approximately 3.7 per cent, one of the highest in the world. This meant that about half of the Omani population were under the age of 14 years in 1993. As a consequence, the social demand for education in general, and higher education in particular, has increased and will continue to increase sharply both in the short- and the long-runs. In fact this has already been experienced in Oman for some years, and the pressure is increasing on higher education institutions to admit more students as the number of secondary school graduates increases every year.

Employment indicators show that the majority of the work force is expatriate and that Omanis were less than 15 per cent of the total in 1993. Accordingly, the demand for qualified national manpower is likely to be

higher than the supply for a long period.

Key education indicators demonstrate that student enrolment has increased sharply at elementary, intermediate, and secondary levels, while it remains low in higher education. As indicated in table 2-3, students in higher education in Oman represent 2.8 per cent only of the total number of students in 1993. Therefore, in addition to the social and economic demand, the small capacity of the higher education system provides an additional case for further development. These developments will require the allocation of more public funding which might prove to be a challenge given the current situation of public finance in Oman.

Table 2-3

Enrolment in different levels of education in Oman, 1993

Level	Students	
	Number (000)	Per cent of total
Primary	338.5	62.0
Intermediate	125.7	23.2
Secondary	62.0	11.5
Post-secondary	15.3	2.8
Total	541.6	100.0

Source: Ministry of Development, (1993)

Table 2-2 shows that, although declining, the oil sector has been and remains the main source of public revenues during the last twenty five years. In 1999 it accounted for some two thirds of government revenues. Even though, the Omani Government has tried several policies to diversify the sources of public finance, the oil sector still dominates. This dependency has always been risky for the Omani economy for two main reasons. First, the level of oil reserves is not promising in the long term, and second, the fluctuations in oil prices in the international markets causes fluctuations in public revenues, making it hard to plan and manage public expenditures. The large increase in budget deficits in the first half of

the 1990s (shown in table 2-4) occurred as a result of the sudden fall in oil prices.

Table 2-4
The annual budget deficit in Oman 1991-1999

Year	Deficit (Million Omani)
1991	283
1992	579
1993	518
1994	496
1995	479
1996	264
1997	40
1998	375
1999	476

Source: Ministry of National Economy (2000)

The expansion in the budget deficit was caused by the rise in public expenditures which exceeded the planned levels, as well as by the fluctuations of oil prices. To tackle this problem, the Government introduced policies to rationalise and reduce public spending and to balance the budget by the year 2000. To achieve this ambitious objective, Government policies were focused on cutting public spending and increasing oil production. It was thought that this would help to maintain public spending at its current level while allocating surplus revenues to finance the deficit.

However, these policies have produced some negative effects on the Omani economy because public spending is the largest source of investment in the economy. Since higher education has been financed entirely by the Government during the last twenty five years, it suffered as

a result of the cuts.

2.3. Population, education and training, and employment

Since 1970, the Omani Government has placed great importance on the development of the country's human resources through increased expenditures on education and training, employment, and health services. The availability of these services has had a positive impact on the quality of living standards and population growth rates, (as shown in the social and economic indicators in tables 2-1 and 2-2) and therefore a continuing increase in the demand for these services. In what follows we shall review the implications of each of these factors for higher education in Oman.

2.3.1. Population structure

The only population census in Oman was undertaken at the end of 1993. Most of the statistical data on demographic issues prior to this were estimates by Omani public authorities such as the Directorate General of National Statistics of the Development Council, and international organisations, mainly the World Bank, the UNESCO, the ILO, and other UN organisations. For example, the International Bank for Reconstruction and Development (1974) provided the estimate for the Omani population in 1971 shown in table 2.5. The total population was estimated at 600,000 with an annual population growth rate of 3 per cent. Another important factor is that the majority of the population 510,000 were living in rural areas and only 90,000 were living in urban areas. This points to the fact that the country was underdeveloped and the level of urbanisation was very small in the period prior to the 1970s. This is also shown by the large number of economically active population working in traditional sectors such as agriculture and fishing which was estimated to be 119,000 in comparison to 31,000 employed in the modern sector.

Table (2-5)**Estimates of the Omani population in 1971**

Population sector	Estimate	
	Total (000)	Per cent of total
Total Omani population	600	100
Rural population	510	85
Urban population	90	15
Economically active population	150	25
Traditional sector employment	119	20
Modern sector employment	31	5

Source: International Bank for Reconstruction and Development (1974)

The UNESCO Regional Office for Education in the Arab States (1974), has estimated the population of Oman to be; "in the range from 450,000 to 750,000 and more" for this period which was close to the previous source. According to the UNESCO the majority of the population were under the age of 30 years old. Table 2-6 gives more details about the age structure.

Table 2-6**Estimated age structure for Omani population in 1971**

Age-group	Number (000)	Per cent of total
Up to 4	93	15.5
5- 9	87	14.5
10-15	68	11.3
16-20	58	9.7
21-30	118	19.7
31-40	85	14.1
41-50	47	7.9
51-60	26	4.3
61 and above	18	3.0
Total	600	100

Source: UNESCO (1974)

It should be stressed that since these are estimates there must be some doubt concerning their accuracy. However, they are the only sources available which can provide some indication of the age structure of the Omani population during this period. According to these different estimates the population can be characterised as small in size, dominated by middle aged groups, and mainly rural. The other major characteristic not shown in the table is that the whole population were almost all Omanis by birth. This indicates that Oman was an isolated country and did not attract people from other countries to come to work and live in it, as has been the case since the 1970s.

The General Population Census that was undertaken in 1993 has provided large amounts of demographic data with a higher degree of accuracy. According to this Population Census, the total population of Oman in 1993 was found to be just over two million. The Omani population numbered nearly 1.5 million with the non- Omanis around 0.5 millions. Thus the proportion of non-Omanis had risen to become some 25 per cent of the total in 1993.

Table 2-7 shows an analysis of the population by region according to the 1993 Population Census. Some 55 per cent of the population were living in Muscat and Albatinah which are the most urban regions in Oman at present. This was caused by the development of the economy since 1971 and the shift away from rural to urban areas.

Table 2-8 shows the age structure for the Omani population in 1993. It can be seen that 51 per cent was aged 14 years or under. This is a result of the high rate of population growth and it is a figure of great significance for education policy. The demand for higher levels of education, mainly secondary and higher education is likely to increase substantially in the coming years and therefore capacity has to be expanded.

Table 2-7**Population of Oman by region and origin in 1993**

Region	Omanis		Non-Omanis		Total	
	No.	%	No.	%	No.	%
Muscat	295.6	54	253.5	46	549.1	27
Albatinah	472.1	84	92.6	16	564.7	28
Musandam	22.1	78	6.3	22	28.7	1
Adhairah	135.0	75	46.1	25	181.2	9
Adhakiliaih	199.0	87	30.4	13	229.8	11
Asharkiah	219.0	85	39.1	15	258.3	13
Alwusta	13.7	80	3.1	20	17.1	1
Dhofar	125.6	66	63.5	34	189.1	9
Total	1,483.0	73	534.9	27	2,018.1	100

Source: Ministry of Development (1996).

To summarise, a comparison of the population in the early seventies with 1993 reveals several dramatic changes. First, the size of the population has risen by more than three times during the last twenty years, indicating to a very high population growth rate. Second, the geographical distribution of the population has changed from rural to urban in character. Third, the number of non-Omanis who are mostly expatriate workers has increased sharply. The 1993 Census showed that, around 27 per cent of the population in Oman were expatriates. Employment opportunities created by social and economic development and the shortage of Omani skilled workers were the main reasons for their presence. Fourth, table 2-8 shows that 51 per cent of the Omani population were under 15. This phenomenon can be viewed as a natural response to the huge improvement in living standards which resulted from the economic development in the last 25 years.

This demographic structure will continue to put some pressure on the Omani government to develop and enhance the social and economic

infrastructure and facilities. In these circumstances, all types and levels of education and training, especially higher education, will have to be expanded both in terms of quantity and quality. In order to obtain a clear view of the future needs of, and issues facing, education in Oman, we shall need first to examine the pattern of development in education and training over the last twenty five years.

Table 2-8
Age structure of the Omani population, 1993

Age- group	Total (000)	Per cent of total	Males (000)	Females (000)
Under 4	255.6	17	130.2	125.4
5- 9	268.7	18	136.3	132.4
10-14	240.8	16	123.0	117.9
15-19	175.3	12	90.3	85.0
20-24	110.4	7	57.9	52.5
25-29	80.9	5	40.6	40.1
30-34	65.1	4	32.0	33.1
35-39	60.7	4	28.3	32.4
40-44	46.9	3	23.3	23.6
45-49	42.3	3	21.3	21.0
50-54	40.7	3	21.1	19.5
55-59	24.4	2	13.4	11.0
60-64	27.1	2	14.9	12.1
65-69	12.8	1	6.9	5.9
70-74	14.2	1	7.0	7.2
75-79	5.4	0	2.7	2.7
80-84	6.2	0	3.0	3.3
85+	5.6	0	2.7	2.9
Others	0.2	0	0.2	0.1
Total	1,483.2	100	755.1	728.1

Source: Ministry of Development, (1996)

2.3.2 Education and training

During the last twenty five years the Omani Government has focused attention on the establishment and development of a modern education and training system. A large share of oil revenues was allocated for the provision of education and training services. Statistical data produced by national authorities, as well as international organisations' provide clear indicators of the development that has been achieved. Table 2-9 shows the state of education in the early 1970s. The total number of students was 24.5 thousands in the academic year 1972/73 and over 99 per cent of these were enrolled in the primary sector.

Table 2-9

Number of students in Oman by level of education in 1972/73

Level of education	Students (000)	Enrolment Per cent
Primary	24.3	99.2
Intermediate	0.2	0.8
Secondary	0	0
Higher Education	0	0
Total	24.5	100

Source: International Bank for Reconstruction and Development (1974)

Another indication of the small capacity of the education system in Oman in the early seventies is the level of public spending. Table 2-10 shows that total expenditures on education was 2,647 thousands in 1972 representing 3.8 per cent of total Government spending and 1.7 per cent of GDP.

Table 2-10
Public expenditures on education in Oman in 1972
(thousands Omani Rials)

Type of spending	Amount
Current	984
Capital	1663
Percentage of total government spending	3.8
Percentage of GDP	1.7
Total	2647

Source: International Bank for Reconstruction and Development
(1974)

These figures provide a clear picture of the state of education and training in Oman in the early seventies. Even though the share of total expenditure allocated to education was only 1.7 per cent of GDP it was sufficient to cover all educational funding requirements. However, this advantage would change later as the system expanded and the financial requirements would become much greater.

The data presented in table 2-11 below give some indication of the size and capacity of expansion in education and training in Oman in the period from 1974 to 1999. This expansion is expressed both in terms of quantity; (i.e. the number of students enrolled in education), and the resources allocated, as represented by recurrent and capital expenditures on education.

It is clear that student enrolment at all levels of education, as shown in table 2-1 above, has increased sharply since 1973. By 1999 enrolment was about 17 times greater than in 1973. Table 2-11 shows the expansion of education in general. Over this period Government spending on education increased from 2.3 per cent to 9.2 per cent of total spending. Higher education, however, did not expand at the same rate. This was the result first, of the condition of education and training in general in the period prior to the 1970s was very poor; and, second, as shown above,

the high proportion of Omanis who were of school age. Thus demand for primary and secondary education exceeded that for higher education. Consequently the Government's top priority in the development of education was to provide basic general education to meet the requirement of this young population.

Table 2-11
Development of Oman's education system, 1973-1999

Years	Students (000)	Current expenditures (Million Omani Rials)	Development expenditures (Million Omani Rials)	Educational expenditures (percentage of total public expenditure)
1973	36.0	1.8	0.8	2.3
1975	56.1	7.2	2.2	1.8
1980	108.3	31.8	6.1	4.0
1985	221.7	83.1	16.2	5.1
1990	360.1	124.3	11.2	7.2
1994	474.9	154.2	18.8	7.9
1999	599.9	196.4	11.2	9.2

Source: Ministry of National Economy (2000)

However, the expansion of education and training during the last twenty five years indicates that the pressure on higher education will be greater in the coming years. The current small capacity of higher education will not be adequate to satisfy future social and economic demand. This issue will be discussed in chapter 3.

2.3.3. Employment and the labour market

The UNESCO mission to Oman in 1974 estimated the size of Omans' labour force at 300,000. The mission also estimated that 50 per cent of this active labour force was already participating in the labour market. As we have pointed earlier, and as can be seen from table 2-12, most of the

labour force in Oman was employed in agriculture in the period up to 1974. This means that the quality of the labour force can be characterised as unskilled and uneducated. The main reasons are the absence of formal education, as discussed earlier, and the predominance of traditional employment activities that do not require much formal education.

Table 2-12
The distribution of active labour force in Oman in 1974

Sector	Number (000)	Per cent
Agriculture	109	72.7
Fisheries	15	10.0
Government	10	6.7
Construction	6	4.0
Oil, financial services	5	3.3
Other, mainly services	5	3.3
Total	150	100

Source: UNESCO (1974)

A more accurate estimation of the occupational distribution of the labour force in all sectors was not available for this period; however, table 2-13 provides some data on the occupational distribution of employment in private sector. It shows, as well, that most of the Omani workforce employed in these sectors was employed in jobs which did not require high levels of education and training.

Table 2-13
Occupational distribution of the Omani labour force in 1974

Occupational group	Number (000)	Per cent of total
Professional, technical	6	4.3
Administrative	1	0.8
Clerical and sales	9	5.7
Service	7	4.8
Skilled production	80	53.3
Un-skilled production	47	31.1
Total	150	100

Source: UNESCO (1974)

The size of the Omani labour force and labour market has expanded dramatically both in terms of quantity and quality in the last twenty five years. This change happened as a natural requirement for the wide scale development programs introduced by the Omani Government and financed from oil revenues. In other words, the large development programmes implemented in all economic and social activities required a large amount of labour input, both in terms of quantity and quality.

The expansion of the Omani labour market, as may be seen from table 2-1, has had three main features: first, the increased participation of Omanis from 14.3 per cent in 1980 to 25.5 per cent in 1999; second, the movement from traditional jobs in agriculture and fishing to a more modern sectors such as public administration, defence, education and health services which require higher skills; and third, the increased dependency on the number (though not the proportions of) foreign workers (from 26 thousand in 1980 to 475 thousand in 1999).

According to the results of the 1993 General Population Census, the total active labour force (15 years and above) was found to be 670, 275 which represents a more than 100 per cent increase on the estimated size of the early 1970s. The distribution of employment by economic sector is given in table 2-14.

As we can see, by 1993 Omani employees were concentrated in the public sector, defence, and education rather than in agriculture. This indicates that the level of education and skills had improved during this period. The spread of general education since 1970, coincided with the massive social and economic development programmes introduced by the Government utilizing oil revenues, enabled many Omanis to become better educated and therefore to look for better jobs. The occupational structure of the Omani labour force, shown in table 2-15 reflects these changes.

Table 2-14

**The distribution of the labour force in Oman by economic sector in
1993**

Economic sector	Total (000)	Omanis (000)	Non- Omanis (000)	Omanis (per cent)
Agriculture	54.0	13.9	40.2	25.6
Fishing	8.7	8.1	0.6	93.5
Mining and quarrying	14.1	8.1	6.0	57.4
Manufacturing	60.0	4.2	55.8	7.0
Electricity, gas, water	4.4	0.9	3.5	21.3
Construction	107.7	4.4	103.3	4.1
Wholesale, retail trade	88.9	11.3	77.6	12.7
Hotels, restaurants	14.4	0.9	13.5	6.3
Transport, communication	24.3	11.3	13.0	46.6
Financial services	7.1	4.8	2.3	67.1
Real estate	10.0	1.1	8.9	10.6
Public admin., defence	160.3	134.7	25.6	84.0
Education	36.6	17.8	18.8	48.5
Health and social work	16.2	6.9	9.2	42.9
Community services	23.2	9.0	14.1	38.9
Domestic services	33.5	0.2	33.3	0.6
Non-regional organisations	1.0	0.3	0.7	26.1
Non-classified	5.8	2.6	3.8	35.2
Total	670.3	240.0	430.3	35.8

Source: Ministry of Development (1996).

Table 2-15
Occupational distribution of the labour force in Oman, 1993
(thousands)

Occupation	Omanis	Non-Omanis	Total
Specialists:			
Applied science	2.9	13.0	15.9
Non applied science	13.9	17.0	30.9
Lecturers (higher education institutions)	0.2	1.3	1.5
Teachers (intermediate and secondary levels)	2.3	12.0	14.3
Total	19.3	43.3	62.6
Percentage of grand total	8.1	10.1	9.4
Technicians:			
Science	4.0	5.6	9.6
Non science	1.1	1.0	2.1
Nurses	1.2	5.8	7.0
Health care worker	0.4	0.7	1.1
Teachers (preparatory level)	8.9	4.3	13.2
Total	15.6	17.4	33.0
Percentage of grand total	6.5	4.1	4.9
Skilled:			
Clericals	33.8	18.4	52.2
Manuals	76.5	28.8	105.3
Total	110.3	47.2	157.5
Percentage of grand total	46.3	11.0	23.6
Semi-skilled:			
Clericals	7.8	82.3	90.1
Manuals	1.3	19.6	20.9
Total	9.1	101.9	111.0
Percentage of grand total	3.8	23.8	16.6
Unskilled	84.1	218.9	303.0
Percentage of grand total	35.3	51.1	45.4
Grand total	238.4	428.7	667.1

Source: Ministry of Development (1996).

The most important factor indicated by data in tables 2-14 and 2-15 is that the number of expatriate workers in the Omani labour market was more than 60 per cent of the total in 1993. This situation is expected to continue until at least 2020. The future size and structure of the Omani labour

market as forecast by the Omani Ministry of Development in 1996 is shown in table 2-16.

Table 2-16
Estimated labour market requirements in the year 2020

Occupation	Required (000)	Available		Deficit	
		(000)	Per cent of required	(000)	Per cent of required
Specialists:					
Applied science	52.1	42.0	80.6	10.1	19.4
Non applied science	52.8	43.2	81.8	9.6	18.2
Lecturers (higher education institutions)	5.6	4.3	76.8	1.3	23.2
Teachers (all levels)	79.8	73.4	92.0	6.4	8.02
Total	190.3	162.9	85.6	27.4	14.4
Technicians:					
Science	35.8	34.0	95.0	1.8	5.02
Non science	4.0	4.0	100.0	0.0	0.0
Nursus	12.0	11.3	94.2	0.7	5.8
Health care worker	2.2	2.2	100.0	0.0	0.0
Total	54.0	51.5	95.4	2.5	4.6
Skilled:					
Clericals	115.9	104.0	89.7	11.9	10.3
Manuals	337.7	295.2	87.4	42.5	12.6
Total	453.6	399.2	88.0	54.4	12.0
Semi-skilled:					
Clericals	177.6	149.1	84.0	28.5	16.0
Manuals	68.8	25.8	37.5	43.0	62.5
Total	246.4	174.9	71.0	71.5	29.0
Unskilled	344.3	103.3	30.0	241.0	70.0
Total	1288.6	891.8	69.2	396.8	30.8

Source: Ministry of Development (1996)

This forecast has been developed according to the following assumptions:

- (i) an annual growth rate of 3.5 per cent in Gross Domestic Product and a 1 per cent annual increase in productivity;
- (ii) a decrease in the population growth rate from the current rate of 3.7 per cent to 2.7 per cent by the year 2020;

- (iii) the restructuring from low added value activities to high added value activities;
- (iv) an increase in the female participation rate in the labour market from the present 3 per cent to 11 per cent.

As is clear from table 2-16, the forecast requirements of the labour market will exceed the available number of Omanis in most of the occupations by the year 2020. The most important, is that the Omani labour market will require more specialists and technicians than the number of Omanis expected to be available. It is expected that total demand will increase to nearly 1.3 million by the year 2020 and that the total number of Omanis available for employment is forecast to be 891.8 thousands. This means that the excess demand of 372.2 thousand (nearly one third of requirements) will have to be met by expatriates. The greatest deficits are forecast to be among the unskilled and skilled categories. Omanis are reluctant to work in these occupations because of economic and social factors such as low wages and salaries and social status. The Government has tried several policies to encourage Omanis to work in these occupations but the level of success has been minimal.

At the same time it is expected that by the year 2020 the demand for specialists and technicians will increase to 244.3 thousand and the output of higher education institutions in Oman who are believed to be employed in these occupations is expected to be around 214.4 thousand. This means that the deficit will be 19 per cent of the total demand for specialists and technicians. Therefore, this should be one of the factors for consideration in planning the future capacity of higher education. In other words, meeting the increasing demand of the Omani labour market for professionals and specialised workers requires the expansion of the capacity of higher education institutions. Table 2-16 shows that the deficit of lecturers in higher education will be over 23 per cent by 2020. If a higher population of these is to be trained within Oman it will mean that

extra investment is required. Further, a large number of skilled workers will require some sort of education training which will increase the pressure on the education sector as a whole especially if education is to be provided in Oman rather than from abroad. This issue will be discussed in more detail in the next chapter which will focus on the development of higher education.

2.4. Public finance

Pressure to develop the economy led to a substantial expansion in public finance over the period 1971-1990. Table 2-17 shows the trend of government revenues and expenditures over this period. With the exception of the years 1971, 1979 and 1981 expenditures exceeded revenues throughout the period. Public revenues have increased from 50.1 million Omani Rials in 1971 to 1,262.2 million Omani Rials in 1981, reaching 1,851.6 Million Omani Rials in 1995. This means that revenues have increased more than 24 times in the period from 1971 to 1981.

Even though the level of revenues fluctuated in later years, as a result of oil price fluctuations, the comparison between the total revenues of 1985, which was 1,572.9 million Omani Rials, with that of 1995 that was 1,851.6 million Omani Rials shows an increase of about 17 per cent. On the other hand, total government expenditures increased more rapidly during the same period. In 1971, total public expenditures were 46 million Omani Rials only. This amount has increased to 1,223.7 million Omani Rials in 1981, and in 1995 it was 2,331.0 million Omani Rials. To be more specific, total public expenditures rose more than 25 times during the first ten years from 1971 to 1981. During the last fifteen years total expenditures have been fluctuating following the same trends as public revenues. Total expenditures rose from 1,928.4 million Omani Rials in 1985 to 2,331.0 million Omani Rials in 1995, an increase of 20.8 per cent.

Table 2-17
Public revenues and expenditures
(Million Omani Rials)

Year	Public revenues	Public expenditures
1971	50.1	46.0
1972	53.0	71.7
1973	68.6	108.4
1974	303.2	349.2
1975	387.7	509.5
1976	488.0	574.0
1977	520.0	524.0
1978	502.3	560.0
1979	692.2	650.4
1980	923.7	959.8
1981	1,262.2	1,223.7
1982	1,175.4	1,412.9
1983	1,253.9	1,546.9
1984	1,340.7	1,760.3
1985	1,572.9	1,928.4
1986	1,186.9	1,886.8
1987	1,460.2	1,609.1
1988	1,204.8	1,567.2
1989	1,370.1	1,665.8
1990	1,876.3	1,887.4
1991	1,585.1	1,868.1
1992	1,680.2	2,258.7
1993	1,723.9	2,242.4
1994	1,757.4	2,252.9
1995	1,851.6	2,331.0
1996	1,990.2	2,253.7
1997	2,267.2	2,307.3
1998	1,846.3	2,221.6
1999	1,796.1	2,269.0

Source: Ministry of National Economy (2000)

The review of the main components of public expenditures and revenues shown in table 2-18 shows that income from oil exports represents the largest source in public revenues.

Table 2-18

**The main components of public revenues and expenditures
(Million Omani Rials)**

Item	1990	1993	1995	1999
Revenues:				
Net Oil	1,538.0	1,302.8	1,372.7	1,201.6
Non Oil	338.3	421.1	478.9	594.5
Total	1,876.3	1,723.9	1,851.6	1,796.1
Expenditures:				
Defence	742.3	738.2	776.1	N /A
Current civilian	827.8	989.4	1,083.4	1,808.9
Development civilian	285.8	477.6	456.9	426.2
Others	31.5	37.2	14.6	33.9
Total	1,887.4	2,242.4	2,331.0	2,269.0
Surplus (+) or deficit (-)	-11.1	-518.5	-479.4	-472.9

Source: Ministry of National Economy (2000)

The largest share of public expenditures was allocated to *civilian current expenditures* followed by *defence*. For the financial year 1995, the percentage of civilian current expenditures was 46.4 of the total public expenditures, while the defence share was 33.2 per cent from total.

During the last thirty years a large share of these expenditures has been devoted to defence. The reality that national security is the most important task for governments and without it no social and economic development can be achieved, encouraged the continuation of this policy. However, the allocation of a large share of public revenues for this sector was at the expense of other equally important sectors such as *education*. Table 2-19 provides a comparison between expenditures on defence and security and education in the period from 1973 to 1995.

Table 2-19**The structure of Government expenditures**

Year	Current expenditures (Million Omani Rials)	Development expenditures (Million Omani Rials)	Defence expenditures (per cent)	Education expenditures (per cent)
1973	22.0	32.2	45.8	2.8
1980	28.6	26.0	42.8	4.0
1981	27.4	25.9	42.7	4.4
1982	31.4	28.0	36.9	5.3
1983	28.5	24.4	43.4	5.7
1984	28.8	26.4	44.4	5.4
1985	31.6	27.9	38.9	5.1
1986	35.0	28.7	35.9	6.1
1987	41.1	20.9	37.0	7.2
1988	44.4	17.0	37.6	7.4
1989	46.4	15.5	36.1	6.9
1990	44.9	14.1	39.3	7.2
1991	44.9	14.6	34.4	7.5
1992	43.8	19.5	34.4	6.7
1993	44.4	20.5	33.5	7.7
1994	45.0	19.6	34.5	-
1995	47.2	18.8	33.3	-

Source: Al-hajry, M.N. (1997)

Another important factor, pointed in our discussion of socio-economic indicators in tables 2-1 and 2-2 and supported by the data in table 2-18, is that the budget deficit has been increasing. This is caused by the fluctuations of oil prices in the world markets and the sharp rise in public expenditures. In other words, the dependency on oil revenues as the main source of public finance and the increasing demand of funding for the provision of public services, represent a challenge for the Omani government in terms of balancing revenues and expenditures. In some cases the government was forced to cut public expenditures especially in periods when oil prices were falling. This was reflected in the slow down turn of social and economic development including the development of higher education. Therefore, the structure and development of public finance is an important element in the future expansion of the education

system. The next section briefly highlights the impact of oil production and exports on public finance.

2.5. Oil production and export

The previous review of socio-economic indicators provided a clear picture of the importance of oil revenues in the overall performance of Omans' national economy. The exploration of oil had started in Oman by the late 1960s, and first exports were made in the early seventies. Most exploration and development activities are undertaken by the Petroleum Development of Oman Company (PDO). At present the Omani Government owns more than 50 per cent of the Company.

Revenues from oil exports have been the main source of public finance for the last thirty years. For more clarification table 2-20 shows the ratio of total government expenditures financed by oil and non-oil revenues.

Even though its share has been fluctuating, more than half of public expenditures were financed by Oil revenues. To be more precise, this share was 61.5 per cent in 1995. As a result of this dependency, the production and export of oil has been increasing annually especially in the last ten years. The development of Omans' oil production and the fluctuation of oil prices as well as the level of proved reserves are shown in table 2-21.

These data indicate that Omans' oil production has been fluctuating in this period as a consequence of three main factors. First, is the growth of public expenditures and the dependency on oil revenues as the main source of funding as explained above. Second, the fluctuation of oil prices in the world markets has led the government to adjust the production level accordingly. For example, production is often increased in periods of falling oil prices to compensate for the loss of revenues and vice versa. Third, the continuing efforts to find new oil fields to increase the reserve level. Proved reserves have increased from a level of 1.741 billion barrels

in 1970 to 2.493 billion barrels in 1980 reaching the level of 5.2 billion barrels in 1995.

Table 2-20
Government expenditures financed
by oil and non-oil revenues

Years	Total spending (Million Omani Rilas)	Oil revenues		Non-oil revenues	
		Amounts (Million Omani Rials)	Per cent of total	Amounts (Million Omani Rials)	Per cent of total
1973	91.7	41.3	45.0	3.7	4.0
1974	362.0	291.5	80.5	11.7	3.2
1975	489.2	373.1	76.3	14.6	3.0
1976	581.0	455.0	78.3	32.0	5.5
1977	557.0	482.0	86.5	38.0	6.8
1978	586.0	458.0	78.2	35.0	6.0
1979	663.0	635.0	95.8	58.0	8.7
1980	949.8	1109.5	116.8	78.4	8.3
1981	1223.8	1144.0	93.5	118.2	9.7
1982	1411.9	1076.8	76.3	98.6	7.0
1983	1546.9	1128.5	72.9	125.4	8.1
1984	1760.3	1166.5	66.3	174.2	9.9
1985	1915.3	1343.7	70.2	216.1	11.3
1986	1854.0	932.4	50.3	254.0	13.7
1987	1576.4	1182.1	75.0	278.1	17.6
1988	1567.2	995.0	63.5	209.8	13.4
1989	1665.8	1129.5	67.8	240.6	14.4
1990	1887.4	1588.3	84.2	288.0	15.3
1991	1868.1	1289.5	69.0	280.9	15.0
1992	2258.7	1338.9	59.3	322.1	14.3
1993	2197.9	1302.9	59.3	414.1	18.8
1994	2252.9	1363.7	60.5	393.7	17.5
1995	2331.0	1433.9	61.5	418.3	17.9

Source: Al-hajry, M.N. (1997).

Table 2-21**Oman's oil production, prices and proved reserves, (1973- 1995)**

Years	Oil price (US \$)	Daily production (Million barrels)	Production growth rate (per cent)	Annual production (Million barrels)	Provisional reserve (Million barrels)
1973	3.1	293	3.9	107.0	1.698
1974	11.4	290	-1.0	105.8	1.489
1975	11.5	342	17.9	124.6	1.329
1976	11.7	366	7.0	133.8	1.278
1977	12.9	340	-7.1	124.2	1.414
1978	13.0	314	-7.6	114.7	1.535
1979	20.5	295	-6.0	107.7	2.480
1980	36.8	283	-4.1	103.7	2.493
1981	36.9	328	15.9	119.8	2.908
1982	34.3	336	2.4	122.6	2.991
1983	29.2	389	15.7	141.9	3.500
1984	27.9	416	6.9	152.4	3.852
1985	27.1	498	19.7	181.9	4.026
1986	13.5	560	12.5	204.3	3.972
1987	17.3	582	3.9	212.0	4.088
1988	13.5	619	6.3	226.6	4.119
1989	16.3	640	3.4	233.8	4.269
1990	20.7	685	7.0	250.1	4.361
1991	17.4	708	3.4	233.8	4.269
1992	18.0	740	4.5	270.8	4.748
1993	15.0	780	5.4	284.6	4.970
1994	14.8	809	4.7	295.4	5.138
1995	17.8	864	6.8	311.3	5.200

Source: Al-hajry, M.N. (1997).

The above data indicate that Omans' oil production has been fluctuating in this period as a consequence of three main factors. First, is the growth of public expenditures and the dependency on oil revenues as the main source of funding as explained above. Second, the fluctuation of oil prices in the world markets has led the government to adjust the production level accordingly. For example, production is often increased in periods of falling oil prices to compensate for the loss of revenues and vice versa. Third, the continuing efforts to find new oil fields to increase the reserve level. Proved reserves have increased from a level of 1.741 billion barrels

in 1970 to 2.493 billion barrels in 1980 reaching the level of 5.2 billion barrels in 1995.

Assuming that oil production will be kept on its 1995 level, Oman can continue to depend on oil resources as the main source for public finance for the next 17 to 20 years. After this period alternative sources have to be found in order to sustain the level of socio- economic development. This factor has been realised by the Omani government since the early seventies. As a result, all five years development plans since 1974 have adopted the diversification of economic revenues as their main strategy. To achieve this goal, oil revenues were allocated to build the main infrastructure for other productive economic sectors that could replace oil in the future. These sectors include industry, agriculture, fishing, and trade and financial services. The same attention was given to human resource development mainly through the development and enhancement of education and training systems. Further more, the Omani government introduced policies and strategies to encourage and motivate the private sector to occupy a larger share in national economic activities. In this respect, the Government introduced laws and regulations with the aim of promoting the expansion of the private sector and financial incentives were provided to encourage its participation.

These policies and strategies were very ambitious, however, as a result of internal and external factors, practical achievements have been slow to materialise and oil still represents the largest source of Oman's public finance. The future development of higher education will thus continue to depend on oil.

2.6. Conclusions

This review of the socio- economic development in the Sultanate of Oman during the last twenty five years provides some justification for the need to embark in this research and for the need to expand the current capacity of

higher education.

Starting with the demographic structure of the Omani society, two main problems were identified: first, the high level of population growth (3.7 per cent annually according to 1993 population census); second, the youthful character of the population (more than 50 per cent were less than 15 years old). These two demographic characteristics indicate that there is likely to be an increased future demand for higher education in line with the expansion of education in general.

Another element that was highlighted is the development of the education sector. So far higher education has not developed at the same rate as other levels of education. Although there might be reasonable justification for this, the fact remains that the current capacity of higher education is limited and too small to cope with future needs and national demand. 'Seen in the context of the expected decline in future oil revenues and the need to economise on the 'import' of higher education and technical managerial skills, as well as the social need to establish a higher education sector which is an essential part of the economic and social structure, investment in higher education is virtually important'.

From a labour market demand perspective, official forecasts show that there will be increasing demand for higher education to improve the skills of the labour force. The current capacity of higher education institutions are not, at present, sufficient to meet these requirements. Further expansion will be required, otherwise the country will have to depend as at present, on expatriates to fill the gaps on foreign countries to educate the work force.

Finally, it was identified that there are important macroeconomic constraints on government spending. These constraints are represented by the increasing level of the budget deficit on the one hand and the continuing dependency on oil revenues as the main source for public expenditures on the other. In other words, further expansion of higher

education will require more financial resources than are likely to be available in the future. Therefore, new methods and mechanisms of funding have to be adopted.

In summary, the continuing development of Oman requires, as shown in table 2-16, a bigger and better educated workforce. If this workforce is to be Omani and educated in Oman it will be necessary to expand higher education.

CHAPTER THREE

THE DEVELOPMENT OF HIGHER EDUCATION IN OMAN

3.1. Introduction

In the previous chapter we have reviewed some of the key aspects of social and economic development in Oman during the last thirty years which have had an impact on the development of education in general and higher education in particular. We have showed that there is strong case to expand the current capacity of higher education to satisfy future social and economic demands. We indicated that it is likely to be difficult for the public sector to provide all the resources required for this large expansion using the current funding mechanisms.

This chapter will focus on the historical development of higher education in Oman and its current institutional structure. The social and economic demand for education in general including higher education was seen in the last chapter to derive from a young population structure and the economy's dependency on a large number of expatriate workers in the context of the high dependency on oil revenues that are expected to decline in the future. It would therefore appear economically sound to become less reliant on 'importing' higher education and to become more independent in this respect. It is also important to acknowledge the fact that the country needs to educate its own graduates rather than to rely on purchasing foreign education in order to achieve its cultural independence and to develop its own educational infrastructure.

3.2. The development of higher education in Oman

3.2.1. The current system of higher education

It is more logical to review the structure of higher education in Oman as part of the education system as a whole. There are two different structures at present. The first is the general education system that has been for the last thirty years and still in place. The second and the most modern is the basic education system that was introduced about five years ago as part of the long term social and economic development strategies or what is called 'Vision 2020' for Oman. A pictorial simplification of these systems is shown in figures 2-a and 2-b in the next pages.

As it is clear from figure 2-a, that the general education system is structured into four levels. The first is the elementary level that extends for a period of six years enrolling students from the age of 6 to the age of 11. The second is the preparatory or intermediate level for a period of 3 years from the age of 12 to the age of 14. The third is the Secondary level which, as well extends for a period of three years from the age of 15 to the age of 17. At the second year of this level students are divided into sciences and arts secondary according to their choice. These three levels are called the general education system and are under the responsibility of the Ministry of Education.

Students who graduate from secondary school proceed to the fourth level in the education system that would be either a four years higher education program or a technical and vocational training for up to three years. In our view, this is the most critical level in the education system in Oman at present. The deciding factor on which type of post secondary education a particular student can follow is her or his attainment in the general examinations at the final year of the secondary level, as well as the number of places available in higher education institutions. The sharp increase in secondary school graduates as shown in table 3-1 and the limited capacity of higher education institutions indicated in table 3-2

meant that the number of students admitted in post secondary education in general and in four years programs in particular is very small.

Figure 2-a
The structure of the education system in Oman,
(general education)

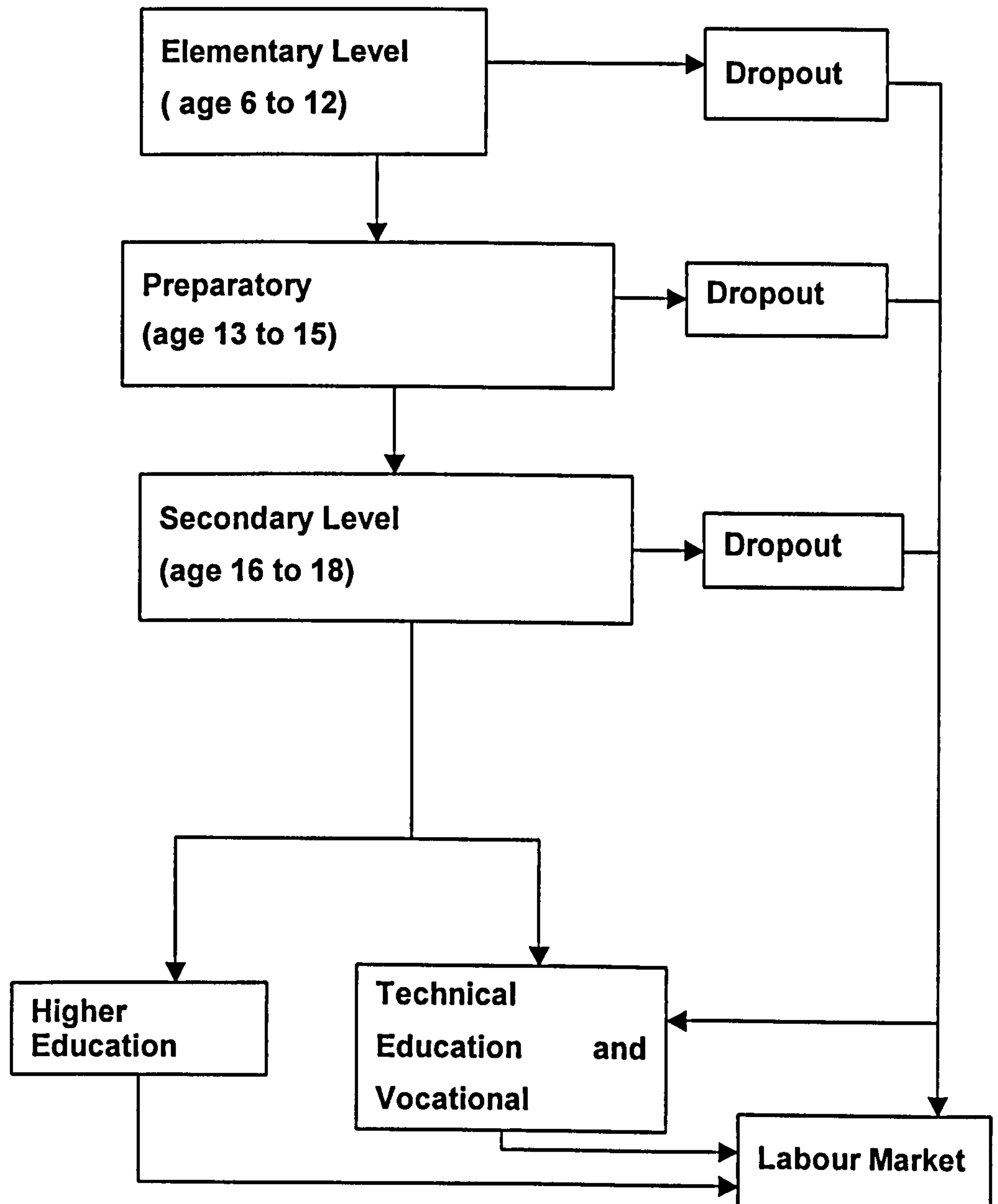
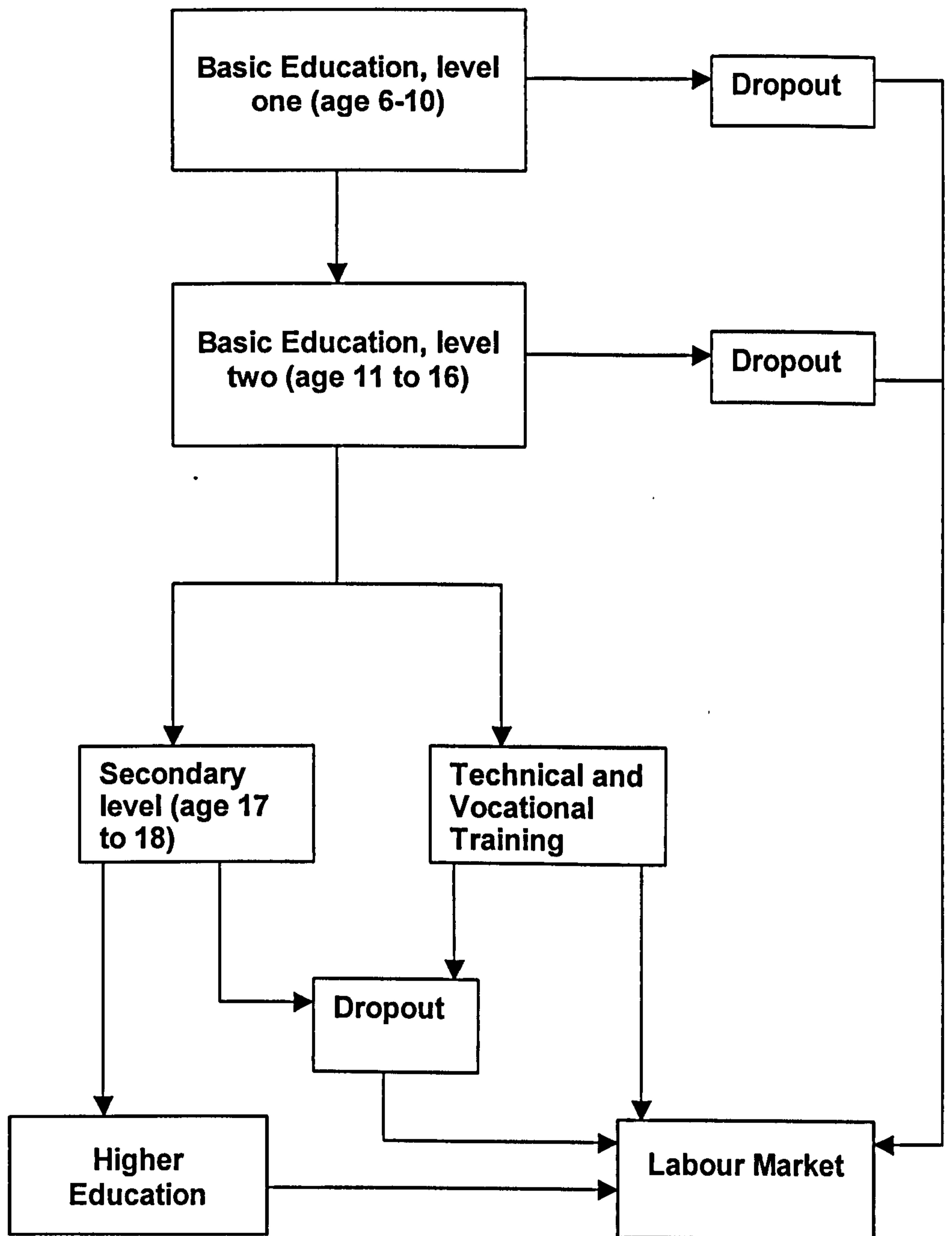


Figure 2-b
The structure of the education system in Oman,
(basic education)



The large number of secondary school graduates who are not absorbed in higher education will face three choices. A small minority will study at private institutions locally and abroad depending on the social and

economic backgrounds of their families. The second choice is to join the labour market as unskilled employees with low productivity and income. Larger portion of graduates is unemployed and therefore will create social, economic, and political burdens for the society. These issues will be discussed in more details in the next sections of this chapter.

The current structure of education is shown in figure 2-a. This 'general education system' has been in place for some 30 years. Five years ago, under 'Vision 2020' modifications were introduced as part of long-term social and economic development strategies. This 'basic education system' was introduced specifically to reform the quality of the education system by making the skills of investigation and enquiry the approach rather than rote learning. This approach is believed to improve learning skills and to enhance the student's ability to acquire knowledge and skills at later stages in higher education and vocational training. The modifications to the general system of education are shown in figure 2-b.

Several reforms had to be introduced as requirements to implement the modern basic education system. The most important was the availability of teachers who understand this new concept and are willing to adopt it. The Ministry of Education has designed teachers' training programs to overcome this problem. Other reforms included curriculum development, the introduction of English language in the first year, the reduction of class size, the extension of school day, and the availability of laboratories and teaching resources centers.

The implementation of this system is proceeding in gradual stages at present both in terms of educational level and geographical coverage. The Ministry has managed to introduce the first stage for the age from 6 to 10 years old in many schools across the country during the last five years. The second stage for the age from 11 to 16 is planned to start in the academic year 2001/2002 with more schools being opened. It is expected that this system will dominate and the old general education system described above will be abolished in the future. The main reason for this

gradual implementation is the large amount of resources both in term of financial and human that are needed for this huge development. However, the Omani Government is committed to this reform and willing to provide all moral and financial support.

A systematic evaluation of the output in comparison with the set of objectives that were described above would not be meaningful at this stage. Such feed-back will require an in-depth scientific inquiry that would be more appropriate after the completion of all the stages and the availability of some cohorts of graduates who will proceed to higher levels of education and training or the labour market. In our view, the degree of success will depend on the accurate and practical implementation of the system.

The third level following the basic education stages is either a two years secondary education or technical and vocational training. The picture on the size of each type and the method of channeling students are still not clear. Concerned authorities and policy makers in this field are working on these issues at present.

The fourth level is a four years higher education program for students who achieve the required result in the final secondary school examinations. According to the social and economic development visions for Oman until 2020, it is estimated that the percentage of students admitted in higher education institutions will be in the range of 30 per cent of the total number graduating annually from secondary school.

3.3. The Institutional structure

The institutional organization of education including higher education in Oman is structured into two main levels. The policy making level which is responsible for setting the general objectives, policies and strategies for the education system as a whole and allocating tasks and responsibilities for individual organizations. It is also responsible for coordinating activities

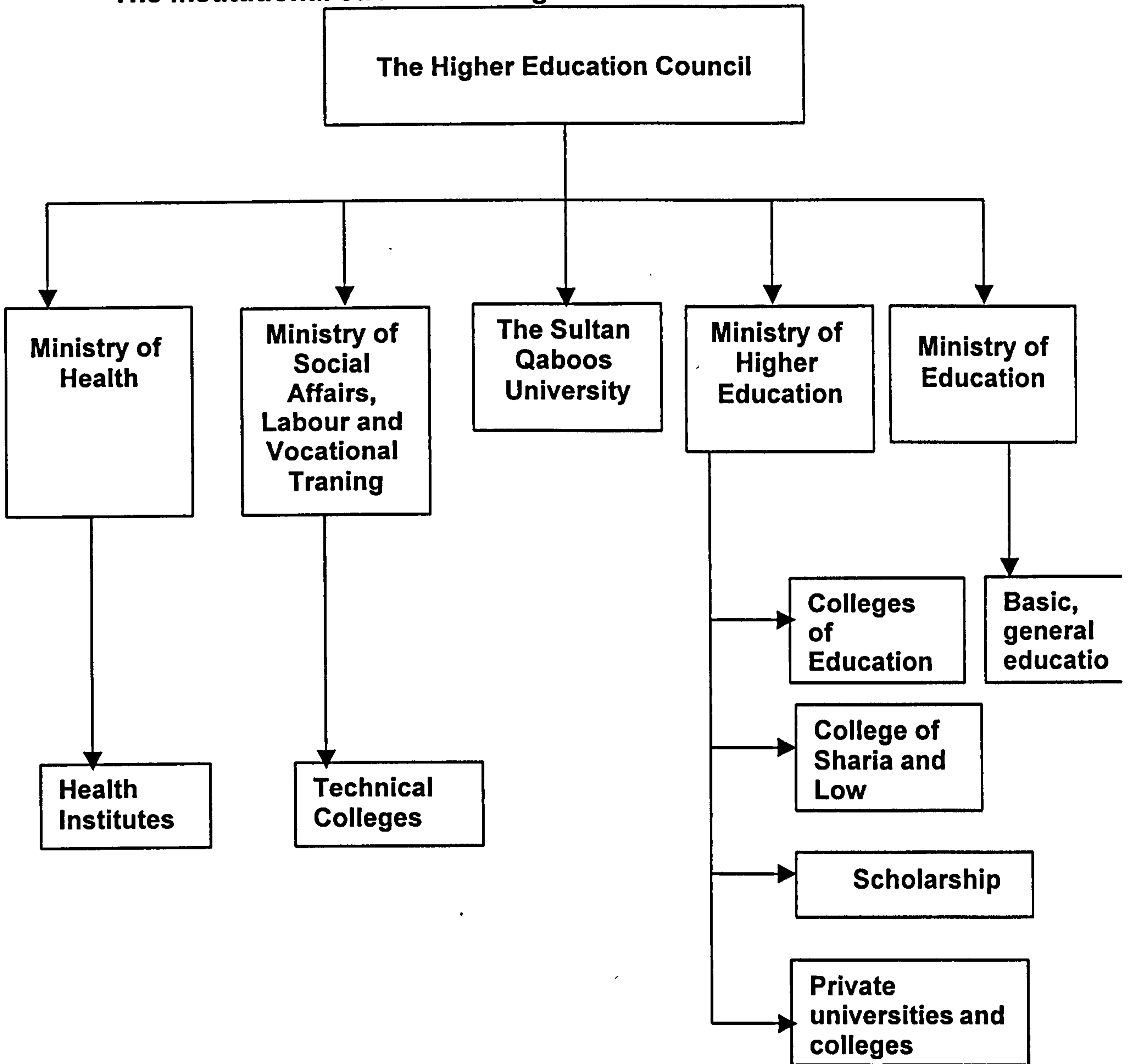
undertaken by these organizations. The Higher Education Council is the institutional authority in this level at present.

The second level comprise the different ministries and institutions that are responsible for implementing the objectives, policies and strategies approved by the Higher Education Council. These include; the Ministry of Education, the Ministry of Higher Education, the Sultan Qaboos University, the Ministry of Social Affairs, Labour and Vocational Training, and the Ministry of Health. Figure 2-c in the next page shows this institutional structure.

3.3.1. The Higher Education Council

The Higher Education Council was established by the Royal Decree number 65/98 issued by His Majesty the Sultan of Oman on the 27th of September 1998. The Minister of the Diwan of the Royal Court was appointed as the president of the Council and the Minister of Higher Education as the vice president. The ministers of National Economy, Education, Social Affairs, Labour and Vocational Training, and the President of the Sultan Qaboos University were appointed as members. The delegation of the councils' presidency to the Minister of the Diwan of the Royal Court who is a very high-ranking minister was meant to strengthen and empower its institutional status and authority. It also shows the level of importance and attention given by the leadership in Oman to higher education as a key factor for human resources development.

Figure 2-c
The institutional structure of higher education in Oman



This importance was embodied in the set of tasks allocated to the Council. According to the Official Gazette (1998) these tasks can be summarized as follows;

Drawing general policies for higher education and scientific research in the universities and other higher education institutions and direct them to meet

the national needs and to achieve social and economic objectives of the country.

- (i) Regulating students' admission in higher education institutions including the allocation of student numbers to be admitted in each institution.
- (ii) Coordinating between higher education institutions.
- (iii) Reviewing laws and regulations governing higher education with the aim of recommending ways of improvement online with the general national policies.
- (iv) Looking at problems facing higher education and recommending ways of solving them.
- (v) Reviewing the draft laws and regulations for higher education that are proposed by concerned authorities.
- (vi) Studying higher education issues delegated to the Council by His Majesty the Sultan and the Council of Ministers.
- (vii) Looking at issues and matters presented by other institutions in relation to higher education.
- (viii) Looking at issues and problems in different level and types of education.
- (ix) Looking at annual reports prepared by universities and other institutions on their performance and recommend methods of improvements.
- (x) Preparing annual reports to the Council of Ministers on the situation of higher education with recommendations for improvements.
- (xi) The periodical follow up for the implementation of its policies and decisions.

The Council undertakes these tasks through periodical meetings that are held once in every four months or according to the needs. The General Secretary of the Council is responsible for documenting the minutes of the

meetings, collecting required data and statistics, and preparing studies that are needed for different issues in front of the Council.

The Council held several meetings since its establishment in 1998 and some policies were discussed and approved for both public and private higher education. An example of these is the decision to allow the establishment of private universities with the government support in terms of financial aid and other incentives as will be reviewed in section 3.3.2.8.

However, we believe that the achievements of the Council could be further enhanced by expanding its membership to include other institutions such as the Ministry of Civil Service and the Ministry of Health who are as well responsible for employment and training. This expansion would enable the Council to involve most of the institutions and organizations working in the field of education and training. Another improvement that can be added is the creation of a technical secretariat supported by experts and professionals in the field of education policy, planning, management and other matters related to education in general and higher education in particular. The Secretariat will provide the technical support for the Council in terms of studying and evaluating the issues proposed by other institutions and by the Council itself in a technical and professional way. This in turn will support the members of the Council on the decisions to be taken.

3.3.2. The second and third levels

Higher education plays an important role in the development of human resources. One of its main tasks is to supply societies with a professional labour force who are highly specialised to work in occupations which require a high degree of practical and theoretical skills and knowledge. The importance of this task has motivated governments to pay great attention to the development of higher education both in term of quantity and quality.

This important function has inspired the Omani government to establish a modern and universal higher education system that will meet the countries' social and economic demand. The historical analysis for the socio-economic development in Oman during the last three decades points to the fact that higher education was given priority within the context of human resources development plans which were drawn up and implemented by the government. Sound objectives, policies, and strategies were introduced and financial and technical supports were provided to establish a modern higher education system

However, the process of quantitative and qualitative development of higher education in Oman was constrained by social and economic development in general and the development of the education sector in particular. In other words, in the first five year development plans which were implemented in the nineteen seventies and the first half of the nineteen eighties most of the efforts and resources were focused on the provision of lower levels of education and training mainly elementary, intermediate, secondary, and vocational education. The fact that there was no formal education in Oman prior to the 1970s was the main reason for this policy. At the same time, and as a consequence of this situation, the number of Omani students leaving secondary school and demanding higher education was small. Accordingly, all secondary school graduates wishing to continue to higher education were given scholarships abroad covering the cost of their studies, travel, and living expenses.

From the nineteen eighties onwards the number of secondary school graduates started to increase sharply as a natural result of the high population growth rate and the universal provision of lower levels of education. Table 3-1 shows the number of students graduating from secondary school in the period from 1976 to 2000.

Table 3-1

General secondary school graduates in Oman, 1976 - 2000

Year	Number of graduates
1976	58
1980	252
1985	2,591
1990	5,311
1991	7,023
1992	9,086
1993	10,946
1994	13,278
1995	15,943
1996	19,067
1997	20,886
1998	24,903
1999	27,037

Source: Ministry of Education (2001)

The Government then decided to focus on establishing local (Omani) higher education institutions. This was crowned by the opening of the Sultan Qaboos University in 1985 which is still the most popular higher education institution in Oman. The following section gives brief review to the most important higher education channels and institutions starting with scholarships.

3.3.2.1. Scholarships

Scholarships provided by the Government for all secondary school graduates to study in foreign universities were the only source of higher education available to Omanis during the nineteen seventies. It was more efficient to provide scholarships for the smaller number of secondary school graduates than to establish local institutions at that time. The Ministry of Education was responsible for providing these until the establishment of the Ministry of Higher Education in the nineteen nineties. The number of Omani students that were send abroad on scholarships started to decline during the second half of the nineteen eighties and the

nineteen nineties as a result of establishing local higher education institutions notably the Sultan Qaboos University and the Colleges of Education. Table 3-2 shows the decline of scholarships in the nineteen nineties.

Table 3-2

Student enrolment in higher education institutions, (1976-1999)

Institution	1976	1980	1985	1990	1995	1999
Sultan Qaboos University	0	0	0	2,473	4,888	7,530
Teachers institutes /colleges	25	483	657	2,244	2,616	8,720
Technical colleges	0	0	266	459	3,915	4,319
College of Sharia and Law	0	0	0	0	0	351
Scholarships	422	1,282	2,681	704	587	554
Health institutes	0	0	175	338	1,345	1,791
Banking institute	0	0	95	214	98	379
Private colleges	0	0	0	0	150	2,076
Total	447	1,765	3,874	6,432	13,599	25,720

Source: Ministry of Higher Education (2001)

3.3.2.2 The Sultan Qaboos University

The Sultan Qaboos University (SQU) was opened in Muscat the capital of Oman in 1986 admitting a total number of 557 students in five of its seven colleges. The University started with the colleges of education and Islamic studies, medicine, engineering, sciences, and agriculture. It has continued to expand both in terms of quantity and quality. From a quantity point of view, the policy was to admit around 2000 new students every year that increased the total number of students enrolled to 7,530 in 1999. In the

quality side, the University started to focus on the national higher education requirements in terms of types of programmes and field of studies demanded by the society and the labour market. In this respect two more colleges were opened; the college of arts was opened in 1987 and the college of economics and commerce in 1993. Another element of the quality aspect was the introduction of postgraduate programmes and research activities in some of the faculties that have been promoted by the University in the last few years. Since its establishment in 1986 the SQU has continued to be the biggest higher education institution in Oman. Table 3-2 shows the number of students enrolled at the University.

3.3.2.3. The Colleges of Education

The formal education revolution which has taken place in Oman since the nineteen seventies and the lack of qualified Omanis to meet the labour demand of this development forced the government to depend on expatriate labour force, especially in the teaching occupations. Other Arab countries, that had surplus teachers such as Egypt, Sudan, and Jordan, were the main source.

The Government realized the crucial importance of Omanizing the labour force in the education sector in all levels. Plans were drawn up to achieve this objective taking into consideration the required resources of which the available number of graduates from the education system was the most important. Accordingly, the Omanization of teaching occupations was implemented in different phases starting with lower levels of education that do not require university graduates.

Teacher training centres offering a diploma in education were first opened in 1976. The intake of these centres were graduates of intermediate schools who were trained for three years to be teachers at the primary level. In 1980 the requirement for admission in these centres was limited to secondary school graduates as a result of the expansion in education.

Another important step in the development of teachers training was the establishment of two teachers colleges in 1984 that offered a diploma in education for secondary school graduates after two years of training. Similar colleges were opened in different regions of Oman in the years that followed, increasing the number to seven by 1990. The greatest improvement in this field was the upgrading in 1994 of programs offered by the colleges to (four years) degree level.

The output of the training centres, teachers institutes and colleges, and the college of education at the Sultan Qaboos University had contributed to a large extent to speed the process of Omanisation of the teaching professions. This was a notable achievement. Colleges of education that are under the supervision of the Ministry of Higher Education, besides the College of Education at the University continue to be the main source of teacher education and training in Oman. Table 3-2 shows the number of students enrolled in the institutes and colleges of education.

3.3.2.4. The College of Sharia and Law

The College of Sharia and Law was opened under the supervision of the Ministry of Higher Education in Muscat in 1997. Its main mission is to offer four years degree programmes in Islamic Sharia law and general law to supply the legal professions. Table 3-2 shows the College enrolment in 1999.

3.3.2.5. The Industrial Technical Colleges

The dependency on expatriate workers in technical and vocational skills has led the Omani government to introduce policies and strategies that will guarantee the availability of vocational training and technical education. These policies and strategies were integrated within the general framework of the social and economic development plan.

Five industrial technical colleges were opened in different regions of Oman during the last ten years. The main task of these colleges is to provide technical and vocational training for secondary school graduates. It was intended that most of the graduates would be employed in the private sector that currently employs most of the expatriate labour force.

These colleges are under the supervision of the Ministry of Social Affairs, Labour, and Vocational Training. Table 3-2 shows that the number of students enrolled in 1999 was more than 16 times the number in 1985.

3.3.2.6. The Health Institutes

The Ministry of Health recognized the urgent need to Omanise the labour force employed in the health sector starting with occupations that do not require high level of education such as nursing and assistant staff in hospitals and the health sector in general. To achieve this objective the ministry opened about 14 health institutes and centres in Muscat, the capital, and other regions of Oman during the last thirty years. Most of the intakes are secondary school graduates who are trained for a period of up to three years and then awarded a diploma in the field of training. The output of these institutes and centres had contributed to a large extent to the Omanisation of occupations in the health sector, especially in the nursing field. Table 3-2 shows the number of students enrolled in the Health Institutes and Centres.

3.3.2.7. The Institute of Banking and Financial Studies

This institute was established in the nineteen eighties under the supervision of the Central Bank of Oman. The main mission was to train secondary school graduates for a period of up to three years. Most of the graduates of this institute are employed in the banking and financial sector. Table 3-2 shows the number of students enrolled.

3.3.2.8. The private colleges

We have already seen that the sharp increase of secondary school graduates and the rising demand of the labour market for qualified manpower created a social and economic demand for higher education. The small capacity of higher education institutions as reviewed above and the high financial cost to expand them, as well as other economic reasons explained in chapter two made it difficult for the public sector to meet this demand.

To overcome this problem the Omani government adopted policies and strategies to encourage the participation of the private sector in the provision of higher education. The Ministry of Higher Education was given the responsibility of setting the roles and regulations that will govern the establishment of private higher education and monitor and follow-up its performance and quality. The private sector was asked to get the permission and approval of the Ministry for opening higher education institutions. Upon the submission of a satisfactory feasibility study that will explain all the technical and administrative aspects the government will give the permission for the project.

During the last seven years nine private colleges were opened, mostly in Muscat area. They were given the permission to admit secondary school graduates who are willing to finance the cost of their education from private sources. All the colleges were allowed to offer programs of studies in different fields up to three years duration awarding diplomas and in affiliation with popular foreign universities. Quality assurance was the main reason for this requirement. Table 3-2 shows the number of students enrolled in the private colleges.

In the last few years these colleges started to face some financial problems that could have threatened their future. The reality that the main objective of private investment in higher education is profit making is an important issue in the establishment and existence of these colleges. In

other words, the low rates of return to investment would force private investors to reevaluate their decision to continue investing in the project leading to the closure of the institution.

The fact that the majority of secondary school graduates are from low-income families made it difficult for them to bear the high tuition fees and other living costs charged by the private colleges. It seems as well that there is a lot of duplication in the fields of studies offered and that most of these colleges offer similar programs. These two factors in our view were the main reason for the low demand for private higher education.

The Government has stepped in to tackle this problem on line with its continuing efforts to promote and encourage the participation of the private sector in higher education. Financial and technical incentives were provided directly and indirectly. For example, it was decided to allow the establishment of private universities to make private higher education more attractive to students who wish to be enrolled in a university level and not a college level higher education institutions. In fact, the Government went further by showing its willingness to provide direct financial support for the establishment of such universities, as well as exempting them from direct and indirect taxes and allocating free lands to build their premises. Another direct financial incentive is the Governments' allocation of hundreds of scholarships for secondary school graduates from low-income families to study in the private colleges. This action had a positive impact for the survival of some of the colleges that were straggling to maintain their activities.

In our view, the development and enhancement of private higher education, whether it is at college or university levels will depend on several factors. First, the quality of private higher education and its willingness to meet the social and economic demand, as well as, the ability to complement and compete with public institutions is an important issue. Second, are the student's social and economic background and the level of household income that will determine the affordability to cover the cost

of studying. Third, is the availability of private financial institutions that are ready to provide sources of funding for individual students and institutions on acceptable terms. Fourth, is the governments' direct and indirect financial and technical support. These views are in agreement with Yussof (2001) who discussed this issue in more details in his empirical research on the case of Malaysia.

As it is clear from this review the only factor in support of private higher education out of those four factors is the Governments' support. We have to stress that the other elements are very crucial and might be deciding factors for the future of higher education in Oman.

Conclusions

The historical development of Omans' education system during the last thirty years was characterized by the domination of lower levels in terms of students' enrollment. More than 50 per cent of the total number of students in Oman were enrolled in elementary level in 1999. The ratios for intermediate, secondary and higher education levels were 25.4, 17.2 and 3.9 per cent respectively at the same year. We have explained that the lack of formal education in the period prior to the 1970s and the high population growth rate during the last three decades are the main reasons for this phenomenon.

However, the number of secondary school graduates started to rise sharply in the mid-1980s onwards causing increasing pressure on the capacity of higher education institutions. For example, the total capacity of public institutions could not admit more than 30 per cent of total secondary school graduates in 1999. The remaining 70 per cent were left to sort out their future through private higher education, joining the labour market as unskilled workers or to be unemployed. At the same time, a shortage developed in the number of higher education graduates required by the labour market and it is expected to continue for many years to come.

CHAPTER FOUR

THE MARKET FOR HIGHER EDUCATION IN OMAN

4.1. Introduction

In our review of the economy of Oman, we have shown that there is both an economic and a social case for expanding the provision of higher education. The facts that Oman imports both graduate education and skilled graduates mean that there are substantial potential savings and benefits from expanding the higher education sector. The questions that needs to be clarified concern what is desirable, and what is possible. The purpose of this chapter is to analyse the broad structure of the market for higher education in Oman in terms of demographic factors and to set out options for the Government based on alternative assumptions about the amount of resources to be devoted to the expansion of higher education.

A free market economy is one in which free competition results in price balancing supply and demand in all markets. In Oman, higher education has hitherto been provided free by the state. The only sacrifice for students has been the income foregone while in higher education. For the society (Government), the price can be thought of as the production foregone by students not being in the workforce. The balancing of supply and demand has to be achieved by the Government which determines the capacity of higher education. Thus, the 'shadow price' is the ratio of resources allocated to higher education to all other employed resources.

In what follows, we shall analyse, first, the number of secondary school graduates who will be seeking admission to higher education. Second, we will review how the capacity of public higher education in Oman has developed in the last 30 years in terms of number of places available to students. Together these analyses will give an indication of the limits to the demand for higher education and the capacity of Oman to supply it. This

will enable us to determine the degree to which it might be necessary to expand the current capacity.

Clearly, this analysis will only establish the broad parameters of the market, both supply and demand will be influenced by social and political as well as economic influences. For example, private sector higher education is expanding and a new private university was established in 2001. The establishment of this private university is likely to have been based on an analysis of the situation similar to that presented here. A part from the capacity it will add to the higher education system, it is hard to predict the influence it is likely to have on the higher education sector.

4.2. The Demand for higher education

Demand in economics refers to what will be purchased at a given price. Since higher education is free in Oman, apart from real and opportunity costs, we are here using the term to denote a wider concept concerned with the preferences of private individuals and, or, the government. From this point of view total demand can be subdivided into the social and the economic. The social demand is the amount of places required by individuals and can be measured by the total number of secondary school graduates or other individuals in the population who are qualified to be enrolled in higher education. This is termed 'social' because it indicates not only those who would normally wish to enter higher education but also those who might not consider entering higher education but whom the government wants to be educated in the society's interest. On the other hand, the need of the national economy for qualified human resources represents the economic demand. It can be estimated by identifying the labour market requirements for graduates to enter the professions.

We showed in table 2-8 on page 12 that more than 40 per cent of the Omani population was under the age of 15 years in 1993. Recent estimates by the Ministry of National Economy indicate that the annual population growth rate is still very high. The flow of large numbers of

students to the upper levels of education as indicated in tables 3-1, 3-2 and 3-3 provides a strong case for the sharply increasing social demand. A clear example to prove this factor is that the total capacity of higher education could not admit more than 30 per cent of total secondary school graduates in 1999. The other 70 per cent had to opt for privately funded higher education, to join the labour market as unskilled workers, or to be unemployed.

It was also indicated in the previous chapter that the Omani labour market demand for higher education graduates would exceed the supply even until the year 2020. The estimates provided by the Ministry of National Economy and presented in table 2-16 show that there will be a deficit of more than 14 per cent in occupations that require (4 years higher education) graduates by the year 2020. If other occupations that require some sort of higher education and training such as science and non-science technicians, nurses, health care workers, skilled clerical and manual workers are added, the deficit will increase to 31 per cent of the total requirements in these occupations. The estimated shortages or deficit could be filled either by expanding the current capacity of public higher education or by importing expatriate labourers. The large amounts of social and economic benefits make it more desirable for the country to expand the current capacity of public higher education.

The official estimates for future supply and demand for the labour market in Oman, as explained in the last chapter, show a much larger deficit in lower level occupations. For example, there will be a 70 per cent deficit in the unskilled labour by the year 2020. This might cast some doubt on the justification for further expansion of higher education from an economic point of view, in the long term. If the current capacity of higher education is to be expanded dramatically then one could argue that the supply of graduates would exceed the labour market demand in the future. In this situation higher education graduates will end up as unemployed or they might be forced to accept jobs that require lower levels of education and

training. This can be viewed as an economic wastage or misallocation of private and public resources. In other words, such resources could be allocated to other levels and types of education that are in greater demand and, therefore, which would be of greater direct benefit to society.

Nevertheless, there are several factors that would support the policy of further expansion of higher education. First, the estimates of labour market requirements should be treated with caution. It is widely acknowledged that there is a large margin of error associated with the results of long term human resource planning models that are used to project the labour supply and demand. The estimates in our analysis were produced by the Ministry of National Economy for the purpose of human resources planning in Oman for a period of 25 years from 1995 to 2020. There are already signs that the assumptions used in these estimates require further updating. A clear example is the fluctuation of gross domestic product as a key assumption. The estimates were based on 3.5 per cent annual increase in gross national product for the whole period while the average for the last five years has been more than 4 per cent. This means that the actual demand for labour is higher than that estimated. (See section 4.5 below.) The movement of the Omani economy from low skill based activities to more advanced modern sectors that require higher skills in the long term make the actual demand for higher education graduates likely to be significantly more than that estimated at present.

The second factor is that the definition of the demand for graduates used for the estimates was limited to the Omani labour market. The establishment of the Gulf Cooperation Council (GCC) by the six of the Gulf States (Saudi Arabia, United Arab Emirates, Oman, Qatar, Kuwait, and Bahrain) in the late 1980s has allowed the mobility of employees within the region by giving equal rights in terms of wages, salaries and employment conditions. This is likely to lead to Omani graduates moving to the other states where demand is high compared to Oman and where salaries are also relatively higher. As expatriate workers they will have the added

advantage of being native Gulf citizens. This regional demand factor was first sited in the 1980s by the GCC General Secretariat and with continuing social and economic growth in the area, it is likely to be of increasing significance and could lead to a deficit developing in the Omani labour market (GCC 1990). While this factor concerns wider economic policy issues, and concerns only a small part of demand, its affect on the outcome of demand forecasts is worth keeping in mind. Accordingly the real demand for qualified graduate manpower is likely to be higher than that estimated.

To sum up there is a need to expand the current capacity of the system. The current estimates for the future labour supply and demand in Oman, produced by the Ministry of National Economy in the first half of the 1990s, show larger shortages in the Omani labour force in lower level occupations that do not require higher education. On the other hand, there is reason to believe that official estimates of the demand for graduates underestimate the true situation. Policy makers have tended to focus their attention on lower levels of education and training and to allocate resources to this sector at the expense of higher education. However, the expansion of primary and secondary education calls for more teachers who are the product of higher education. So it may be argued that an expansion of higher education is required in order to achieve other educational facts. In the context of the Omanisation policy of the Government, this means the training of more graduates.

4.3. The capacity of the higher education system

The capacity of public higher education under study refers to the total number of higher education opportunities or places available for all who are qualified for admission in terms of academic requirements and age

specifications (gross enrolment)¹. This includes all post-secondary education and training and the university education with which this study is most concerned.

Most of the officially published data concerning enrollment in higher education in Oman relates total enrollment to the total number of secondary school graduates rather than those in the age group of the population who are supposed to be in higher education². This indicator therefore overestimates the enrollment level by omitting a large number of the population from the demand side and therefore gives a misleading picture of the situation.

Accurate time series data on the Omani population of the age group 18 to 24 who are supposed to be in higher education are not available to compare with the enrollment level. The UNESCO (2000) estimated the gross enrollment ratio in higher education in Oman by 4.1 per cent in 1990 and 8 per cent in 1996. These are considered as small in comparison to other countries as will be shown below in our discussion on international comparisons of enrollment.

The comparison of enrollment in higher education with other levels of education might provide some idea of the past and current capacity of the system. Table 4-1 shows the concentration of enrollment in lower levels of education especially the elementary level. In 1977 about 93 per cent of total enrollment was at the elementary level, by 1999 enrollment at this level was still more than 50 per cent of the student population. Enrollment in intermediate and secondary levels started to increase sharply during the 1980s and the 1990s. Enrollment in higher education continued to be low

¹ According to UNESCO (2000) Gross Enrolment Ratio in higher education (%) is the percentage of those who are enrolled in higher education of the population who are in the age group from 18 to 25 years old.

² The age specification for admission to the SQU is normally 18 years and mature students are admitted in the degree level programs.

in comparison to lower levels but during the 1990s, when the number of secondary school graduates started to increase, it doubled to 3.9 per cent.

Table 4-1
Student enrollment in all levels of public education in Oman

Year	Total (000)	Elementary level		Intermediate level		Secondary level		Higher education	
		(000)	Per cent	(000)	Per cent	(000)	Per cent	(000)	Per cent
1977	76.7	71	92.6	5	6.5	1	1.3	0.7	0.9
1980	108.8	92	84.6	14	12.9	2	1.8	1.8	1.6
1985	222.4	175	78.7	33	14.8	11	4.9	3.4	1.5
1990	362.6	258	71.1	72	19.9	26	7.2	6.6	1.8
1995	503.2	297	59.0	122	24.2	69	13.7	14.2	2.8
1999	563.9	303	53.7	143	25.4	97	17.2	21.9	3.9

Source: Ministry of National Economy (2001)

In 1977 some 100 per cent of secondary school graduates were enrolled in higher education. By 1999 it was not possible to accommodate all secondary school graduates and only 16.4 per cent were enrolled. As can be seen from tables 4-1 and 4-2 this inability to accommodate the growing number of secondary school graduates began in the mid 1980s and grew in the 1990s. In the absence of other data, we take table 4-2 to indicate the capacity of the higher education system. It can be seen that there has been a structural decline in admissions to higher education since 1994.

It is clear that the ratio of student enrollment in higher education in Oman is low in comparison with enrollment in other levels of education and the annual number of secondary school graduates especially during the 1990s. This indicates that the current capacity, or supply of higher

education, is not sufficient to meet the increasing demand and therefore more opportunities have to be found.

Table 4-2
Annual admission of secondary school graduates to higher education in Oman, 1994-1999

Year	Secondary school graduates	Admission to all post secondary education		Admission to 4 years higher education	
		Total number	Per cent of graduates	Total number	Per cent of graduates
1994	13,271	5,672	44.6	3,422	25.8
1995	15,943	6,004	37.7	3,647	22.9
1996	19,067	6,734	35.3	4,308	22.6
1997	20,886	7,523	36.0	4,708	22.5
1998	24,903	6,628	26.6	4,096	16.4
1999	27,037	7,964	29.5	4,433	16.4

Source: Ministry of Higher Education (2001)

4.4. International comparisons

Table 4-3 shows that compared with other upper middle income countries at a similar level of development Oman has a relatively poor enrollment in higher education. According to the UNESCO (2000), gross enrollment (i.e. the ratio of the population of the age group 18 to 24 who are supposed to be enrolled in higher education) was 4.1 per cent in 1990 and 8 per cent 1996 in Oman.

The lowest ratio was in Botswana at 3.2 per cent 1990 and 5.8 per cent in 1996 while South Korea achieved the highest ratio of 38.6 per cent in 1990 and 67.7 per cent in 1996. The world average ratio was 13.8 per cent in 1990 and 17.4 per cent in 1996. It can be seen that Oman was well below average in both.

Table 4-3

Student's enrollment in tertiary education in upper middle-income countries in 1990 and 1996 (percentage)

Country	Years	
	1990 (per cent)	1996 (per cent)
Oman	4.1	8.0
Saudi Arabia	11.6	16.3
Lebanon	28.9	27.0
Malaysia	7.3	11.7
South Korea	38.6	67.7
Argentina	38.1	36.2
Barbados	27.2	28.7
Botswana	3.2	5.8
Brazil	11.2	14.5
Chile	21.3	31.5
Croatia	23.9	27.6
Hungary	14.0	23.6
Malta	13.0	29.3
Mauritius	3.5	6.1
Panama	21.5	31.5
Poland	21.7	24.7
Czech R.	16.0	23.5
South Africa	13.2	17.2
Estonia	26.0	41.2
Gabon	5.7	8.0
Mexico	14.5	16.0
Uruguay	29.9	29.5
World	13.8	17.4

Source: UNESCO (2000)

Even though there were some improvements, as we have indicated previously in this chapter, the enrollment ratio in Oman has not changed a lot during the last five years. Accordingly, this comparison provides further support for the policy of increasing the capacity of higher education.

The level of the required expansion must be based on supply and demand factors as well as on other elements influencing the provision of higher education in the short and long-terms. There is no doubt that the current small capacity needs to be expanded, but the crucial issue of concerns is how much expansion is required? In a free market, expansion would be determined by what people are willing to spend but where education is free, the government has to determine the resources to be allocated whether or not education should continue to be free to all secondary school graduates without limits in terms of quantity and quality.

4.5. Different scenarios for future development

In order to create a preliminary picture of the future size of higher education in Oman, it is of crucial importance to look at the issue of supply and demand for higher education in the coming years. Tables (4-5, 4-6, 4-7, 4-8) in the appendix present four different options (scenarios) for the future size of higher education that will be determined by public demand (secondary school graduates) and the labour market demand. The main sources of data used to generate these scenarios are statistics published by the Omani Government, mainly the Ministry of Development. At this stage they can be used as indicators to create some pictures for future supply and demand for higher education.

The estimates of the supply and demand for higher education for the period from 1997 to 2020 that are presented in the appended tables 4-5, 4-6, 4-7, 4-8 are based on the following assumptions;

1997 was used as a base year for secondary school graduates as well as for the number of student admitted to higher education. Based on the on data produced by the Ministry of Education in Oman, the number of graduates is estimated to grow by nearly 4 per cent annually.

The number of students admitted to higher education is estimated by taking different enrollment ratios of secondary school graduates. In the first scenario the assumption is that the ratio of 22.5 per cent that was admitted

to higher education in 1997 will remain constant. Subsequently we explore the implications of increasing this rate to 30 percent, 40 per cent, and 50 per cent. The number of students graduating from higher education is estimated on the base that the average period required for graduation is 5 years as it is the case at the Sultan Qaboos University and the rate of drop-out is 5 per cent.

The total number of employees in the labour market and the number of Omanis and non-Omanis were estimated by the Ministry of Development in 1994. The estimates were based on an average growth rate of 3.37 per cent in the total number of employees and the Omanization of jobs currently occupied by expatriates at an average rate of 4.3 per cent for the next period up to 2020.

The total demand for Omani graduates is the sum of the total number of non-Omanis in the labour market and the annual increase in total number of employees. The balance that shows the deficit or surplus of Omani employees is calculated by deducting the total number of graduates from the total demand for Omanis. Table 4-4 shows the effect of admitting 22.5, 30, and 40 percent of secondary school graduates in higher education on the balance of graduate labour supply and demand.

According to these scenarios the balance of total demand for Omanis with the available number of graduates from higher education shows that there will be a deficit of about 4132 graduates by the year 2020 if there is no expansion to the current capacity of higher education. If the capacity is expanded to admit 30 per cent of annual secondary school graduates the deficit will be reduced to 131 graduates by the same period. Further expansions to admit 40 or 50 per cent of secondary school graduates will reduce the period by 3 and 5 years respectively.

Table 4-4

The impact of increasing admission of secondary school graduates to higher education on the balance of graduate supply and demand

Year	Alternative assumptions on the percentage of secondary school graduates admitted			Supply minus demand for graduates in higher education		
	22.5	30	40	22.5	30	40
1997	4267	6266	8354	-40978	-40978	-40978
1998	4438	6517	8688	-38408	-38408	-38408
1999	4615	6777	9036	-36818	-36818	-36818
2000	4800	7048	9397	-35262	-35262	-35262
2001	4992	7330	9773	-33163	-31264	-29280
2002	5191	7624	10164	-31625	-29650	-27587
2003	5399	7928	10570	-30088	-28034	-25889
2004	5615	8246	10993	-28553	-26416	-24185
2005	5840	8575	11433	-27018	-24797	-22476
2006	6073	8918	11890	-25485	-23174	-20761
2007	6316	9275	12366	-23953	-21550	-19040
2008	6569	9646	12861	-22422	-19923	-17312
2009	6832	10032	13375	-20892	-18293	-15578
2010	7105	10433	13910	-19363	-16660	-13837
2011	7389	10851	14466	-17835	-15024	-12088
2012	7685	11285	15045	-16309	-13385	-10332
2013	7992	11736	15647	-14783	-11743	-8567
2014	8312	12206	16273	-13259	-10097	-6794
2015	8644	12694	16924	-11735	-8447	-5012
2016	8990	13202	17601	-10213	-6793	-3220
2017	9350	13730	18305	-8691	-5134	-1419
2018	9724	14279	19037	-7171	-3471	392
2019	10112	14850	19798	-5651	-1804	2215
2020	10517	15444	20590	-4132	-131	4048

Source: tables 4-5, 4-6, 4-7, 4-8 in the appendix to this chapter

The admission of 50 per cent of total number of graduates annually would require a large amount of resources and might end up in producing large number of unemployed graduates in the long-term. At the same time the admission of 30 per cent would not make much difference and will not solve the deficit problem. Accordingly the most acceptable level would be

to admit 40 per cent of secondary school graduates annually. This will satisfy the demand from those who are qualified for admission to higher education. At the same time it will satisfy local and regional labour market demands for graduates.

The impact of admitting more students on the capacity of higher education institutions in terms of extra resources that would be required to meet this expansion is an important issue. It is clear that admitting 30 per cent of graduates, will result in about an extra 47 per cent in the total number of students admitted to higher education than would otherwise have been the case by 2020. This growth will be around 97 per cent if the admission rate were 40 per cent as we have suggested. In other words, the current capacity of higher education institutions would have to be expanded by more than half to achieve such levels of admission.

4.6. Other influences on the supply and demand

The foregoing analysis deals only with demographic factors. As is the case for many other goods and services that have a market value, supply and demand is not only governed by the number of people (consumers) in that market but by many additional influences. Demand is influenced by price, tastes and expected utility (benefits) and supply is influenced by expected benefits. We cannot specify precise supply and demand functions for higher education in Oman but it is relevant to acknowledge at least, the other influences that might affect demographic factors.

In the general, the most important economic factors influencing both public and private supply and demand for higher education are the direct and indirect costs and the expected benefits. The provision of mass public higher education is often constrained by limited public resources. At the same time, the level of direct private cost (fees) and other expenses, as well as the opportunity cost (income foregone) have an influence on individual's decision to enroll in higher education. For example, students from low-income families will experience difficulty in bearing the cost and,

therefore, it will affect their decision to pursue higher education. Another economic factor is that low expected benefits from obtaining a higher education qualification may deter individual students from enrolling in higher education. Expected levels of wages and salaries and the future shape of labour supply and demand for qualified manpower are likely to be the main determinants of demand. In other words, the costs and benefits and the expected rates of return to investment in higher education will have an important influence on the public and private decision to invest and therefore on the supply and demand for higher education.

Further more, the existence of many public and private benefits that are difficult to measure such as externalities and spillovers from higher education have an influence on the supply and demand. These are major economic factors for public provision that means that higher education is not a pure private good, and therefore, if supply and demand are left to be decided by free market mechanisms there will be a market failure. In other words, individual consumers who try to maximize their own personal benefits from investment in higher education will not consider other public externalities and spillovers. If they anticipate that their private benefits do not justify the cost they will not invest in higher education and then the supply and demand will be negatively affected. A well-educated population brings many benefits to the society in general apart from the economic. Accordingly, governments interfere in the supply of higher education in order to maximize social externalities and spillovers. Examples of these externalities are the creation of an educated and enlightened society that respects cultural and moral values. The real benefits of such a society are seen in its stability, high living standards and respect of the law.

In addition to the economic factors, there are social influences. Among the most influential social factors are family background in terms of level of education, occupation, and income. These factors influence both supply and demand. From the supply perspective, many governments, especially in less developed countries, provide free access to higher education. At

the same time, parents with higher qualification levels and income, and employed in professional occupations, tend to motivate their children to continue to higher education and provide them with funding. Other social influences include ethnic groups, religion and language. In many countries, these elements have positive and negative effects. For example, it was found that more students of Chinese backgrounds tend to enroll in education in Malaysia than those of other ethnic groups. Accordingly the Malaysian Government provided greater access to education to motivate other ethnic groups of the population. (Foster 1965). It is clear from this case that ethnicity had an influence on the demand of Chinese students for education, as well as on the supply, by encouraging the Malaysian Government to provide more access to education for others. Religion and language also are found to have an effect on the demand of education. (Dutcher 1982).

Finally, in many non-democratic countries, the provision of higher education is influenced by special political factors. Higher education is used as a place to spread political ideologies and create an elite in society which is loyal to the government. It is also used as a means of rewarding service to a particular region, tribe, or any group of the population who support the government.

All these economic, social and political influences apply to higher education in Oman. One further important factor that cannot be pursued here is the founding in 2001 of a private university (Sohar University). The development of a private sector in Oman suggests that higher education is seen as potentially a very profitable activity. The Government should view this as encouraging for two reasons: first, it will provide extra capacity in higher education that will either reduce the need for it to spend or will provide a vehicle for achieving its targets; and second, it provides reassuring evidence that the expected rate of returns on investment in higher education is attractive.

4.7. Conclusions

Both demographic forecasts and comparisons with other similar countries indicate that there is an urgent need to expand the current capacity of higher education in Oman by providing more places for secondary school graduates and increasing the levels of admission. The analysis of these scenarios of the future supply and demand for higher education indicated that the most desirable and feasible would be to admit 40 per cent of secondary school graduates annually. Accordingly, total annual admission will increase by nearly 97 per cent in comparison to the current level and therefore will require the allocation of more resources to facilitate this expansion assuming that current resources are fully utilized.

However, other economic, social and political factors must be taken in consideration in the analysis of the market for higher education. Economic factors such as the cost and benefits and the expected rates of return as well as public externalities and spillovers have an influence on the supply and demand for higher education. Social factors including family backgrounds, religion and language are important influences, and public provision of higher education in some countries is motivated by political objectives and policies.

An important case to make is that social and economic demands for a particular public service are not the only factors for the allocation of more or less public resources. Government policy makers could argue that other public services and utilities are in the same situation and they require more development and more resources as well. The reality that public resources in Oman are facing several constraints as explained in the chapter 2 makes the problem worse. Therefore, a balanced and rational policy has to be adopted that takes account of the economic, social and political desirability of higher education relative to expansion in other

areas. Such a policy would acknowledge that expansion in other areas of the economy will require an expansion in higher education. The development of a private sector higher education will not change the problem but should assist in the solution.

The analysis of private (individual) and public (social) rates of return to investment in public higher education can be used as an indicator of the cost and benefits and therefore provides some basis for future policies. This analysis of the market for higher education leads to the treatment of expenditures as investment which improves and extends the stock of 'human capital'. This, in turn, leads to the applications of computational techniques of investment analysis to investment in higher education. In the following chapters we shall explore the origins of thinking on this approach to education in the literature, and describe the associated tools of investment analysis.

CHAPTER FIVE

THE DEVELOPMENT OF THE HUMAN CAPITAL APPROACH TO EDUCATION

5.1. Introduction

The economic theory on which the financing of education in general is based assumes that individuals and societies allocate resources to achieve material benefit. Rational economic decisions are made on the basis of maximizing net benefits. These benefits may comprise consumption and, or, investment elements. If education is perceived to yield higher benefits to the individual or society than its cost, then more resources will be invested. This approach has developed from the time of Adam Smith to the sophisticated human capital theory developed in the US by Schultz and Becker, during the 1960s.

Human Capital Theory provides the basis for tackling many issues in education especially the analysis and evaluation of finance and funding mechanisms. Over the last 30 years this approach which has been developed in advanced nations has increasingly been applied to developing economies. Empirical work started to appear in the United States and other industrialized countries, where education systems were expanding and solutions and policies were required for development. In later periods, these tools were also used in developing countries, especially through the World Bank and other international organizations.

Education may be regarded either a consumption good or an investment good, or both. Consumption benefits increase present satisfaction to those who are in education whereas investment by individuals and societies leads to the development and enhancement of the specific skills and general abilities which constitute human capital. All expenditures on labour that increase its productivity are regarded in human capital theory as

investment comparable to the expenditures on maintenance and improvement of plant and machinery. The theoretical framework for this research is based on the human capital concept. The finance of higher education is thus regarded as an investment in human capital from both a private and a public point of view.

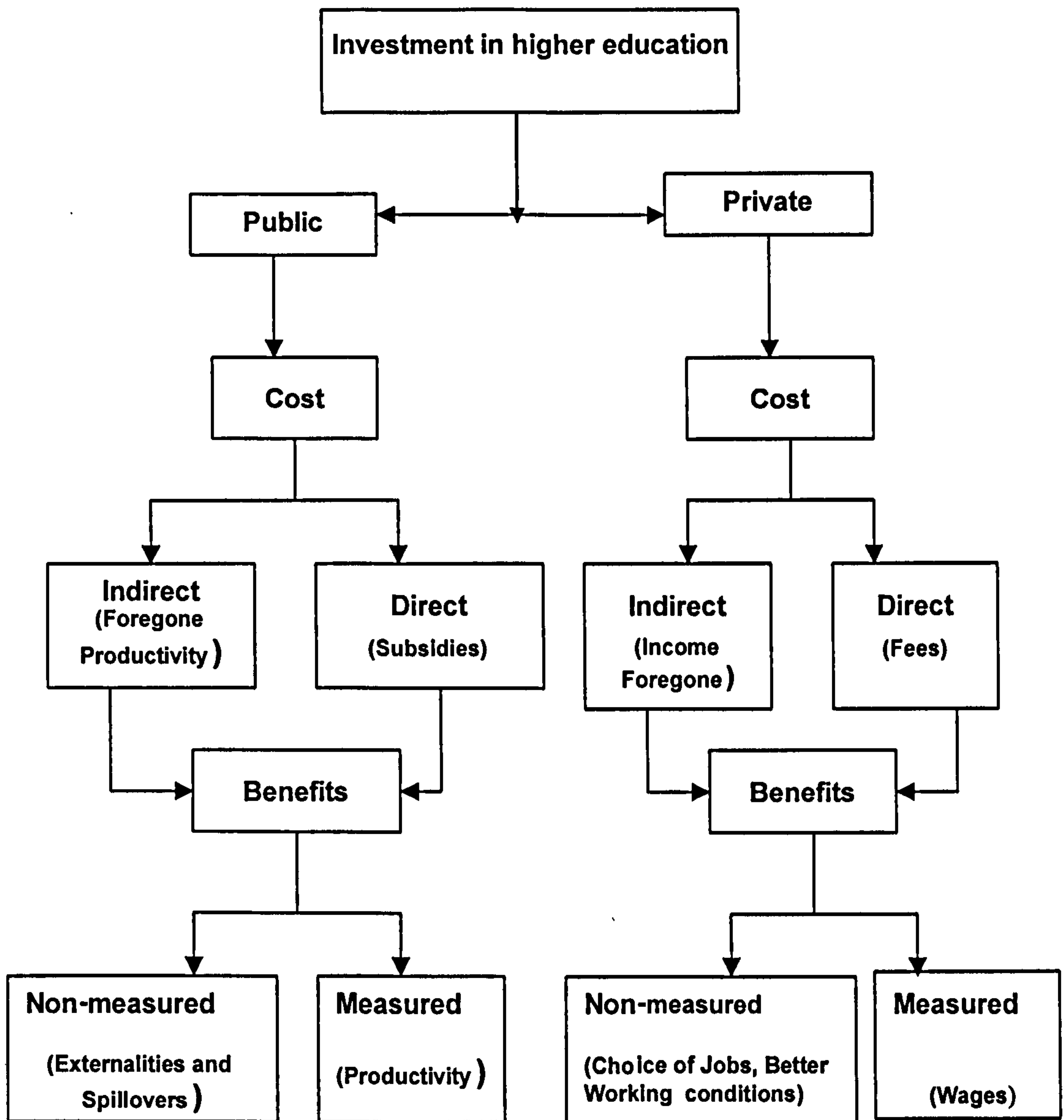
It follows that the skills and knowledge gained from education that has market value will yield future monetary and non-monetary benefits for both individuals and societies. For example, improved labour productivity resulting from enhanced skills and knowledge should lead to higher income for the individual and an increased level of economic growth for the society. These are set out schematically in figure 5-a. Empirical studies by Hansen (1963), Becker (1964), Marenbach (1973), Psacharopoulos (1973, 1980, 1981, 1984, 1994), Carnoy and Marenbach (1975) and Williams and Gordon (1981) all provide strong examples that give support for this view.

5.2. Historical origins

The historical roots of the human capital theory are linked to the period of classical economics. Schultz (1961, 1963, 1981), Kiker (1966), Blaug (1970) and Wykstra (1971) all argued that early interest in the development of the human capital concept by economists such as Petty, Smith, Say, Von Thunen and others was motivated by the need to draw attention to factors such as systems of compensation for injury and death, the development of a relevant tax system, and the impact of education and training which affect the working individual.

Adam Smith devoted a large part of the *Wealth of Nations* to human resources and the definition of labour. He believed that the skills and knowledge accumulated by the labour force to be the main factors of economic growth. By including human capital in his definition of capital, Smith believed that expenditures on education and training were equivalent to capital investment.

Diagram 5-a
The human capital concept
of investment in higher education



“....the wages of labour vary with the easiness and cheapness, or the difficulty and expense of learning the business. When any expensive machine is erected, the extraordinary work to be performed by it before it is worn out, it must be expected, will replace the capital laid out upon it, with at least the ordinary profits. A man educated at the expense of much labour and time to any of those employments, which require extraordinary dexterity and skill, may be compared to one of those expensive machines. The work, which he learns to perform, it must be expected, over and above the usual wages of common labour, will replace to him the whole expense of his education, with at least the ordinary profits of an equally valuable capital. It must do this, too, in a reasonable time, regard being had to the very uncertain duration of human life, in the same manner as to the more certain duration of the machine” (Smith 1776, 1973, p. 203-204).

Alfred Marshall (1961) suggested that education can be regarded as a form of personal investment and that the motive to invest in education and training followed the same rules as other types of investment. These two examples are clear evidence of the early recognition of the importance of investment in education and its social and economic benefits to individuals and societies. However, after this, interest declined until the 1960s possibly because economists wished to keep human and non-human resources separate for ethical reasons.

“The moral implications of viewing human beings as capital also appeared to have discouraged more complete acceptance to the human capital concept” (Wykstra, 1971, p. 3).

A further technical reason for the lack in interest according to Kiker (1966) was the difficulty of separating the consumption and investment values in education. Another factor is that the financial resources required for the provision of education, in these periods, were fully met by governments without difficulty. This is due to the fact that private demand for education was small especially at the higher and more-expensive levels of education (OECD, 1990).

5.3. Modern developments

According to Blaug (1970, 1976, 1983), Wykstra (1971) and Johnes (1993), most empirical work in this field only started in the period after the 1960s.

"The birth of human-capital theory was announced in 1960 by Theodore Schultz. The birth itself may be said to have taken place two years later when the Journal of Political Economy published its October 1962 supplement volume on "Investment in human beings" (Blaug, 1976, p. 3).

In trying to explain the rate of economic growth in the USA and other economies, economists encountered a substantial residual which they attributed to the quality of human capital employed. In simple terms the theory predicts a positive correlation between investment in education and training and future pecuniary and non-pecuniary returns. This derives from the assumption that individuals, households, and societies make rational choices and decisions to invest in education and training which develop and enhance skills used to improve labour productivity. This in turn increases the level of income (wages and salaries) for the individuals, and promotes economic growth for the society. Thus Schultz (1981, P.

xi) argued:

"There is much anxiety about food, energy, space, and other physical properties of the earth. Such anxiety is not new. It was expressed cogently at the beginning of the nineteenth century by David Ricardo and T.R. Malthus. To the extent that the present foreboding are based predominantly on assessments of the declining physical capacity of the earth, I reject them, because a valid assessment must reckon on the abilities of man to deal with changes in the physical properties of the earth. These abilities are ignored in these earth view assessments. Increase in the acquired abilities of people throughout the world and advances in useful knowledge hold the key to future economic productivity and to its contribution to human well-being.

The thrust of my argument is that the investment in population quality and in knowledge in large part determines the future prospects of mankind. When these investments are taken into account, foreboding concerning the depletion of the earth's physical resources must be rejected. A decidedly favorable achievement of many low income countries during recent decades is their investment in population quality."

Denison (1962), Johnson (1964), Becker (1964), and Weisbrod (1966) all supported Schultz' concept of human capital theory. Denison used the concept of human capital to answer three major questions related to the past and future of economic growth in the United States of America. The

first was to identify the sources of past growth and their share in the overall-economic growth rate. The second question concerned the future forecast of sources of growth. He used the solutions to these questions to answer a third concerning the level of alteration to future growth rates as a result of various actions, and policies. He found out that human capital, in the form of labour quality, represents a major input to the answers to these questions.

Johnson argued that early postwar emphasis on the role of physical capital as the main source for improved productivity was over estimated. He believed that economic development depends on the quality of human capital employed in the production function. Further more, he argued that the short comings of the approach that material capital represents the major input for economic growth has led to the increasing interest in the role of human capital quality.

Weisbrod criticized the conventional methods of explaining economic growth in the United States of America, by arguing that physical capital inputs account for only half or less of the growth of per capita output. He attributed this gap to the rapid growth in total capital stock including human capital.

“Studies of the sources of economic growth that have measured only changes in the stock of physical capital (plant and equipment) have been incomplete; they have neglected the growing investment in human capital” (Weisbrod 1966, p. 70).

The concept of human capital to Wiesbored *“represents resources which man has utilized to augment his personal productivity.”* At the same period Becker (1964) tried to provide some empirical evidence to support this theory. His empirical analysis of rates of return represents pioneering attempts to evaluate and analyze investment in education and training. For this purpose he developed the basis for quantitative methods to measure the rate of return to investment in education and training which are still used by many researchers.

In a review of past and recent developments, Blaug distinguished between two aspects of the human capital theory; calling the first "*the hard core*" and the second "*the protective belt*". He related the hard core to the main concept:

"The concept of human capital, or "hard core" of the human-capital research program, is the idea that people spend on themselves in diverse ways, not for the sake of present enjoyments, but for the sake of future pecuniary and non-pecuniary returns. They may purchase health care, they may voluntarily acquire additional education; they may spend time searching for a job with highest possible rate of pay, instead of accepting the first offer that comes along; they may purchase information about job opportunities; they may migrate to take advantage of better employment opportunities; and they may choose jobs with low pay but high learning potential in preference of dead-end jobs with high pay. All these phenomena-health, education, job search, information retrieval, migration, and in-service training- may be viewed as investment rather than consumption, whether undertaken by individuals on their own behalf or undertaken by society on behalf of its members" (Blaug 1976, p. 5).

Since the 1960s, the theory of human capital and its applications has attracted the attention of researchers all around the world especially in the advanced industrialized nations. Empirical work was focused on subjects that were believed to be directly related to the input and output of human capital. A large amount of research was devoted to the production, provision, and costs of inputs which enhance human capital quality such as formal and non-formal education and training, social welfare, health services, information services, and migration. A similar amount of interest was given to the direct and indirect benefits of human capital accumulation. Researchers tried to identify the impact of the quality of human capital on personal earnings and living standards, as well as on economic development and economic growth.

Blaug (1976) noted the rapid increase in the amount of literature produced in this subject in the period after the 1960s. An indication of the developing interest may be gained from his annotated bibliography to literature in this subject which contained 800 items in 1966, 1350 in 1970, and around 2000 items in 1976.

Later, Blaug (1981) described the period from 1960 to 1970 as the golden period for the concept of human capital in relation to developments in the economics of education. However, he mentioned that the scope and direction of interest in this field started to change in the 1970s. "*First generation*" economists of education were more interested in aspects of education such as measuring the contribution of education to economic growth, the private demand for education, manpower requirements, and rates of return to investment in education. While the "*second generation*" economists focused their attention on patterns of educational finance, other functions of education such as screening and socializing functions, and the labour market segmentation. He explained that the main reason for this change was the massive expansion of the education systems in the industrialized countries and the rest of the world, which caused unemployment, inflation, and other economic problems.

5.4. Education as an investment

To some extent, investment in education is the same as other forms of investment. It is made with the hope of yielding greater returns in the future, and investors try to maximize expected future return and therefore, justify their decision to invest. To a certain degree, the same principle can be applied to investment in education made by individuals and societies. As is the case in most forms of investments there are input and output elements in educational investment. The input element is the cost of all individual (private) and public (social) expenses that are sacrificed to acquire education and the output is the amount of skills, knowledge, and other benefits gained by individuals and societies from the education and training system.

Students (by their own or through their parents and families) invest in their education and training directly and indirectly. Examples of direct investment are those of books and other learning materials, and travel and living expenses. The most important example of indirect cost is the earnings foregone represented by the amount of wages and salaries which could have been earned by the individual student if he or she had

decided to join the labour market instead of being in education. Steel and Sausman (1997, p. 89) explained investment in higher education as follows:

“Studying for a degree can be considered as an investment – society bears costs while the student is at university in the expectations of a flow of benefits in the future. The costs are teaching costs and output foregone during study. As such we can calculate a ‘rate of return’ to this investment, in a similar way to other types of investment. The only conceptual difference is that we are measuring a return to a form of human capital rather than physical capital – the additional skills embodied in a first degree graduate, rather than the returns to a piece of machinery or a building.”

They as well made a distinction between private and social investments:

“Private rates of return just include costs borne by the students (or their family) and benefits that flow to the graduate. Social rates also include costs and benefits born by the rest of the economy (particularly the taxpayers)” (Steel and Sausman 1997, p. 89).

Accordingly, the main principle in adopting the investment theory in education is that individual students like any other investors try to maximize their future benefits. However, the generalization of this principle requires the fulfillment of certain market conditions. To enable us to confirm, and empirically prove that individuals behave as consumers or investors or both in education as they do with other types of private goods and services requires that education should also be viewed as a private good. This will allow market forces to govern through supply and demand factors. The reality is that the market for education and training is not so perfect universally. Most countries around the world subsidize education and training fully or partially through public finance and therefore cannot be viewed as a pure private good.

On the other hand, social investment represents the expected future return to the amount of resources allocated by governments, whether local or central, to the education and training systems. Governments' decisions to spend public resources on the provision of public goods and services are faced by the challenge of the scarcity of resources and the diversity of

public needs. Based on this fundamental factor, rational decisions are made by governments on the allocation of public resources to provide different types of goods and services with the aim of maximizing social benefits and welfare.

The same principle is adopted in the allocation of resources between different levels and types of education and training. Several empirical studies proved that lower levels of education tend to have higher social rates of return than higher levels of education (Psacharopoulos, 1973, 1981, 1985, 1994). This justifies the provision of free public education in elementary, intermediate, and secondary levels in most countries around the world.

Accordingly, higher education can be regarded as both private and public investments. Individuals invest in higher education in direct and indirect ways. Direct investment is the fees and other expenditures made by students to study in higher education institutions and their income foregone during this period is an indirect investment. The return to this investment comes in measurable and non-measurable forms. The measurable benefits are the higher wages and salaries and other types of income expected from having a higher qualification. Non-measurable benefits include all social and welfare benefits, such as personal satisfaction, social prestige, access to better jobs, and better working environments. Public investment is also direct and indirect. The most popular example of direct public investment is all forms of government expenditures on higher education institutions. The amount of productivity foregone by students during years of education represents the indirect public investment. The social return to these investments is higher labour productivity of qualified graduates and the external benefits and spillovers that are difficult to identify and measure.

5.4.1. Private and public investment in higher education

The discussion so far has been on the theoretical development of the human capital concept and that investment in different types of education and training is one of its main components. Researchers have utilized the human capital concept to study and analyze different aspects of education in which higher education is an important part. Private and public investment in higher education and the theoretical and empirical analysis of costs, benefits, and rates of return apply to all types of education and training, not least higher education. Blundell et al. (1999, p. 2) puts this very concisely:

“In the standard economic model, the accumulation of human capital is seen as an investment decision, where the individual gives up some proportion of income during the period of education and training in return for increased future earnings. Individuals will only undergo additional schooling or training (i.e. invest in their human capital) if the costs, (tuition and training course fees, foregone earnings while at school and reduced wages during the training period) are compensated by sufficiently higher future earnings.”

However, this is only in theory, or as it was described “*the standard economic model*”. There are many factors influencing the practicality of this theoretical concept, some of which will be discussed later in this chapter. For example, labour market imperfections affect the supply and demand for labour and therefore wages and salaries may not be a good measure for productivity and the level of skills employed. A competitive labour market is one of the testing conditions for this concept. Blundell, et al. (1999, p. 3) indicated that:

“In a competitive labour market where wages reflect the marginal product of workers, to be able to command higher earnings, the better-educated or more-trained workers must be sufficiently more productive in employment than their less-skilled counterparts.”

They also stressed that:

“...,in the presence of imperfect competition or of barriers to entry into different occupations, wage differentials between the qualified and the unqualified may not be necessarily be related to productivity differentials.”

Nevertheless, this should not be a major concern. The fact is that a perfect or even near perfect labour market competition is difficult to find. At the same time, even regulated or centrally planned labour markets take the role of education and training on skills and productivity in consideration when deciding the scale or level of wages and salaries. Accordingly, the view held by many economists, that higher education enhances skills, productivity and income (the main motive for private and public investment) is valid.

It is true that many individuals and governments do not undertake full economic and financial analysis to decide on whether or not to invest in higher education as it is the case in other physical investments. The expectations of other non-monetary benefits, lack of rational economic thinking and the lack of information are examples of factors preventing individuals and governments from carrying out full analysis and appraisal. However, there seems little or no doubt that the economic return is the main motive for individuals and societies to invest in higher education.

It is a general perception held by individuals and governments that the economic and financial benefits are higher than the cost and therefore they decide to invest without indulging in sophisticated cost-benefit and rates of return analysis. Most empirical works undertaken to analyse the motives of individuals and societies to invest in higher education show that economic and financial returns are the most important. For example, Al-Maskry (1992, p. 227). found that the motivations of Sulatan Qaboos University students to pursue higher education confirm the general concept of human capital theory. He pointed out that:

“..., the level of motivations between pecuniary and non-pecuniary incentives varies between males and females, first and final year students, and between students of different family backgrounds.”

The variation between males and female students was seen in the fact that male students are more motivated by economic incentives. He explained this finding as follows:

“The motivations of male students reflect the pecuniary incentives, such as better job opportunity, financial security, and obtaining education as a means of an investment for the future. On the other hand, the motivations of female students reflect the non-pecuniary incentives, such as the desire to please their parents, future career opportunities, good employment opportunities, and social prestige” Al-Maskary 1992, P. 227).

At the same time, it was found that students from low-income backgrounds are more motivated by economic incentives than those from wealthy families. However, the general finding is that economic incentives were the main motives for enrollment in higher education in Oman. This in turn, confirms the concept of human capital and that both individual students and the Government perceive higher education as an economic investment.

5.4.1.1. Private investment in higher education

Individual students invest in higher education directly and indirectly. The direct investment is the sum of expenditures made by students to cover the cost of their education or part of it. It includes the direct payments for fees and tuition charged by institutions of higher education, the cost of books and learning materials, and living and traveling, and other similar types of expenses. The sources of this investment are families and friends, borrowing from public or private financial institutions, and part time jobs. However, due to large public subsidies for higher education in most countries direct private cost represents a small portion of total private cost. In some countries like Oman and other Arab Gulf states this cost is reduced to none as a result of full public subsidies for public higher education.

Indirect private investment is the opportunity cost of students' time during the years of higher education. It is assumed that at the age of eighteen the student could join the labour market and produce and earn an income instead of going to higher education for four or more years. Therefore the opportunity cost of being in higher education is measured by the average

income of a secondary school graduate for the period of education which will depend on the number of years required for completion. The opportunity cost of time as measured by income foregone or indirect private cost represent the largest portion of private cost and in some countries it is the only cost as it is the case in Oman and other Arab Gulf states.

In other countries, Geske (1996, P. 32) described private cost of higher education in the United States as follows:

“Students enrolled in institutions of higher education in the United States sustain a variety of costs, including tuition and fees, rooms and board, and books and supplies. The largest cost sustained by students is related to the economist’s notion of opportunity costs. Students who spend time in school (or in preparation for school) incur costs known as foregone earnings, to the extent that they could have been employed during this time. In other words, opportunity costs or foregone earnings represent the income that the average student could have earned had he or she been employed. This total of foregone earnings is an important consideration for college students who may give up substantial income while attending school but far less important for high school students and of no consequence for the lower grade levels (because employment is not available to these students).”

In this respect, the system of higher education in the United States differs in two respects from that in Oman and other Arab Gulf states. First, the United States has a long tradition of private higher education and students are used to incur direct private cost such as tuition and fees as mentioned above by Geske. Second, the impact of unemployment on the employability of secondary school graduates is small in the Arab Gulf states compared to the United States and therefore average wages earned by secondary school graduates in these countries can be used as an indicator of wages foregone by university students. This is due to the fact that the Gulf States have smaller populations which are not sufficient to meet the demand of the labour markets and therefore they are dependent on expatriate labour force.

It is assumed that private decisions to invest in higher education directly and indirectly are based on the expectation of reaping an amount of benefits which exceed the cost. Economists have classified these benefits

into measurable and non-measurable or what is described as pecuniary and non-pecuniary benefits. The measurable or the pecuniary benefits are the higher incomes expected from obtaining a higher qualification which is seen as a life-long return to investment. A large amount of empirical work has shown that the individuals' income level and its annual growth rate are positively related to the number of schooling years. In other words, individuals' with higher qualifications benefit from higher starting incomes with faster annual growth rates compared with those of lower qualifications. This is explained by the assumption that individuals with higher qualifications, as a result of more years of education, have accumulated more skills and therefore, are more productive than those with lower levels of qualifications and less years of education (Hansen, 1963), (Becker, 1964), (Marenbach, 1973), (Psacharopoulos, 1973, 1981, 1985, 1994), (Preston, 1997), (Blundell et al., 1999, 2000), (Siphambe, 2000).

The method used by economists to identify and measure private pecuniary benefits is to estimate marginal incomes for graduates by deducting the total income earned by secondary school graduates from that expected by university graduates during the whole working life. This process leads to the construction of age earning profiles to be utilized in the estimation of rates of return to private investment. The weaknesses and short-comings of this method are reviewed in chapter 6.

Psacharopoulos and Woodhall (1985, p. 38) explained that:

“Education yields direct and indirect benefits both to individuals and to society. The most obvious direct benefit is that educated workers receive higher incomes than those who are less educated.”

In the discussion of the relationship between level of education, skills, productivity and income, they stressed that:

“In the case of private benefits, it is not necessary to make any assumption about the link between education and productivity. If educated workers earn more than uneducated workers, the higher lifetime earnings represent a direct financial benefit to the individual regardless of why employers choose to pay them higher wages.”

This has been supported by a large amount of empirical work such as Carnoy and Marenbach (1975), Williams and Gordon (1981), Psacharopoulos (1981, 1985, 1994), Blundell et al. (1999, 2000), and Siphambe (2000). Blundell et al. (2000, p. 97) in a study of Britain concluded that:

“The results showed that there were average ‘raw’ returns to an undergraduate degree of around 21% for men and 39% for women. Controlling for ability at age seven, regions, school type, family background, demographic characteristics and various other features of the job (for example, employer size and unionization) reduced the estimated return to around 17% for men and 37% for women. None the less, it is clear that the returns appear substantial even when controlling for other factors.”

The non-measured or non-pecuniary private benefits are the set of personal satisfaction and enjoyment gained by individual students during university years and all over the individual's life. The satisfaction and enjoyment from reading different sources of knowledge in a university library, sitting in a lecture theatre to listen to a lecture and joining the discussion in these lectures, meeting friends in the students union are examples of these benefits that are difficult to measure. Some of these benefits are extended beyond university years such as the habit of reading and studying and the ability to socialize and communicate with others. At the same time, there are many non-pecuniary benefits that accrue to the individual after graduation. Popular examples are the minimization of unemployment, the choice of jobs, and the choice of a better working environment.

5.4.1.2. Public investment in higher education

Public (social) investment in higher education consists of direct and indirect costs in return of measurable and non-measurable benefits. The direct cost is the sum of all public expenditures on higher education institutions whether it is current or development, capital or fixed. Indirect cost is the opportunity cost of the production foregone by students during the years at university. This productivity foregone is a loss to society in the sense that if an individual student joins the labour market instead of going

to university his or her production in this period is a contribution to national production.

As mentioned above, the largest portion of direct cost of education in general, including higher education, is subsidized by public resources. Psacharopoulos and Woodhall (1985, p. 135) explained that:

“Although private contributions and external aid are important, particularly in some developing countries, most educational support comes from a wide variety of public (either central or local government) sources, which range from general taxation of individuals or companies (including taxes on income, wealth, land, property, profits, expenditure, or sales), customs and excise duties, fees and licenses, specific taxes earmarked for education or vocational training), to national lotteries.”

Further more they described social (public) direct cost of education as follows:

“The total cost of the resources that society devotes to education includes the cost of teachers and other staff, books, other goods and services such as heating and lightning, and the value of buildings and equipment.”

On the other hand, they explained the indirect public cost as follows:

“The wages and salaries that a student must forego in order to enroll in education rather than find employment represent a cost not only to the individual or to his or her family, but also to society, since they reflect the value of the goods or services that the student could have produced in employment. The earnings foregone by a student in higher education, for example, are usually determined from the average earnings of secondary school leavers who are in employment.”

This clarifies the issue that might arise from the similarity of indirect private and social costs which might be seen as a double counting. The fact that the process of estimating private cost is done separately from social cost avoids such double counting.

The social return to this direct and indirect investment is expected to be in the form of measurable and non-measurable, or in other terms, pecuniary and non-pecuniary benefits. It is assumed that education enhances human capital by developing and improving human skills both in terms of quantity and quality which in turn increases the level of labour production and

output. Accordingly, public returns to investment in education can be measured by the monetary value of the individuals' labour productivity.

However, two assumptions must hold in order to achieve an accurate measure. First, that the level of education is positively related to the level of skills and productivity, and second that wages and salaries are positively related to productivity. There are several controversies on the validity of these assumptions, some of which will be reviewed in the context of the short-comings and weaknesses of cost-benefit analysis, in chapter 6. Psacharopoulos and Woodhall (1985, p. 38) described the direct or measurable social benefits of education as follows:

“The most obvious direct benefit is that educated workers receive higher incomes than those who are less educated. Thus the direct benefit of education for individuals is higher lifetime earnings, and for society it is the higher productivity of educated workers and the additional contributions to national income over their entire working lives.”

They stressed the assumptions on which this is based:

“The higher lifetime earnings of educated manpower may be used to measure the direct benefits of education, provided one accepts the critical assumption that the relative earnings of workers reflect their productivity, and therefore that the additional earnings are a proxy measure of the higher output benefits (known as externalities) that are not immediately captured by the individual and that are extremely difficult to measure empirically...”

Further more, Geske (1996, p. 33) indicated that:

“There are basically two types of benefits that belong in the social but not the private domain: tax payments associated with the educational benefit (that is, income taxes paid out of one's lifetime income stream) and “external” benefits, which are due to the educational investment but that the individual cannot capture.”

These definitions which are based on the human capital concept agree with the view that social investment in higher education is motivated by measurable economic benefits. The best method to quantify this benefit is by estimating the marginal labour productivity of university graduates in comparison to secondary school leavers. Thus, creating an age-earning profile to estimate the value of this marginal production for the whole

working life of the individual which is very similar to the estimation of private direct pecuniary benefits. The only difference is that income tax is deducted from the private benefit.

Estimating direct and indirect private and social costs and benefits described so far might seem a straight foreword process. However, the estimation of non-pecuniary social benefits from education is an impossible task. Its diversity and complexity make it hard to measure and to quantify in monetary scale as it is the case with other benefits. This problem made it one of the most popular subjects of study and discussion among economists. The most popular method of identifying these benefits is by describing it rather than trying to use mathematical or econometric tools of measurements. Economists use several terms to label it such as, non-measurable social benefits, non-pecuniary benefits, externalities and spillovers. Attempts to quantify and measure some elements of these externalities and spillovers especially the impact of education on economic growth lead many economists to recommend the level of public expenditures on education. In other words, the extent and level of externalities and spillovers are the main determinant of the level of private and public investment in higher education.

Gemmell (1997) explained that government subsidies or expenditures are often justified for two reasons. First, the good or service is a pure public good and there are no economic incentives for the private sector to produce it, and second, the existence of public externalities and spillovers which makes social rates of return higher than the private return. He added that both of those reasons could be made to justify social investment in higher education. Further more he categorized social externalities into "*production externalities*" and "*consumption externalities*". The first one is associated with the effect of higher education on increasing productivity of uneducated workers as a result of the presence of the educated. The second is the social impact of higher education graduates on other members of the society such as the cultural and political values invented and promoted by graduates. He indicated that

most of the theoretical and empirical analyses were focused on the production externalities which are much easier to quantify and to measure in comparison to other externalities. For this reason the following discussion on externalities will be divided into production or economic growth externalities and other externalities and spillovers including distribution of wealth, health awareness, population and demographic benefits, reduction of crime rates, and other benefits.

5.4.2. Higher education and economic growth

The relationship between education and productivity and economic growth has been the subject of research and analysis for a long time. Psacharopoulos and Woodhall (1985, p. 15) mentioned that:

“The concept that investment in human capital promotes economic growth actually dates back to the time of Adam Smith and the early classical economists, who emphasized the importance of investing in human skills.”

As mentioned previously in this review, greater interest on the empirical economic analysis of this issue started in the United States by Schultz, Baker, Denison, and others during the 1950s and 1960s (Baldwin, 1966), (Psacharopoulos, 1984), Psacharopoulos and Woodhall, 1985), (Geske, 1995), (Barro, 1991, 1998, 2000).

According to Baldwin (1966), the interest in studying the impact of education on economic growth became very popular in the United States during this period as a result of finding an unexplained margin in the traditional methods of estimating the rate of growth. Pioneering economists such as Becker, Schultz and Denison attributed a large portion of the unexplained margin of growth to the quality of human capital gained from education and training. Further more, Psacharopoulos and Woodhall (1985, p. 16) pointed that:

“The early attempts to measure the contribution of education to economic growth were based either on the growth accounting approach, used by Denison and others, or on the rate of return to human capital, an approach adopted by Schultz and others.”

The growth accounting approach is based on the concept of the production function which assumes that the amount of output or production is explained by the amount of physical and labour inputs. However, when economists tried to identify and measure the exact share of these inputs on the growth of output they noticed an unexplained large residual. A large portion of this residual was explained by the quality of labour or in other words, the amount of skills as a result of employing highly educated workers.

By using this method, Denison (1962) found that around 23% of output growth in the United States was explained by the contribution of education in the period between 1910 and 1960. Before that, Shultz (1961) used a different approach to analyse this relationship by comparing rates of return to investment in human capital with that of physical capital. He as well found that a large share of economic growth is explained by the level of skills of educated workers. Since then, this approach has been widely used by economists to analyse the impact of education on economic growth. Psacharopoulos (1973) used both methods at the same time to study the contribution of education to economic growth in a number of countries at different levels of development. He found that:

“... the two approaches gave similar results for the developed countries but for the developing countries the Denison-type estimates were much lower than those using the rental-value approach” (Psacharopoulos, 1973, p. 123).

His main findings were that the contribution of education to economic growth was generally higher in the less-developed countries and that this contribution ranged on the average between 11 and 15 per cent of the observed rate of growth.

One of the major obstacles to analyzing the relationship between education and economic growth lies in the difficulty of measurement. The production function method used by Denison (1963) estimates the impact of education on economic growth as the unexplained residual in the economic growth function. At the same time, the method used by Schultz

(1962), and other economists is based on comparing rates of return to investment in human and physical capital.

The problem here is that both methods assume that the amount of labour productivity is measured by income. This is still a very controversial issue. However, the lack of a perfect method of estimation should not undermine the use of these results. Most of these works indicate positive direct and indirect relationships between investment in education and the rate of economic growth. Psacharopoulos (1984) described these analyses as falling into three stages. The first stage or as he called it "*first generation*" comprises the two approaches introduced by Shultz and Denison described above. The second stage or the "*second generation*" was the use of different econometric approaches with aim of capturing more variables for the sake of finding more accurate measurement and therefore, avoiding the underestimation which characterized the first approaches. In this second stage, development economists concluded that education has a clear positive effect on productivity not only by itself in the form of accumulated skills but by its effect on other factors of production or, in formal economic terms, its complementarities effect. The third stage suggested by Psacharopoulos is the "*enlargement*" stage to avoid under or over estimation caused by the exclusion or the inclusion of different variables. He described this enlargement as widening the concept of the contribution of education from economic growth and the wider concept of social welfare (Psacharopoulos, 1984).

The most important factor to emerge from these attempts to define, and measure the impact of education on national production is that they agree on the finding that education explains a large portion of economic growth and therefore the resources allocated to education are forms of investments. Blundell *et al.* (1999, p. 18) indicated that:

"More direct evidence on the importance of human capital for national productivity growth is provided by growth regression, where the education measures have been found to be significant explanatory variables, with higher education being the most relevant education variable for more developed countries."

In his study of economic growth in a cross section of countries during the last four decades Barro found that the growth rate is substantially positively related to the amount of human capital (Barro, 1991, 1998, 2000). Boltho and Holtham (1992) endorsed Barro's findings of 1991 by explaining that social development which is linked to education is an important factor in socio-economic growth. In one of his latest findings he concluded:

“With respect to education, growth is positively related to the starting level of average years of school attainment of adult males at the secondary or higher levels. Since workers with this educational background would be complementary with new technologies, the results suggest an important role for the diffusion of technology in the development process.” (Barro, 2000)

From another point of view, Levin and Raut (1997) found a high degree of complementarity between trade policies and education expenditures. They mentioned that previous empirical research on the determinants of economic growth has yielded conflicting results. Using a panel of 30 semi-industrialized developing countries for the period from 1965 to 1984, they found the same sensitivity to changes in sample period, selection of countries, and explanatory variables that were found in the previous studies. They explained that this sensitivity is due to the interaction between education and exports. They concluded that their findings provide further support for development policies that stimulate long-run economic growth by promoting investment in human capital and the manufactured export goods.

Benhabib and Spiegel (1994) introduced a model to study the relationship between human capital and the growth of total factor productivity and which produced positive results. In this model, human capital influences economic growth directly by increasing the rate of domestically produced technological innovation, and indirectly through speeding the adaptation of imported technology. This was described as:

“..., human capital stocks in level, rather than their growth rates, now play a role in determining the growth of per capita income” (Benhabib and Spiegel, 1994, p. 166).

The main criticism of the analysis of the relationship between education and economic growth and its findings comes from economists who do not believe that more years of education or schooling necessarily entail more skills. In their views, education plays only a screening role by helping employers to select workers according to their level of education, which might be easier and cheaper than examining and assessing their ability in the field. In other words, the positive impact of education on productivity and economic growth is much exaggerated by the concept of human capital (Arrow, 1973), (Blaug, 1983), (Maglen, 1990).

It is, however, possible to reconcile this conflict between the human capital and the screening hypothesis. The perception of employers that educated workers are more productive than uneducated (as a result of their experience and daily monitoring of their works) leads them to use the level of education as the best indicator of the level of individual skills. Accordingly, the screening concept can be seen as a complementary to the human capital concept rather than a replacement for it. This view is taken by many economists including Blaug (1976, 1983), Whitehead (1981), Psacharopoulos and Woodhall (1985) Johnes (1993) and Gemmell (1997).

An important factor to mention is that some economists believe that the positive impact of education on economic growth requires the presence of certain conditions of which the institutional environment or the economic system is the most important. It is argued that more liberal economic systems that are open to international trade tend to experience greater positive effects of education on economic growth. This is due to the fact that exported goods should be of high quality to meet the required standards and compete in the international level and therefore, highly qualified labour is required to produce it. At the same time, efficient utilization of imported technology in socio-economic development and the

production of new goods require well-educated workforce (Gould and Ruffin, 1995), (Pissarides, 1996). It should be stressed that this is an important issue, especially in less developed countries where the contribution of education to economic growth is minimal. The adaptation of open economic policies, including the liberalization of exports and imports, is an important condition to maximize the positive impact of education on economic growth in these countries.

5.4.3. Externalities and spillovers

The most complicated element of educational benefits to quantify and measure is the impact of education on other aspects of socio-economic development such as poverty reduction, health, agriculture, cultural development, consumption behavior, democracy, and crime reduction. Psacharopoulos and Woodhall (1985) used the term "*intersectoral links*" to describe these benefits while other economists called them "*externalities*" or "*spillovers*". The diversity and complexity of measuring and quantifying these externalities are caused by the widespread link between education and other sectors of development. Many attempts to analyze and assess the extent of these externalities were undertaken in different countries (Hanson, 1970), (Fields, 1975), (Haveman and Wolfe, 1984), (Ram, 1990), (Weale, 1992), (Subbarao and Raney, 1995), (Corvers, 1997), (Usher, 1997), (Al-Qudsi, 1998), (Bratton et. al. 1999). Some of the contributions of these studies will be reviewed in the next sections.

The most important works are those of Haveman and Wolfe (1984) and Weale (1992). Haveman and Wolfe (1984, p. 175) tried to estimate the value of a set of non-market benefits of education in the United States by assigning a numerical (monetary) value for each. To begin with, they identified the most popular non-market benefits for education, utilizing previous studies which they described as "*Catalog of impacts of schooling*". The set of these benefits included: individual market productivity, non-wage labour market remuneration, leisure, individual productivity in knowledge production, non-market individual productivity,

intra-family productivity, child quality through home activities, own health, spouse and family health, fertility, entertainment, consumer choice efficiency, labour market search efficiency, marital choice efficiency, crime reduction, social cohesion, technological change, income distribution, savings, and charitable giving. They described the results of their study as:

“These estimates suggest that the value placed on these non-marketed effects of schooling are not trivial and add substantially to the standard estimates of the measured productivity effect” (Haveman and Wolfe 1984, p. 175).

Accordingly, they urged policy makers to take these considerable values of non-market benefits of education into consideration in the process of resource allocation. They concluded:

“As for the policy implications of these estimates, they suggest a reconciliation of the continued willingness of the nation to maintain high levels of investment in education in the face of falling calculated rates of return. The misallocation of resources implied by claims of “overeducated Americans” (Freeman) may instead represent a miscalculation by economists” (Haveman and Wolfe 1984, p. 177).

According to Weale (1992), there are two popular ways in which externalities from education can arise. The first is “*static externality*” where a relatively large trained population might raise labour productivity by more than would be reflected in their pay differentials. The second is “*dynamic*”, through the impact of education on the ability to adopt new production techniques. From another point of view, Corvers (1997) mentioned that his study of the impact of human capital on labour productivity in manufacturing sectors of the European Union indicated that both profits and labour productivity could be increased by raising the employment share of intermediate and highly-skilled workers. Those workers are often the graduates of higher education systems.

There are more unmeasured benefits from higher education that are gained by society as a whole. For example Gemmell (1997, p. 113) mentioned that:

“Subsidies to students might be similarly justified if there are externalities to their education. These might take the form of production externalities if, for example, higher education (HE) raises the productivity not of university-educated workers but also of those (less educated) with whom they work. Alternatively there may be consumption externalities associated with higher education. For example, do university-educated individuals contribute to the social milieu in ways which benefit others, perhaps by their support for cultural activities from which the less educated also benefit?”

In the following sections we will consider two types of positive externalities from education. First, is the role of education as a mean of income distribution, and second, are the social benefits, such as reducing population growth rates, changing consumption behavior, and reducing crime rates.

5.4.3.1. Education and income distribution

Education can be used by governments as a tool for income distribution in two ways. In the short run, this is seen in the flow of costs and benefits between different groups in the society. This is explained by the fact that education expenditures are financed by income tax, which is mostly generated from individuals with higher incomes (while the current benefits accrue to all those who are enrolled). In other words, while all are sharing the benefits, it is only the wealthy individuals or tax payers who are bearing the cost. This is seen as a form of income distribution where part of rich individuals' incomes is redistributed to the poor through the provision of education services. For example, Hansen (1970) found important income distribution effects for higher education in two American States: California and Wisconsin.

This function is not practical in a country like Oman where there is no income tax. The main source of public finance is revenues from the production and the export of oil. Nevertheless, the Omani government's expenditures on all levels and types of education is an equitable method of distributing revenues from this public asset. Since the 1970s, the Omani Government has provided free education services for all individuals in the

country. Al-Maskery (1992) found that the majority of students at Sultan Qaboos University come from low-income families. However, in the short term, this might not be seen as an income flow between different groups in the society. In the long run, education, especially in the higher levels, should contribute to the redistribution of wealth by allowing free access to higher education for students from low-income backgrounds. So far the only evidence to support this hypothesis in Oman is that more students from low-income families have been enrolled in higher education during the last thirty years.

Other attempts to study the income distribution effect of higher education were that undertaken by Fields (1975) using the case of Kenya. He found that this effect was small due to the fact that the majority of students enrolled in higher education are from wealthy families. Fees that were charged in secondary and primary levels of Kenya's education system prevented many students from low income families from continuing their education. He suggested that fees at lower levels of education should be abolished to encourage more students from low income families to continue to higher education. He believed that this policy would facilitate the achievement of the income distribution function of higher education.

Further more, Ram (1990) analysed educational expansion and schooling inequality in 100 countries for the last three decades. He concluded that the results provided a relatively straightforward explanation for the fact that the increase in inequality of schooling that is likely to have accompanied educational expansion in less developed countries (LDCs) might be a major cause of the observed lack of improvement in income distribution in these countries.

5.4.3.2. Other spillovers

One of the important externality benefits for both the individual and the society is the positive impact of education on consumption behavior. This benefit is more important in less developed countries such as Oman and other Gulf States. Mahdi (1997, p. 36) explained that:

“Rising and unfulfilled consumption expectations are a major constraint upon the development of low-income countries. HE improves access to information and may help to spread affluent consumption patterns and aspirations in poor countries. In the Gulf, however, the effect of HE may well be being in this respect. In the absence of evidence to the contrary, we can surmise that the effects of education upon consumption patterns may be different in the Gulf”.

Another important externality benefit is seen in the effect of the education of women on population growth rates. It was found that female education plays an important role in reducing population growth rates, especially in less developed countries. Even though Mahdi (1997) did not find a direct relationship between female education and the population growth rate in the Gulf countries, he did notice an indirect but positive impact on employment. This arises because educated women have a higher chance of finding employment than the uneducated. In his study to the labour participation of women in the Arab Countries, Al-Qudsi (1998) found a strong association between education and participation. He indicated that:

“Education is an important pathway to effective engagement of Arab females in market activities.”

On the international level, Subbarao and Raney (1995) studied the relationship between female education and fertility in 75 developing countries for the period from 1970 to 1985. They found that expansion in female education reduces fertility substantially and suggested that one of the best policies to reduce fertility is through the expansion of female education.

Further, it is reasonable to suppose that education contributes to the creation of a more civilized and democratic society. This issue is important in the developing countries where the majority of people still do not participate in political development. Education creates an enlightened society which is more appreciative of the need for civil law and of civil life in general. For example, Bratton et al. (1999, p. 821) discovered that civic education programs in Zambia *“are associated with acculturation of democracy”*.

Finally, several studies on the relationship between education and crime have found that the level of education has a positive impact on the reduction of crime rate. Usher (1997) developed a model to demonstrate that the provision of public education in Canada is more efficient than private education in terms of reducing crime rate as a social externality. He argued that public education gives enough attention to moral values which act as deterrent to crime while private education concentrates on the education of pure market values. A closer and a recent example is that Alharthy (1999) found that there is a negative relationship between the level of education and drug abuse in Oman.

5.5. Conclusions

This review has highlighted the importance of several key factors. From an historical point of view, it is clear that economists have long acknowledged the investment element of education and training. However, the real development of human capital theory only started during the 1960s. Since then, a large volume of theoretical discussion and empirical analysis covering a wide range of issues related to the development of human capital have been produced in many countries. A great many of these studies have focused on the concept that all forms of education and training are economic investments whether made by individuals (private) or governments (public). Private and public resources are sacrificed with hope of increasing the stock of human skills (capital) that will increase the production level which in turn will yield higher income for the individual and faster economic growth for the nation. Accordingly, investment in education is comparable to investment in other forms of physical capital and therefore, economists used tools and techniques to measure investment in education similar to those used in physical projects. In other words, the use of cost-benefit and rates of return analysis became very popular in empirical studies of investment in education.

However, most economists who use these techniques admit that their results should be looked at with caution due to some serious shortcomings. The most important is the existence of many benefits that

are difficult or impossible to measure in monetary terms. For example, the individual may desire enjoyment (consumption) while being in education, and after graduation. Similarly, it is possible to identify the benefits that society gains from educational externalities and spillovers but very difficult to measure them. The volume of studies seeking to analyse these benefits is substantial. The list includes studies focusing on the positive effect of education on economic growth, income distribution, consumer behavior, female participation at work, fertility, democracy, crime reduction, and others. If all these benefits were efficiently estimated and incorporated in a cost-benefit and rates of return analysis, the overall benefit of investment in education would be higher than that estimated simply by using workers income (productivity) as the measure of educational benefits. However, in the absence of an ideal tool of measurement the existing method will continue to be the most practical. This issue will be discussed in greater detail in the next chapter.

CHAPTER SIX

COST-BENEFIT ANALYSIS AND RATES OF RETURN TO INVESTMENT IN HIGHER EDUCATION

6.1. Introduction

We have established in the previous chapter that education may be regarded as an investment from both the private and the public points of view and that the techniques of cost-benefit analysis have been adapted worldwide to measure and evaluate this investment in education. According to Psacharopoulos and Woodhall (1985), the World Bank started using this method to assess the possibility of lending to finance education projects as early as the 1960s. Since then its use by international organizations, governments, and individual researchers has gained more popularity. The purpose of this chapter is to discuss the development and adequacy of cost-benefit analysis in the evaluation of investment in higher education.

6.2. The definitions and functions of cost-benefit analysis

Governments and individuals choose between different types of investments on the basis of an evaluation of their costs and benefits. Four crucial factors need to be considered in the evaluation process: the incurred costs, the expected benefits, the time scale of costs and benefits, and the level of risk and uncertainty. According to Psacharopoulos and Woodhall (1985, p. 29):

“Cost-benefit analysis is a technique by which these factors (viz. costs, benefits and timescale) can be compared systematically for the purpose of evaluating the profitability of any proposed investment”.

A profitable investment from the point of view of both the individual and the public should yield greater benefits than the incurred costs. Therefore,

in the process of choosing between different investment alternatives an evaluation of the costs and benefits is undertaken to select the option with higher benefits in relation to costs. This point was simplified by Layard (1972, p. 9):

“If we have to decide whether to do A or not, the rule is: Do A if the benefits exceed those of the next best alternative course of action, and not otherwise. If we apply this rule to all possible choices, we shall generate the largest possible benefits, given the constraints within which we live.”

The techniques of cost-benefit analysis were developed to provide a more systematic method of investment evaluation in order to reduce the dependency on guesswork. However, it should be stressed at the outset of this review that these techniques are far from perfect or precise and therefore, some sort of judgment might be required on the final decision. Psacharopoulos and Woodhall (1985, p. 29) put this very clear:

“Cost-benefit analysis is an aid to judgment, however, not a substitute for it, since future costs and benefits can never be predicted with certainty, and measurement, particularly with respect to the likely benefits of a project, can never be completely precise”.

For example, it is difficult to identify and measure the real value of invested resources. Market distortions and imperfections make it unrealistic to use current prices as a measure of the real value of resources and therefore there is a need to use some sorts of shadow prices as a proxy measurement. This problem becomes more serious in the evaluation of long-term investments such as education. It is also more serious in less-developed countries where price inflation keeps on fluctuating all the time. This issue will be discussed in more details in the section related to the weaknesses of cost-benefit analysis.

Nash et al. (1975) placed great importance on the role of value judgments on the acceptance and rejection of cost-benefit analysis results. They argued that:

“...,there are many different ways of performing cost-benefit analysis, each of which is logically consistent within a particular set of moral notions.”

According to Nas (1996), the inclusion of direct and indirect public costs and benefits made this method more acceptable in the evaluation of public investment, as it is the case in education in comparison to other financial evaluation methods which do not include such costs and benefits. At the same time, the use of monetary values to measure costs and benefits made this method more flexible than other methods such as the cost-effectiveness analysis method which ranks costs and benefits in situations where they do not have monetary values. For those two main reasons Nas (1996) argues that cost-benefit analysis method has been widely used in evaluating and justifying public investment. This is to the extent that in many countries the use of cost benefit analysis is a standard requirement for most public organizations to justify allocations of public resources for socio-economic activities. For example, Nash et al. (1975) mentioned that:

“Since its beginning as a pragmatic and somewhat ill thought-out method of evaluating water-resource projects in the 1930’s, the practice of cost-benefit analysis has spread to encompass most areas of government decision-taking, ranging from fuel policy and industrial project evaluation to health and social services.”

Efforts have been devoted to the use of cost-benefit analysis to estimate the rate of return to investment in education. The main objectives were to assess the level of public and private investment profitability in education in comparison to investment in other forms of economic activities as well as within different levels and types of education. To some extent the results of such assessment were used to draw policy implications concerning the efficient utilization and allocation of private and public resources.

Cost-benefit analysis methods use cash flows to compare the discounted present value of costs and benefits to identify whether or not expected benefits will be greater than the costs when both are measured in present values. This is presented in a form of a statistical summary listing costs and benefits and their spread over time. The use of such cash flows is shared between all cost-benefit analysis techniques; the benefit-cost ratio (the ratio of the sum of discounted future benefits and the sum of

discounted cost), the net present value (the discounted benefits minus the discounted cost), and the internal rate of return (the rate of interest that equates the discounted present value of expected benefits and the present value of cost). In comparison to the other two methods, the use of internal rates of return is more popular in the evaluation of educational investment. The majority of empirical studies in educational investment analysis made an extensive use of this method (Psacharopoulos, 1973), (Psacharopoulos and Woodhall, 1985). Presumably because single summary figures make for single comparisons. For this and many other advantages that will be mentioned in section 6.6 of this chapter, we have decided to utilize its application in the empirical parts of this research (chapters 8,9,10). The following sections will be devoted to rates of return analysis.

6.3. Estimation procedures for rates of return

In general, the rate of return to investing in a particular project is a summary statistic comparing the costs and benefits associated with that project. In more precise terms, it is the rate of interest that equates to zero the discounted net benefits (Psacharopoulos, 1973). For example, if the costs of a particular project at present are C_t and the net benefits are B_t , annually for a period of N years then the internal rate of return r for this project can be estimated by using the following formula:

$$\sum_{t=1}^n \frac{B_t - C_t}{(1+r)^t} = 0 \quad (6-1)$$

The same method can be used to estimate the rates of return to investment in education. The cost side in the case of a four years degree course in higher education consists of direct expenditures C_h and foregone earnings W_s , and the benefits are measured by the difference in wages between a higher education graduate W_h and a secondary school graduate W_s . If the duration of obtaining a higher education degree is estimated to be four years on average, and the expected working-life of

the graduate worker is 43 years, then the rate of return to investment in higher education can be estimated by using the following equation:

$$\sum_{t=-4}^0 (C_h + W_s)_t (1+r)^{-t} = \sum_{t=1}^{43} (W_h - W_s)_t (1+r)^{-t} \quad (6-2)$$

This equation can be used to estimate different types of rates of return by adding or omitting different variables. In other words, adjustments can allow the estimation of private, social, average, marginal, males, females, formal education, and on the job training rates of return.

As mentioned in the previous chapter, Becker (1964) was one of the early economists to use rate of return methods to analyze investment in education and training. He compared investment made by individuals and societies in education to that of on-the-job training made by workers and firms. He introduced the following simple model to represent this function:

$$W = MP - K \quad (6-3)$$

Where: W = wages (earnings), MP = marginal productivity (earnings foregone) and K = direct cost.

This simple function established the basis for later research in the use of rates of return methods in educational investment. The main problem with this early initiative was that it made unique comparisons between investment in education and that made in on-the-job training. In reality there are major differences between the two. An important factor is that education has a present and future consumption benefit in addition to the future investment element. The other factor is that individual's earnings foregone in early levels of education such as elementary and intermediate is zero due to the fact that the student's age at these levels is still below the standard working age.

A similar method was used by Carnoy and Marenbach (1975) in their analysis of the return to schooling in the United States in the period 1939 to 1969, using data from four census years. Their aim was to estimate rates of return to schooling for four groups of individuals: white males, nonwhite males, white females, and nonwhite females. To estimate the

rate of return, they used the standard discount formula 6-2. Their general finding is that rates of return to investment in education (especially social returns) in the US declined in the period from 1939 to 1969.

Psacharopoulos (1973, 1981) identified three different procedures to estimate rate of return to investment in education. These are; “*The elaborate method*”, “*the earnings function method*”, and “*the short-cut method*.”

He explained the first method as:

“...the exact algebraic definition of the rate of return, which is the discount rate that equates a stream of benefits to a stream of costs at a given point in time” (Psacharopoulos 1981, p. 82).

Accordingly, the rate of return is estimated by the value of r in the previously mentioned equation:

$$\sum_{t=1}^n (Y_h - Y_s)_t (1+r)^{-t} = \sum_{t=1}^c (Y_s)_t (1+r)^t \quad (6-4)$$

Total private cost in this method is the sum of direct and indirect private costs. Direct costs are the direct expenditures made by students such as tuition fees and cost of living. Indirect cost is the earnings forgone by the individual while being in education. This is due to the fact that education is provided by governments free of charge. At the same time, private returns are represented by total individual’s earning after tax. In a similar fashion, social cost is the sum of all direct and indirect public expenditures allocated to education institutions and the return is the total earnings before tax, representing the volume of individual’s productivity.

“*The Earnings Function Method*” is based on the fact that a strong correlation is established between earnings and the number of years of schooling as well as the length of working experience in the labour market. The rate of return is estimated by calculating the value of b in the following equations:

$$\ln Y_i = a + bS_i + cEX_i + dEX_i^2 \quad (6-5)$$

In this function, $\ln Y$ is the logarithm of an individual's total earnings; S is the number of school years, and EX is the number of years of working experience in the labour market. The main weakness of this model is that it can only be used to calculate the private rate of return, leaving social rate of return unresolved.

"The Short-Cut Method" is very similar to the earnings function method. It also concentrates on the correlation between the number of schooling years and earnings. The similarity between those two methods was described by Psacharopoulos (1981) as: *"This amounts to doing in an explicit way what the earnings function method is doing implicitly..."*

This function is illustrated by the following equation:

$$r_k = \frac{\bar{Y}_{k-Yk-\Delta s}}{S(\bar{Y}_{k-\Delta s})} \quad (6-6)$$

\bar{Y} is the mean earnings of employees with the subscribed educational level. The main benefit of this method is that already tabulated information on individual's earnings can be used, as well as its flexibility to quantify social rate of return after adding data related to social cost.

The most important feature of these methods is that they yield a single figure, that is the internal rate of return to investment in education, which provides an indicator of the profitability of investment from the point of view of the individual (the private rate of return) and society (the social rate of return). Therefore, the private rate of return is a measure of the relationship between costs and benefits of education for the individual, and the social rate of return measures the costs and benefits of education to society as a whole. The crucial step in all cost benefit and rates of return analysis is the identification and measurement of costs and benefits.

6.3.1. Measuring the costs of education

A better estimation of the private and public rates of return to investment in education requires an accurate identification and measurement of all

types of direct and indirect costs that are utilized and employed in the education process. Direct cost includes all resources and expenses that are allocated to education such as current expenditures and fixed assets; indirect cost is the opportunity cost.

Accordingly, total private costs are all the direct and indirect expenses incurred by the individual while being in education. Such expenses might include fees, accommodation, transportation, books and other tools required for studying, and other living expenses, as well as the opportunity cost which is measured by the amount of income she or he foregoes while being in education. It is important to mention here, that in Oman as well as in many other countries higher education is free and some students receive allowances for most of their maintenance and living expenses. Therefore, earnings foregone are the only private cost which can be included. However, the identification and measurement of income forgone by students are influenced by the level of education indicated by a student's age, and the level of unemployment; therefore, adjustment has to be made for these factors. In other words, the age of students in lower levels of education is often below that required to enter the labour market which means that they do not forego any income. The same can be said in situations where the unemployment rate is high. For example, in countries like India where employment chances are very small, students have to spend a long time searching for a job if they are not enrolled in education. It is assumed that these two factors will not have an impact on the estimation of the rates of return to investment in higher education in Oman which will be presented in the empirical chapters (8, 9, 10). The fact that this study is concerned with students in higher education in the Sultan Qaboos University means that their ages allow them to enter the labour market. Another factor is that the low unemployment rate in Oman will not have any negative impact on the probability of students' employment if they choose to do so.

In comparison to private costs, the identification and measurement of social cost of education is more complicated. In general, social costs

include all types of expenditures made by the government to provide educational services. These will include all the direct and indirect costs. The direct costs includes tuition fees paid directly or indirectly to educational institutions, staff wages and salaries, cost of buildings and property rents, furniture and other equipment, electricity, gas, water, and other utilities, library, information facilities, and other specialized laboratories, students services, etc. Indirect cost is the opportunity cost which measured by the amount of income foregone by students as described above. The production foregone by the economy while students are in higher education is equivalent to their forgone income and thus represents an opportunity cost to society.

The complexity of identifying and measuring all the social costs of education is attributed to the different types and sources of costs that do not take formal shape and are not recorded. Psacharopoulos and Woodhall (1985, p. 34) mentioned that:

“Some of the resources used in education do not appear in any budget and thus cannot be captured as an expenditure. For example, a local community may donate land for a school or may provide free food or lodging for teachers”.

However, the fact that most of the resources allocated to higher education in Oman (the case of the Sultan Qaboos University) come directly from one main source, the Ministry of Finance, makes the influence of this factor much less significant.

Another cost element which has to be adjusted for in the estimation process is the wastage cost (i.e. students' repetition of classes and dropout rates). This is an additional cost to public resources which affects the estimates of social rates of return negatively and therefore it should be measured and added to the cost side.

The second step in the process of estimating the rates of return to investment in education is the identification and measurement of the expected private and social benefits.

6.3.2. Measuring the benefits of education

There are many direct and indirect benefits of education that accrue to the individual and the society. The best example of a direct benefit is that educated workers earn higher incomes than those who are less educated. Accordingly, the direct benefit of education to the individual is higher earnings over the lifetime, and for the society is the higher productivity of educated individuals which brings additional contribution to national income. Therefore, the lifetime earnings of workers are used to measure the direct benefits of education which is based on the critical hypothesis that earnings represent an accurate measure of productivity. At the same time, there are many indirect social benefits of education (externalities and spillovers) that are difficult to capture and measure by using the traditional cost-benefit and rates of return analyses. The presence of these externalities and spillovers contribute to the under (or over) estimation of the true rates of return to investment in education and therefore constitute as the main weakness of cost-benefit and rates of return analysis.

Whether or not productivity is positively linked to education does not affect the identification and measurement of private benefits as far as the levels of wages and salaries are based on educational qualifications. For example, the wages and salaries scale which is used in the Civil Service employment in Oman is based on this assumption¹. However, the link between education and productivity is crucial in the measurement of social benefits. This issue has been, and still is, the subject of intense debate among economists, especially between the supporters of the human capital approach and those who argue that education qualifications are used as screening tools only. The empirical analysis of the social rates of return to investment in higher education in Oman which will be presented in chapters 8, 9, and 10 is estimated on the assumption that there is a positive relationship between education and productivity. This is based on the large volume of theoretical and empirical literature produced in many

¹ The data related to workers income that are used in the empirical parts of this research to measure private and social benefits are based on this source.

countries reviewed in the last chapter, and which suggests that there is a strong relationship between education, productivity and economic growth.

The establishment of a positive relationship between education and productivity in one hand, and between productivity and income on the other is the corner stone of measuring private and social benefits of education. The second step is to construct age-earnings profiles which provide a measure of the extra lifetime incomes of workers. Data on the lifetime pattern of earnings are often obtained from two sources. The first is the longitudinal, or cohort studies which follow the career of a sample of workers over a period of time to analyse how their incomes change. The problem with this method is that it takes a long time to follow the sample of workers and it is very difficult to achieve in many developing countries. The second source is to obtain data on earnings of a sample of workers of different ages and work experience at a single point in time. These data are used to analyse the effect of age and experience on income and then used to construct an age-earnings profile. This method is often used in most cost-benefit and rates of return analysis, and it is the one that is adopted in the empirical analysis presented in chapters 8, 9, and 10. Another advantage of this method is that it avoids the effect of inflation on the value of money.

In order to construct age-earnings profiles the sample data of workers income were classified by age or years of work experience and educational qualifications. These profiles are used to calculate the average lifetime earnings associated with different levels of education. For example, when age-earnings profiles are constructed for workers with university and secondary school qualifications they can be used to calculate earnings differentials associated with university education and the extra lifetime earnings of university graduates in comparison to secondary school graduates. Finally, the internal rate of return can be estimated as the rate of interest at which the present value of benefits (the sum of the extra earnings attributed to education) and the present value of costs (as explained in section 6.3.1.above) are equal. This method of

analysis of the rates of return to investment in education has been used on a large scale by many governments and organizations for different policy issues.

6.4. Rates of return analysis and educational investment

The individual's costs and benefits were summarized by Westoby (1977) as follows:

“The decision to take a course of higher education can be seen as an investment broadly comparable to the decision by a family to purchase a house, or the decision by a manufacturing company to build a new factory. They are all, in principle, accessible to the economist's technique of ‘cost-benefit analysis’, a method used to appraise investments by systematically comparing the expected costs with the expected benefits” (Westoby 1977, p. 53)

But public and private investment decisions concern the allocations of resources and the exes function of relevant costs and benefits. The point is concisely put by Westoby (1977, p. 54):

“Education absorbs resources and finance that could be used in other ways, thus imposing costs on the economy as a whole. It also produces more highly educated workers who, on average, earn (and arguably produce) more than they would have done without additional education. The social rates of return to particular levels and types of education can also therefore be investigated, taking into account the costs and benefits to the economy as a whole.”

Further, he listed five economic factors which are thought to influence the individual's decision to invest in higher education and which are often taken in consideration in rates of return estimations.

- i. The direct and indirect cost of education.
- ii. The expected level of earnings.
- iii. The distribution of expected earnings over time, for example, whether the graduate average differential to graduates arises early or late in life.
- iv. The incidence of unemployment.
- v. The intensity with which the individual concerned values present advantages more than future ones, or in other words, the extent to which he discounts the future relative to the present.

All this suggests that the main purpose of using cost-benefit and rates of return analysis in educational investment is to get some indicators of the profitability of this investment. From a private point of view, these indicators can support private investors (individual students and their families) on their decision to enroll in education, especially in higher levels (Harmon and Walker, 1995). In addition to its impact on the private demand, it has an influence on the sources and methods of private finance and on the distribution of costs and benefits of education.

Social rates of return have been widely used by governments to assess the efficiency of current public resources allocated to different levels and types of education and training as well as the future trends of these allocations. Further more, most of the modern funding mechanisms for higher education institutions in many countries were based to some extent on indicators provided by rates of return analysis. A closer example is that of the United Kingdom. Both reports of committees on higher education in the United Kingdom (1963) and (1997) made use of rates of return analysis in their policy recommendations to reform the funding mechanisms of higher education in the UK.

Several attempts to evaluate investment in education from a private and public point of view using cost-benefit and rates of return analysis have already been cited in the last chapter and in the previous sections of this chapter. For example, reference was made to Hansen (1963), Becker (1964), Marenbach (1973), Psacharopoulos (1973, 1981, 1985, 1994), Carnoy and Marenbach (1975), and Williams and Gordon (1981) (see chapter 5).

An early attempt to use rates of return techniques to analyse investment in education was that of Hansen (1963). He used the 1950 population census to estimate the social, or "total" as he described it, and private rates of return to investment in different levels of education in the US. In general, he found private rates of return exceed social rates and that the marginal rates of return rise with more schooling up to a certain level "*grade eight*" and then decline gradually.

Using similar methods, Psacharopoulos (1973, 1981, 1985, 1994) examined and updated rates of return to investment in education in many countries of different levels of development. His main findings were as follows. First, that both the private and social rates of return are higher in less-developed than in advanced countries. Second, that it is the case in most countries that investment in lower levels of education yield higher rates of return. And third, that returns to human capital are higher than that of physical capital in less-developed countries and are nearly equal in advanced countries.

An important empirical study using the rates of return analysis methods was undertaken by Williams and Gordon (1981). The main objectives of this study were to identify the relationship between the level of education (qualifications) and average earnings in England. The results of this study showed that there is a positive relationship between the level of education and earnings. Students in England were found to have enough "awareness" of the financial rates of return to investment in education; however, it was not the only factor influencing their educational decisions. This conclusion was used to explain the changes in the demand for higher education in England during the 1960s and 1970s. To be more precise, Williams and Gordon (1981, p. 74) stated that:

"The implications of these findings for an understanding of changes in the demand for higher education during the 1960s and 1970s are considerable. They lend support to claims that one of the prime motives for the rapid expansion of the 1960s and much slower growth of the 1970s was economic."

Even though rates of return analysis proved very useful to explain an important factor to determine the demand for higher education in England, this method still suffer from two main weaknesses. The first is the future movements of the actual rate of return. Other empirical work proved that rates of return to investment in higher education change from time to time as a result of the fluctuations in the supply and demand for graduate labour force. See for example, Psacharopoulos and Woodhall (1985), Cohen and House (1994), Eckstein and Wolpin (1995), Groot (1996), Blackaby, Murphy and O'leary (1999), and Blundell et al. (2000).

The second weakness is the difficulty of using these methods to quantify social rates of return. There are many social externality benefits and spillovers which are difficult to identify and measure, as well as other factors such as imperfect capital markets and economies of scale. These issues will be discussed in more detail in section 6.5 below.

Further more, Blundell et al. (1999) recently studied the rates of return to investment in human capital (education and training) to the individual, the firm and the economy in the United Kingdom. Their general finding was that there is a positive economic return from education and training for the individual, the firm, and the economy. From the individual point of view the main determinants of rates of return, variations were found to be the type and level of education qualification as well as the different sources and types of training. The same factors were assumed to influence rates of return to education and training for the firm and the national economy. However, they admitted that most of the empirical work in this field concentrated on the private economic rates of return and less on the contribution of education and training to economic growth. At the same time, the *“lack of suitable data and methodological difficulties have, to date, prevented adequate assessment of the impact of human capital accumulation on firm performance”*.

In a different case, Glewwe (1996) used data from Ghana to examine the estimates of rates of return to additional years of schooling. In his conclusions, he questioned the usefulness of those estimates for government investment decisions. He found that; first, variation of education quality causes imperfection in human capital attainment and therefore simple estimates of private rates of return may be biased. Second, cognitive skills have more impact on wages rather than years of schooling. Third, and most important, is that the low quality of education in less-developed countries makes the results of rates of return estimates, even after adjustment for social rates of return, of little relevance to education investment decisions.

A recent interesting application of cost-benefit analysis is that of Belli et al. (1999, p. 27) in which they undertook a feasibility study to assess a higher education project in Mauritius. Both internal rates of return and net present value methods were applied to estimate private and public rates of return to different levels and disciplines of higher education. They concluded that:

“The results show that all programmes considered are good investments from both the private and the social point of view, although some programmes are more profitable than others. One important finding is that the combination of progressive taxation and the payment of tuition fees by students bring the private and social returns of this project to equilibrium” (Belli et al. 1999, p. 27).

It is clear from this review that the application of cost-benefit and rates of return techniques in the evaluation and assessment of educational investment have coincided with the introduction of the human capital theory in the 1960s. These techniques were used as tools to test the empirical validity of this theory as well as its policy implications. However, despite its popularity and widespread use, these methods have been criticized by many researchers some of which were mentioned above.

6.5. The weaknesses of rates of return analysis

Most of the criticisms directed to the estimates of cost-benefit and rates of return analysis to investment in education are based on three main issues. First, is the difficulty in measuring non-pecuniary benefits such as the consumption benefits, externalities and spillovers. Second, the type of relationship between education and productivity and to what extent the variation in productivity is explained by the amount of education. Third, is the validity of the notion that earnings are accurate measures of productivity. Johnes (1993) raised awareness to some of these problems which might hinder the validity of rates of return estimates. These problems and weaknesses can lead to an upward and downward bias in the final results. Factors such as the consumption element of education, as well as imperfections in labour markets might lead to a downward bias.

At the same time, the use of education as a screening and signaling tool might lead to an upward bias. Johnes (1993, p. 31) pointed that:

“The damage which biased estimates could cause is therefore significant, and it is not least for this reason that considerable care should be taken in evaluating rates of return”.

6.5.1. The effect of consumption benefits of education

Some economists argue that the individual's demand for education, especially at higher education levels, is not only determined by pure economic returns in the form of expected higher incomes but also by consumption benefits during and after the years of education. For example, the learning experiences enjoyed by university students are types of consumption benefits which may motivate them to enroll in higher education. Example of such consumption benefits include the pleasure derived from reading, lectures and discussions, being with other students, and making friends, taking part in different events organized by the university and the union of students, using the library and other information resources, and many other activities. Some of these benefits might as well be enjoyed over the lifetime such as the pleasure of reading and socializing with other people in the society.

However, consumption benefits are often omitted in the calculations of rates of return to investment in education leading to an under-estimation of the true rates. The main reason for this omission is the difficulty associated with identifying and measuring these benefits in monetary terms. There have been some attempts to measure some elements of consumption benefits and to add them to the estimates of rates of return but the difficulty to identify and measure the set of all benefits remains (Gullason, 1989).

6.5.2. The effect of externalities and spillovers

Many of the externality and spillovers benefits that accrue to society more than the individual were discussed in the last chapter and popular theoretical and empirical studies in this field were cited. Examples of the externalities and spillovers that were mentioned are the distribution of

wealth, the education of women and its effect on fertility and population growth rate, consumption behavior, and the reduction of crimes (see chapter 5, pages 109 to 111).

The problem of these benefits is that it is difficult to identify and measure them so they can be added to the rates of return calculations. Many of the externality benefits accrue at different times and affect a wide range of sectors of life, and thus, their identifications and measurement becomes a complex process. Psacharopoulos and Woodhall (1985, p. 53) mentioned that:

"In the case of education, some have succeeded in identifying externalities, but few have been able to quantify them".

Accordingly, these benefits are not added to the benefit side in most cost-benefit and rates of return calculations resulting in a serious under-estimation to the overall rates of return to investment in education. For example, Haveman and Wolfe (1984) mentioned that standard rates of return estimates might capture only three fifths of the true value of education in the United States.

6.5.3. The effect of the screening and filtering hypothesis

The advocates of the screening hypothesis argue that the relationship between education and productivity is not a positive one, or in other words, education has little impact on the improvement of productivity. Instead, there are other personnel attributes which have greater influence on productivity and that education qualifications are used by employers as screening devices only. Such individual attributes might include innate abilities, intelligence, motivation at work, and the ability to adapt to new methods of work and new technologies, etc. If this hypothesis is proved to be true then the human capital concept that the variations of workers productivity is due to skills gained from education will not be valid and therefore, income is not a good measure of the level of production. Accordingly, the estimates of rates of return to investment in education which are based on the human capital approach are false.

However, there is mounting evidence that the relationship between education and productivity is positive.

“At first sight, it looks as though this argument would undermine any cost-benefit analysis of education by denying that earnings measure productivity and that education increases the productive potential of the individual. Evidence on the relationship between education and productivity measured not in terms of earnings but in terms of physical measures of output suggests, however, that credentialism, or the screening hypothesis, is not as damaging as it first appears to be” (Pscharopoulos and Woodhall 1985, p. 44).

6.5.4. The link between education and productivity

The assumption that income is a good measure of productivity is justified under perfect competition where the level of wages is based on the marginal product of labour. The generalization of this assumption to all workers in all labour markets, however, should be treated with caution. For example, earnings in the non-formal (non-wage) sectors might not be a good measure of productivity. Most age-earnings profiles are estimated by using data obtained from modern sector labour markets. These data do not necessarily represent the rewards of workers in the non-formal sector of the economy such as the self-employed, farmers in rural areas, and fishermen along coastlines. All these occupations may provide public or real benefits which are highly priced by the recipients but which are impossible to measure. The generalization of earnings profiles might thus produce a misleading estimate for the true rates of return to investment in education for these groups of workers. Some economists suggested that this problem can be solved by measuring the physical output per worker to be compared by the level of education (Psacharopoulos and Woodhall, 1985). The World Bank sponsored surveys to study this issue in some countries including South Korea, Malaysia, Thailand, and Nepal during the 1980s. Education was found to have a positive impact on productivity in most of these studies (Psacharopoulos and Woodahall, 1985).

However, the fact that most of the higher education graduates in Oman work in the modern sector (mainly the Civil Service) means that this

problem will have no implications on the estimates of the rates of return to investment in higher education in Oman.

6.5.5. The link between productivity and earnings

Earnings can be good measures of the level of productivity in free and perfectly competitive labour markets where wages and salaries are decided by supply and demand. It is difficult to achieve this condition in reality as perfect competition of supply and demand for labour is difficult to find in any economy. Many economists argue that, in this case, some sort of competition must exist in the market otherwise rigidities and interventions might distort market mechanisms. Accordingly, scales of wages and salaries might be based on factors other than the level of productivity. This problem is more prevalent in less developed countries where the majority of the educated work force is employed in the public sector and where wages and salaries are not determined by labour supply and demand. In these cases earnings are not a good measure of productivity and their use in constructing earnings profiles for rates of return analysis might yield misleading estimations. The solution to this problem is that wages and salary scales in the public sector must be based on labour supply and demand in the overall economy. This has already been implemented in many countries.

“Even in countries where the public sector is dominant employer, this sector is not completely insulated from market forces. The fear of an upward bias in measurement of the return to education because of the influence of the public sector should not be exaggerated. Attempts to compare pay scales in the public and private sectors in developing countries have produced conflicting results, but even in the public sector, there is evidence in many countries that relative salaries respond gradually to changes in demand and supply” (Psacharopoulos and Woodhall 1985, p. 51).

This is also the case in the wages and salaries scale of the Civil Service in Oman. The Ministry of Civil Service keeps modifying and updating this scale in response to market mechanisms and labour supply and demand. The negative impact of this problem on the estimates of social and private

rates of return to investment in higher education in Oman as will be discussed in chapters 8, 9, and 10 is minimum.

6.6. The advantages of using rates of return analysis

Despite all the weaknesses and shortcomings of cost-benefit and rates of return analysis, this method remains a powerful tool to evaluate the profitability of private and public investment in education. It has been and still is the main technique used by the advocates of human capital theory to prove empirically that education is a form of investment similar to that of other economic projects. The widespread use of rates of return analysis in education started as early as the 1960s. Hansen (1963, p. 139) used this method to estimate the total social and private rates of return to investment in different levels and types of education in the United States. He concluded that:

“... it appears that ranking of the returns to investment in schooling by the rate-of-return method is clearly superior to the methods employed in the work of both Miller² and Houthakker³”

Ten years later, Psacharopoulos chose to use the rate of return method instead of the net present value method in his international comparison of rates of return to investment in education. The main justification was that rate of return analysis was used in most studies of investment in education.

“...28 out of 53 profitability studies we have reviewed were only in terms of rates of return, fifteen of them presented both present values and rates of return, and only five of them were exclusively in terms of present values. If by nothing else, the rate of return measures has won the race by popular demand! Of course, all authors have been aware of the weaknesses of the approach, but they have not considered that these weaknesses were enough to invalidate their results” (Psacharopoulos 1973, p.19).

² Herman P. Miller is an American economist who published a paper, “Annual and lifetime Income in Relation to Education: 1929-1959” in the *American Economic Review*, L (December, 1960), 962-986. He used the additional lifetime income method in his analysis.

³ H. S. Houthakker is an American economist who published a paper, “Education and Income”, in the *Review of Economics and Statistics*, XLI (February, 1959), 24-28. He used the present value of additional income method in his analysis.

This popularity can be attributed to three main advantages. First, the simplicity of measuring the costs and benefits of education and converting them into monetary values and comparing them in a single figure is a major advantage for the rates of return analysis in comparison to other methods. This single figure (estimate) of the expected private and social benefits of investments in education can easily be compared to other investment options. Second, the possibility of making systematic adjustments to overcome the shortcomings of omitting other variables as explained in section 6.5 above. Third, the availability of data related to the private and social costs and benefits of education which are required to construct age-earnings profiles. These data can be obtained from population and labour force censuses that are updated on regular bases in most countries.

6.7. Conclusions

Rates of return analysis can be used to assess whether a quantity of investment is worthwhile and to make (or assist in) investment decisions. It may also be used to evaluate the efficiency of investment and as a means of improving efficiency.

Any investment decision is complex. Cost-benefit and rates of return analysis are ways of focusing on what from the economic point of view are the crucial factors and including these factors in a single model. It is as well to be aware, however, that this is not an exact technique. Problems exist in the recognition and measurement of individual costs and benefits and the rate of private returns may only be a guide to the full rate of net benefits of a project over time. There may well be factors in the economic, social and political environments which dominate and, or, change rates of return over time. The modeling of education as an economic good is, therefore, to focus on one dimension of something which has an important intrinsic social and political value which is capable of dominating the economic in the investment decision process.

CHAPTER SEVEN

THE FINANCE OF HIGHER EDUCATION INVESTMENT

7.1. Introduction

In the previous two chapters the discussion has focused on the theoretical aspects of investment in education and the methods of evaluating this investment. This chapter will be focused on the theoretical issues of financing investment in higher education. Human capital theory, as mentioned in chapter 5, regards education as a private and social investment. Both the individual and the society allocate a certain amount of their resources in order to obtain pecuniary and non-pecuniary benefits from higher education. In chapter 6, we argued that private and public costs and benefits can be identified, measured, and evaluated as other forms of investment, and that estimated rates of return are the most powerful method of evaluation. The estimates of private and social rates of return can be used as indicators of the level of investment profitability. These estimates, in addition to other economic, political and social factors, can provide the bases for the sources and levels of financing for this investment.

7.2. Present trends of financing higher education

The fact that education is a private and social investment means that its costs and benefits are shared by individuals, employers, governments, and others such as international organizations. This sharing varies from one country to another in terms of the proportions of financing the costs, and the mechanisms of funding. Almost all the funding required for education in most countries was provided by governments during the 1960s and 1970s. This period witnessed the start of a sharp expansion of education at all levels and in all countries. Education was perceived to be the vehicle for socio-economic development and therefore the demand

increased sharply as well as the amount of public resources allocated to meet this demand. Psacharopoulos and Woodhall (1985, p. 128) mentioned that:

“... the proportions of GNP devoted to education in developing countries rose on the average from 2.3 per cent in 1960 to 4.5 per cent in 1984, and the proportion of the national government budget rose from 11.7 per cent 1960 to 16.1 percent in 1984”.

Following this period of development and expansion in the education systems, many countries started to rethink their policy of continuing to increase educational spending from public sources. Psacharopoulos and Woodhall (1985, p. 128) attributed this change to three reasons. The first is the huge increases that had occurred in the 1960s. The second is the uncertainty that was expressed by many policy makers about the economic role of education in the light of the increase in of qualified manpower and the concern about unemployment among educated workers. The third is the needs of other high priority areas of the public sector such as health, population, and rural development which compete with education for public resources. In most countries, higher education was the most affected sector. Even richer countries such as the OECD and Oil rich Arab countries started to rethink their policies of higher education funding. According to (OECD 1990, p. 17):

“All countries taking part in this study reported some financial stringency in their public funding of higher education during at least part of the period between the early 1970s and the mid-1980s”.

In a worldwide comparison between student's enrolments and public expenditures in higher education institutions, Albrecht and Ziderman (1992, p. 12) indicated that:

“Aggregate statistics show that in Latin America, between 1975 and 1985 enrolments grew 370 per cent while real public expenditures grew 210 per cent. Thus, real public expenditures per student fell 34 per cent. In Africa the story is similar. Between 1970 and 1983, public recurrent expenditure per student in higher education fell 45 per cent. This figure has fallen even further in the past seven years”.

The following table provides some indicators on students' enrolments and public expenditures in higher education in different regions of the World.

Table 7-1

**Real public expenditures vs. enrolment growth in higher education
(percentage)**

Region	Years	Real public expenditure growth	Enrolment growth	Change in public expenditure per student	GDP growth/enrolment growth 1990-2000
Africa	1970-83	Not available	Not available	-45	-25.5
Asia	1975-85	252	550	-46	Not available
Europe, Middle East and North Africa	1965-82	Not available	768	Not available	-17.3
Latin America	1975-85	210	370	-34	1.9

Source: Albrecht and Ziderman (1992, p. 13)

The situation of higher education in the Arab states in terms of enrolments and public expenditures followed a similar trend. According to the General Secretariat of the Gulf Cooperation Council (GCC) (2001, p. 24, 25, 26, 27) many of the Arab states adopted a policy of enrolment expansion in higher education to increase the number of graduate workers. For example, Egypt was the first Arab country to expand its higher education system in order to admit most secondary school graduates and then the other Arab countries followed suit. Syria and few states in the Gulf started in the mid sixties and Iraq, Algeria, Morocco and Libya began expanding their systems in the eighties. Most of these expansions were financed from public resources. The previous reference mentioned that government funding represented approximately 89 per cent of total higher education funding in the Arab countries. Most of these countries continued the policy of enrolment expansion in the 1980s and the 1990s, however, without increasing financial resources, whether from public or private sources, to facilitate this expansion. The Arab Gulf states were an exception at the

beginning, however; higher education systems in those countries started to face similar problems as a result of budget deficits caused by fluctuating oil prices and the financing of two Gulf wars. The following table shows the number of students enrolled in the Arab universities, total public spending on higher education and expenditure per student during the last twenty years.

Table 7-2

Students' enrolment, public expenditures, and expenditure per student in the Arab universities (1980- 2000)

Year	1980	1985	1990	1995	2000
Students (Million)	0.7	1.1	1.65	2.5	3.85
Expenditures (\$ billion)	1.443	2.173	2.836	4.508	6.116
Average expenditures per student (\$)	2062	1975	1720	1800	1590

Source: General Secretariat, Gulf Cooperation Council (2001, p. 31)

This trend of declining resource allocation to higher education institutions in proportion to enrolment levels, which caused the deterioration of the quality of education and training, was experienced by most countries. Accordingly, policy makers started to search for other alternatives of funding higher education institutions. This has led to the assessment and evaluation of current sources and mechanisms of finance in order to improve and develop new solutions.

7.3. The public and private financing of higher education

In most countries, data on private expenditure on higher education are hard to find compared with public expenditures. However, available data indicate that personal expenditures on education in general vary considerably in developing countries, from less than 1 per cent to about 3 to 4 per cent of total personal consumption expenditures. This might take the form of tuition fees, registration or examination fees, and the purchase of books, materials and special clothes and uniforms, as well as the

indirect costs of income foregone (Pscharopoulos and Woodhall 1985, p. 131). Apart from personal spending other revenues of private finance for higher education include charitable organizations in the forms of donations and endowments, and external aid from friendly countries and international organizations.

Even though, private expenditures are crucial in some countries and for some institutions, most of higher education investment funding comes from public sources. Public finance authorities, whether central or local, allocate a certain amount of the public resources which are raised in different ways including: the general taxation of individuals and companies (taxes on personal income and wealth, land and property, expenditures, sales and profits) customs and excise duties, fees and licenses, specific taxes for education. These also include oil revenues in countries where oil resources are in national ownership such as in the Arab Gulf States including Oman.

It has already been argued that from a human capital point of view, both private and public financing of higher education are forms of economic investment. However, this review has shown that public financing in most countries takes greater share to total expenditures. Therefore, it is important to review the rationale and arguments for public and private financing of higher education.

7.3.1. The case for public financing of higher education

There are three main arguments to justify public financing of higher education. The first is the externalities and spillover benefits of higher education that accrue to society as a whole and not only the individual student (this has been discussed in chapters 5 and 6). The second is related to equity and equality of opportunity. The provision of education under free market conditions would prevent individual students from poorer backgrounds from continuing higher education so that only those who can afford the cost will be able to continue. This would result in an under investment in higher education from the social point of view, and the

preservation of income inequalities in the society since education is anticipated to be a determinant of lifetime income.

One could argue that individuals can have access to private capital markets, and therefore, they can borrow to fund their private investment in higher education so long as the expected rate of return to this investment is higher than the cost of borrowing. However, the existence of many imperfections in the capital markets, and the presence of high risk and uncertainties in this type of long-term investment, are serious problems to using this method. Many governments provided free interest loans and risk guarantees to make this option attractive to students and private financial institutions. Nevertheless, problems are still there and the experience of those countries, as will be discussed later in this chapter, is not an overall success. The most important is that governments believe that the externalities and equity issues require substantial public funding rather than the provision of loans (Psacharopoulos and Woodhall 1985, p. 137-144).

The third argument in favour of greater public financing of higher education is the issue of economies of scale and many believe that it is more efficient to finance and provide education publicly. However, there is conflicting evidence on the practicality of this view (Psacharopoulos and Woodhall 1985, p. 138).

It should be stressed that those three arguments for the public financing of higher education are based on equity and efficiency without specifying the extent and level of public subsidies. In this respect, Pschacropoulos and Woodhall (1985, p. 138) stated that:

“What is at issue is not whether education should be subsidized, but to what extent. In other words, is the present balance between public and private financing optimal?”

They added that:

“Several studies of educational financing have tried to tackle this question, but could not agree on the optimal level of public subsidy in developed or developing countries”.

Accordingly, the public sector continued its traditional role of providing a substantial share of the financial requirements for higher education. Many countries, pressured by fiscal constraints and motivated by the equity and efficiency arguments, developed several methods and mechanisms to make efficient utilization of public resources in higher education, in addition to encouraging private contribution.

7.3.2. The private contribution

The case for private contributions in the funding of higher education investment is based on several factors. First, and most important is the growing financial constraints on the public funding for higher education which is caused by fiscal problems on a macro level. These comprise the fluctuation of public revenues, the expansion of overall public expenditures and increasing national debts on the one hand, and the increasing private demand for higher education on the other. Therefore, private contribution to the finance of higher education will help to reduce the pressure on public expenditures and will constitute alternative funding sources for higher education institutions. Second, several studies on private rates of return to investment in higher education pointed to substantial private benefits (see chapters 4, 5, 6) which was used as a justification for some form of private contribution towards the cost of their education. Third, private contribution might have a positive impact on the efficiency of education provision. Individuals who are bearing some of the cost of their education will try to maximize their benefits from education by enrolling in subjects that are in great demand by the labour market, and they will be committed to gain as many skills as they can, and to work hard to achieve the best grades.

Accordingly, many countries started to adopt policies that would encourage able students to cover some of the cost of their education including tuition fees and other educational services and facilities as well as maintenance and living expenses. The most popular examples are the experiences of the US, Japan, UK, and other industrialised countries. In those countries, students have to cover some of the cost of their education

relying on family support, part-time jobs, and other schemes that are often facilitated by the government and higher education institutions, such as income-contingent loans and graduate income tax. However, for political, social, economic, and cultural reasons, many developing countries are still hesitant to introduce such measures. For example, the problem of financing higher education institutions is widely discussed in the Arab Gulf Countries, including Oman, but the issue of introducing measures that would encourage students to contribute to the cost of their education in the public institutions is a sensitive one from a political point of view. The most important measures that were taken by some of these countries (mainly Oman and the United Arab Emirates) is to encourage the establishment of private higher education institutions which are privately funded and where most of students enrolled are funded by private sources. However, this experience is new to the region and the evaluation of its effectiveness will require more time.

However, there are some problems in introducing measures to promote private contributions in the funding of higher education institutions. First is the lack of accurate and reliable information on expected private benefits and rates of return to investment in higher education.

Second is the difficulty in identifying students who are able to cover all or some of the cost of their education. This is a major problem in countries where data on family income (household income) and other similar indicators are not available.

Third is the difficulty in relying on private financial institutions as a source of borrowing to cover the cost of education. These institutions find it unattractive to lend for such long-term investment. Repayments of such loans are often spread over 20 or more years after graduation and might not be repaid at all. Many countries that have developed this method of funding are experiencing many serious problems as a result of students not being able to repay their loans.

Fourth is the difficulty in identifying the type of cost that should be covered by students, as well as the difficulty to measure this cost accurately. Some

institutions do not provide accurate data and indicators that are classified and categorised by type of expenditure such as that for tuition fees, research, libraries and computing centres, and housing and other properties. Identifying and categorising the types of institutional expenditures is crucial for the development of public and private funding mechanisms.

7.4. Funding sources and mechanisms

The funding of higher education institutions in most countries comes from three main sources. The first is the public (government) subsidies which are allocated to the institution either directly or indirectly. The second is the funding raised by the institution from private sources including fees charged on privately funded students, research and consultancy projects to private sector, and the sale of other services. The third and the most common is the funding received from a combination of public and private sources.

Al-awdah in the General Secretariat of the Gulf Cooperation Council (2001, p. 33, 34) listed five different sources of funding higher education:

- i. Government funding.
- ii. Private funding.
- iii. A mix of public and private funding.
- iv. External funding from International Organizations and foreign governments.
- v. Own funding from internal activities such as the rent or sale of properties and other types of investments.

From another point of view, the OECD (1990, p. 10) identified five ways of funding higher education institutions:

“...,its own investments; general government grants and tax concessions; specific government grants; plurality of government grants; and sale of academic services”.

The first source is the institution's own property or investments. The second is a general grant from a government agency that can be spend by the institution according to its priorities. The third is a grant from a

government agency that is linked to specific objectives and therefore it should be spend according to the guidelines and roles set by this agency. The fourth is a collection of several grants received from different government agencies and organizations which give the higher education institution the advantage of relying on different sources of public funding. The fifth is the commercialization of educational services such as charging fees for privately funded students and the sale of research and consultancy services to public and private organizations.

Further more, the OECD explained that each of these funding arrangements or sources is linked to a certain form of organisation of higher education institutions. Four main forms of organisation were identified: collegial, political, bureaucratic, and market.

“The collegial model has its roots in the concept of a self-governing community of scholars arriving at consensus decisions amongst themselves. In the political model the scholars have organised themselves into different interest groups corresponding often to different subject areas; bargaining between competing groups rather than consensus amongst the whole college becomes the norm. The bureaucratic model is managed by a professional administration often heavily influenced by government agencies outside the institution. Finally, in the market model the academics within the higher education institutions exchange educational and research services for resources from the rest of the community” (OECD 1990, P. 10).

Therefore, the first two sources of funding are associated with the collegial or political forms of organisation where resources are made available to the institution with few conditions imposed by the providers on its distribution. The third source of funding in which detailed spending plans and line-by-line budgeting is required before the allocation of resources is linked to the bureaucratic forms of organisation. The fourth and fifth sources of funding are based on the market form.

It is often the case that higher education institutions in most countries rely on a mix of funding sources. The relative importance or the proportion of each source of the total funding varies from one country to another and from one institution to another within the same country. For example,

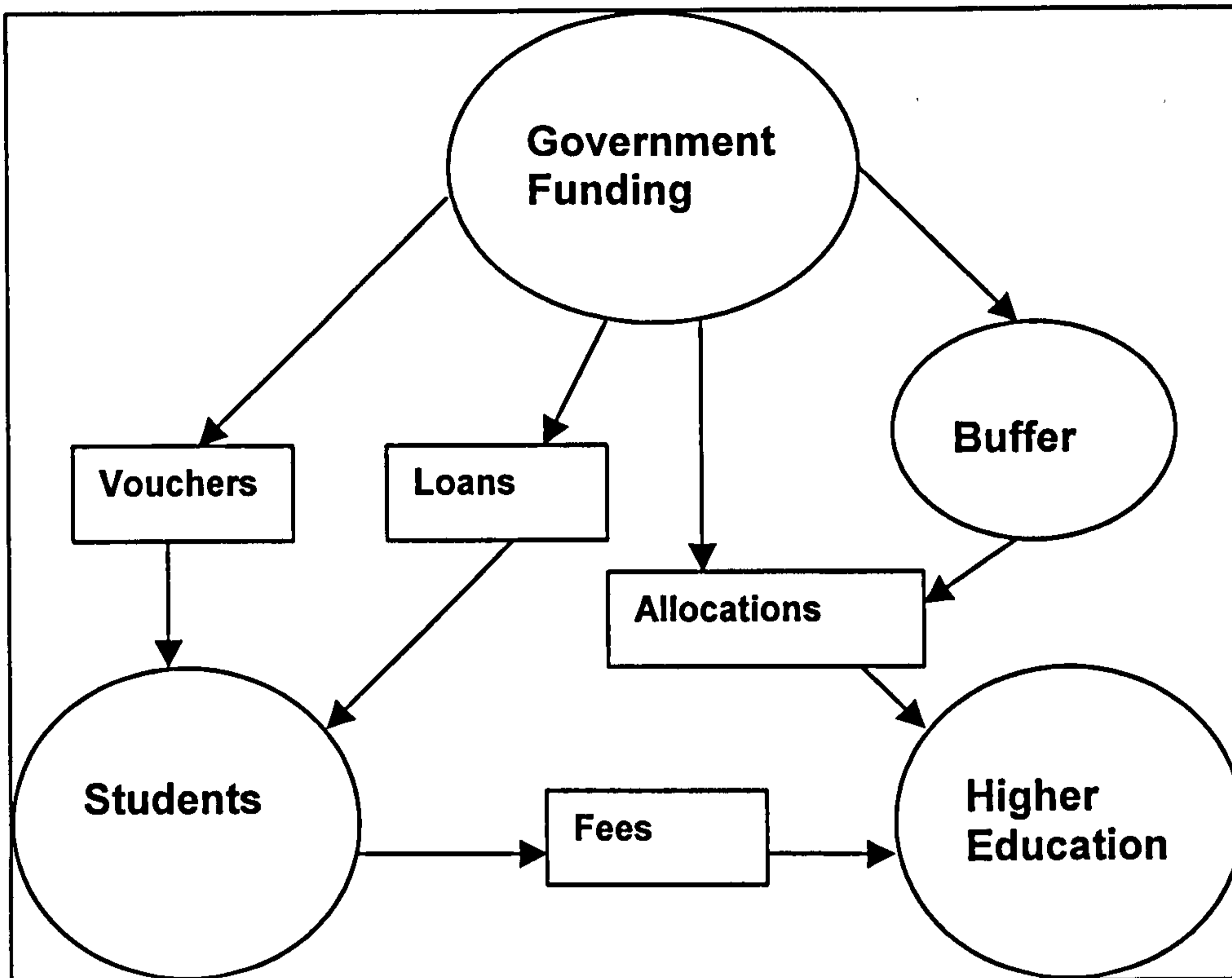
"In all OECD countries most institutions of higher education receive income from several different sources, both government agencies and private economic enterprises. None receives public funds entirely unconditionally, and no OECD country has so far depended entirely on the market for the finance of the larger part of its system of higher education" (OECD 1990, p. 11).

Nevertheless, public or government finance represents the largest source of funding for higher education institutions, especially in less-developed countries where more than 80 per cent of funding is subsidised by governments. For example, as mentioned above page 3 around 89 per cent of the funding of the Arab universities is from public sources. Accordingly, it is of relevance to shed some light on the justification and mechanisms of public funding for higher education institutions.

7.4.1. Government funding mechanisms

In almost all countries, government funding for higher education institutions is allocated either directly or indirectly. The direct allocation is the sum of funding which is transferred from the government's budget to the higher education institution. In some countries, this transfer is made directly from the central or regional public finance authority to the department of finance of the institution. In some other countries, this transfer is channelled through other agency or "buffer" as described by Albrecht and Ziderman (1992, p. 6, 8) which is acting as a representative or intermediary to all higher education institutions in the country. The indirect public funding is the subsidisation of the cost of higher education services which is paid to the institution through students such as vouchers and loans for fees and grants for maintenance and other living expenses. Albrecht and Ziderman (1992, p. 5) simplified these allocation pathways in the following chart.

Chart 7-1
Potential pathways for transfer of government resources



Source: Albrecht and Ziderman (1992, p. 5)

Further more, Albrecht and Ziderman identified three different mechanisms of direct government allocation of resources to higher education. These are the output, input, and negotiated mechanisms. In the first mechanisms, higher education institutions are funded according to their output in terms of performance in producing graduates and other educational services. At the same time, the input mechanism is based on the cost of higher education which is provided by the institution, or in other words, the cost of production factors. The third mechanism of direct public funding is the negotiated allocation, in which funding is often based on the allocations and expenditures of the previous financial year and final agreement is reached after discussion and negotiation between the public finance representatives and those of the higher education institution.

Governments adopt either one of those mechanisms or a combination of them to finance higher education. For example, Albrecht and Ziderman

(1992, p. 10) reviewed the public funding experience of higher education institutions in about 35 countries. They found that in most cases allocation is made on a negotiated basis, especially in developing countries. However, a smaller number of countries (mainly industrial) adopts the input and output mechanisms. They attributes the use of the negotiated mechanism by most developing countries to the level of institutional development and the availability of elaborate administrative procedures, data availability and reporting in these countries. The following table shows some of the countries that were reviewed and the mechanism of funding.

Table 7-3

Mechanisms of allocating public resources for higher education institutions in some selected countries

Direct allocations			Indirect allocations
Negotiated	Input based	Output based	Via students
Algeria Argentina Brazil Greece India Italy Jordan Morocco	Canada China England France Hungary Indonesia Japan Norway	Denmark Finland Israel Netherlands	Chile

Source: Albrecht and Ziderman (1992, p. 11)

7.4.1.1. Funding by negotiated budgets

As it is clear from table 7-3 above, the negotiated budget is the dominant mechanism of funding for higher education institutions in the developing countries. This is also the case in Oman and other Arab Gulf States. It is often the case that this method of funding is adopted in the overall public finance and budgeting allocations for all sectors of the economy and in which the political factors are the main determinants.

“Almost all of the countries that rely on negotiated budgets also impose the highest levels of constraint on their institutions. These institutions have little autonomy to control enrolments, to allocate funds internally or to seek additional funding from private sources”(Albrecht and Ziderman 1992, p. 20).

Therefore, the level of funding has no or little relationship to the activities undertaken by the institution. For example, an increase in students' enrolment is not translated into funding increase and vice versa.

There are three types of negotiated budgets: incremental, fixed revenue agreements, and ad-hoc negotiating. The incremental budgeting is a flat increment of funding allocated to institutions according to their previous budget. In the ad-hoc budgeting, the allocation is made after lengthy discussion and negotiation between the representatives of the public finance authority and the institution and in which negotiating skills and political lobbying and influence play a major role in the final decision. The fixed revenue agreement is based on allocating a fixed percentage of total government revenues to higher education institutions.

The main shortcomings of this mechanism are the lack of incentives for efficiency and the inability to respond to external demands. If the allocation is fixed on incremental, ad-hoc budgeting, or a fixed revenue agreement basis, and not related to the cost of input (production), then the institution will not be bound to focus on the efficient utilization of resources. Furthermore, negotiated funding is not often related to external demand of educational services such as the labour market or student demands. In this respect, Albrecht and Ziderman (1992, p. 25) concluded that:

“While negotiated funding has been the dominant form of funding of universities in the developing world, it has not served higher education well. Many of the problems stem not from the funding approach per se, but also from restrictions on institutional ability to control enrolments, to seek additional funds to supplement declining government income, and to redeploy resources to be efficient and responsive to changing external demand. ... The challenge for many countries will be to design a means to improve the broader policy context within which institutions operate, and at the same time, to develop new funding strategies that will allow governments to ensure accountability over the use of their funds”.

7.4.1.2. Input funding

Input funding is a cost-based funding method where allocation is made according to the estimates of costs of educational inputs. The most important requirement for the estimation of the level of funding is that the government should be able to identify and measure the costs of inputs, as well as to distinguish costs in different institutions and programs. There are three methods of identifying costs of educational inputs that are associated with three different mechanisms of funding. The first is to break the costs down by types or category of expenditures, such as salaries and equipment. In accounting terms, this method is associated with line item budgeting. The second is to identify costs by departments or units of administrations and are often described as cost centres. This approach is based on program budgeting mechanism. The third approach is to categorise costs by types of activities (i.e. instruction and research activities) and the amount of funding is decided by formulas.

'Line item' budgeting mechanisms implies that institutions of higher education have to prepare detailed itemised expenditure budgets for the coming years to be submitted to the public finance authority for approval. An important factor in the assessment and approval process is the cost parameters that are used to estimate the amount of funding required by the institution. Examples of regularly used cost parameters are: student teacher ratios, staff student ratios, and space allocations.

In the programme budgeting mechanisms, allocation is based on block grants to cost centres, which gives more institutional autonomy. This is seen as an improvement to the line budgeting method, and accordingly, many countries started to implement it. For example, during the 1960s, many US states replaced the programme plan funding (line item mechanisms) with faculties based system (program mechanisms). Similar developments were experienced in Germany and the Scandinavian countries (Albrecht and Ziderman 1992, p. 33).

In the formula allocation mechanisms, the level of funding is decided by using formulas of certain input cost variables, such as enrolments or

staffing patterns. In other words, institutions of higher education are not required to prepare plans and budgets and submit them to the public finance authority. The funding authority allocates resources on the basis of the costs of institutional activities. For example, a formula can be used to derive or estimate the level of funding for teaching activities by multiplying student enrolments by unit cost. For efficiency and equity reasons, formulas assign weighting for different variables to capture variations of inputs costs across institutions and faculties. It is common that the formula weightings are assigned according to the field of study, type of programme or type of institution. In theory, weighting within the formula should reflect cost differentials e.g. the cost in engineering or medicine might be four times or more than the costs of arts subjects. In other words, the differentiated costs facilitated by the formula funding mechanisms enables funding authorities to have some sort of control on the internal and external efficiency and equity of higher education institutions and programs.

An alternative funding method which was developed from the formula funding mechanisms is described as the competitive bidding approach. The major difference is that input costs are estimated by the higher education institution instead of the funding agency. The Institution of higher education is required to submit a bid and to compete with other institutions for funding. Accordingly, the government will select the best bid in terms of efficiency and equity. In theory, this was thought to encourage higher education institutions to adopt market mechanisms and approaches in their organizational and financial managements. This method was tried in the UK in the late 1980s and early 1990s.

Albrecht and Ziderman (1992, p. 37-38) pointed to several weaknesses in this method. In their view for this mechanism of funding to be successful the relationship between the level of funding allocated to higher education institution and the input costs should be stable as long as the price of those inputs do not change. However, this was not always the case:

“But like ad-hoc negotiations, it has worked less well during austerity when governments are forced to adjust their formulas to ensure that their overall budget stays within its available resources” (Albrecht and Ziderman 1992, p. 37-38).

They also argued that most input funding methods fail to provide efficiency incentives as a result of the fact that allocations are based on input costs rather than output. There are no guarantees that institutions will spend their resources according to the activities that are specified at the time of allocation. Another problem is that input costs are often estimated on an average rather than marginal basis and this might provide an inaccurate and exaggerated indicator to the real cost.

“A central motivation behind the UK’s change in funding is to prevent institutions from expanding simply on the basis of average cost. Similarly, Japan has experimented with ‘throughput’ formulas for institutions. To the extent that institutions conform to these measures, they can receive extra funding” (Albrecht and Ziderman 1992, p. 38-39).

Another issue is that input funding is not responsive to external demands. Subjects offered by institutions do not have to reflect the labour market demand because supply is decided by the government, through formulas funding, and that decision is not perfectly based on the market demand. However, this problem might be eliminated if a market demand coefficient can be added to the formulas mechanisms.

A more serious problem, particularly in some developing countries, is that governments may not have the capacity or the facilities to establish a normative funding system, especially human resources and accurate data and information that are related to the real input costs of higher education. To highlight the extent of this problem, Albrecht and Ziderman (1992, p. 40) indicated that:

“To maximize their funding, institutions reportedly claim extremely high enrolments that are much higher than true enrolments. However, since the government lacks the capacity to verify these numbers, it is unable to determine if these are simply ghost enrolments”.

Their final conclusion was that further studies are required to improve this method of funding with special reference to the use of marginal cost

instead of average cost and the market oriented bidding process which was adopted in the UK in the 1980s and 1990s.

7.4.1.3. Output funding

The output funding mechanism is based on the idea that the allocation of funding to higher education institution should be linked to output rather than the input of educational activities. Therefore, the level of government funding is made according to the number of graduates instead of enrolments. This mechanism was developed to overcome the inefficiency of the input funding mechanism caused by high unit cost due to poor resource utilization or a high cost per graduate because of drop-out and repetition.

Some countries have developed procedures to improve the efficiency of the output funding method, especially in relation to the reduction of wastage (student repletion and drop-out). For example, in countries like Finland and the Netherlands, a maximum number of years were assigned to graduation period during which the institution can be funded. In the Netherlands, this period was 4.5 years of annual unit cost funding per graduate and 1.5 years for drop-out, regardless of the number of years of graduation or drop-out (Albrecht and Ziderman 1992, p. 42).

Indicators from these countries showed positive results in terms of efficient utilization of resources from a quantitative point of view. However, the quality aspects of output (graduates) need to be addressed by this method. Albrecht and Ziderman (1992, p. 44) concluded that:

“Output funding suffers from many of the same problems as input funding with regard to encouraging differentiation and responsive institutions. After developing a hypothetical cost per graduate, there is little attempt to recognize variations between institutions that may be desirable”.

7.4.1.4. Student based funding

The three mechanisms that were reviewed in the previous sections are all forms of direct public funding to higher education institutions. Alternatively, governments may provide funding for students instead of directly

subsidizing the institutions. The most popular examples of these were the attempts by many governments to introduce student vouchers and loans which can be used to cover their maintenance and other living costs as well as tuition fees. For example, the United States has a long tradition in this field and several forms of student based funding were developed, both on a federal and on a state level. Many other countries benefited from the American experience, including; Canada, Australia, Japan, the UK, Chile, and some Scandinavian countries.

There are several advantages to student based funding mechanisms. They might act as tools to incorporate market mechanisms into public subsidies. Higher education institutions are free to set the level of student's fees but the government interferes via student support. It is suggested that this type of funding helps to increase the equity of higher education services by increasing overall access, however, the opposite might be the case. Poorer students might choose to attend low cost institutions and richer students will attend expensive ones as they are willing to pay higher costs from their own resources. If these institutions offer a high quality of education then equity would be reduced. An important benefit of this method is that it promotes competition on two levels: students will compete for support and higher education institutions will compete for students. This should result in greater efficiency and higher quality. Further more, Albrecht and Ziderman (1992, p. 46-47) mentioned that:

“There is an important practical benefit of student based funding over the norm based input and output techniques, namely, the government does not need to depend on as developed an infrastructure to report information so that institutions can be assessed. As mentioned before, one of the potential limitations of input and output funding in developing countries is the lack of institutional capacity to use indicators. Students based funding might obviate the need for such capacity”.

Nevertheless, Albrecht and Ziderman pointed to several problems associated with the implementation of the student based funding mechanisms. The first is that this approach might cause a drop in the quality and standards of education and training, especially in cases where

obtaining a diploma is the main motive for enrolling in higher education. The second is that this method makes less sense in countries where labour markets do not operate smoothly. Labour market distortions, as it is the case in many developing countries, prevent students from reacting to labour market demand, and therefore, they base their decision to enroll in higher education on other factors. The third and most important problem is that these funding mechanisms lead to an undermining of expensive fields of studies such as medicine and engineering. Therefore, other forms of subsidies will be required to overcome this problem. A suggestion might be to provide higher levels of funding for students who study such expensive subjects.

7.5. Conclusion

Public and private financing for higher education is based on the concept that it is a form of investment in human capital which yields public and private pecuniary and non-pecuniary benefits. The controversies concerning the extent of these benefits and whether they are public or a private have long been debated and are still unsettled. Accordingly, the balance between public and private funding of higher education remains an open question.

Past and present trends show that the finance of higher education in most countries is heavily subsidised by the public sector, and even though, there are variations in private contribution among countries and institutions, public finance remains the main source of funding. Equity and efficiency issues are the main arguments for the domination of the public sector. The presence of many social externalities and spillovers of higher education makes it difficult for governments to treat it as a private good and leave its provision to the market. Market imperfections and distortions have a negative impact on the provision of education from quality, equity, and efficiency points of view.

At the same time, the fiscal problems experienced by many countries, and the increasing private demand for higher education, especially in countries of high population growth rates such as the Arab Gulf States, including

Oman, are important reasons for alternative methods and mechanisms of funding higher education institutions. Studies of private and public rates of return to investment in higher education in several countries provided some justification for private contribution toward the cost. It is believed that this will help to reduce the pressure on public finance and will raise extra resources to improve higher education quality. Many countries have introduced policies to encourage the private contribution and developed several mechanisms such as loan and graduate tax schemes to facilitate it.

Most of the funding methods and mechanisms reviewed here were introduced in the process of reforming public funding with aim of making efficient utilization of existing resources. Direct methods such as negotiated budgets, input and output methods, as well as, the indirect student based method, are all developed and implemented by many countries and institutions. In reviewing their strengths and weaknesses it is apparent that the most recently developed, the output and the student based methods, are superior in terms of reducing public costs. However, further evaluation of their impact on the quality of education provision, as well as their suitability for other developing countries will be required.

In the case of Oman, the assessment of the existing method of funding higher education (the case of the Sultan Qaboos University) will provide some indicators of the efficient utilization of resources and the scope for further developments. The cost-benefit analysis and rates of return techniques, as explained in chapter 6, will be used to analyse the public and private costs and benefits and estimate the rates of return to investment. The main objective is to draw some policy conclusions and recommendations on future funding mechanisms for higher education in Oman.

CHAPTER EIGHT

THE ESTIMATED COST OF HIGHER EDUCATION IN OMAN

8.1. Introduction

In Chapter 6 we have shown that the evaluation of the cost and future expected benefits of investment projects is the corner stone for public and private decisions. In this chapter we present an analysis of the private (individual) and social (public) cost of investment in the higher education system in Oman.

Oman differs in some key aspects from other economies for which estimates have been made. First, higher education in Oman is provided free of charge to all qualified students so that the only cost to students is the income from employment that is foregone. Second, there is no income tax which means that the major source of funding for higher education as in most oil producing countries is oil revenues. Thus the individual's direct contribution towards the cost of their education is minimal. Third, Oman has only one university, which was founded in 1985. The Sultan Qaboos University (SQU) is the largest higher education institution in Oman. It has the largest number of students in higher education in the country.

It should be emphasised that this study is indicative rather than precise and comprehensive owing to the lack of relevant data. Insofar as they have had any economic rationale, investment decisions have been based on the experience of other economies and/or, the hypothetical benefits which logic suggests should accrue. It is therefore important to note that this study deals with full-time first degree students only and is not concerned with qualifications above or below this level. The minimum periods of study required by the SQU to award a degree is 4, 5, or 7 years depending on the subject. We are unable to take account of students who voluntarily terminate their studies or who repeat a year, and we assume that students do not have

part-time jobs. While there may be individual exceptions, these assumptions are realistic and justified in the context of Oman. Similarly, we assume that graduates both males and females all find employment immediately and remain employed until retirement at 60, and they have no other source of income. This assumption is based on three main factors. First, the demand for graduates exceeds the supply, as indicated in chapters 1, 2, 3, and 4. Second, the Civil service wage scale does not discriminate between males and females in the type of occupations and the level of wages and salaries. Third, data on the sources and level of income earned from non-formal employment are not available in Oman.

8.2. Cost estimates and data sources

The costs of higher education in general can be separated into those that fall on the individual (private costs), and those that fall on the state (public costs). Both private and public costs can be direct and indirect. Direct private cost is the sum of expenditures made by the individual student for her or his education such as paying fees, buying books, living and maintenance and other similar expenses. Students also incur an indirect cost while in higher education which is measured in terms of the lost employment income that they would have received had they not been in education. This cost is represented by the average annual income earned by employees who graduate from high school but who choose to enter the labour market rather than stay in education. Total income foregone by an individual student in higher education is estimated as the average annual income earned by an employee who is a high school graduate multiplied by the number of years spent by the individual student at university. The addition of both direct and indirect private costs yields the total costs to the individual. However, since higher education in Oman is free, indirect private cost (income foregone) represents the total private cost.

To estimate the annual income foregone by Omani students cross sectional data for all Omani secondary school graduate employees in the civil services ministries was used. The Ministry of Civil Service in Oman supplied these

data for the year 1998. It included most of the important variables required to construct an age-earnings profile, viz.; annual income, qualifications, and years of experience. Since the majority of the Omani labour force is employed by the public sector, this should provide a reasonably accurate estimate of income foregone by university students.

The direct public cost is the sum of all government expenditures allocated to higher education. This is often measured as the cost per student or the cost per graduate. At the same time, the indirect public cost is the amount of production foregone by the society as a result of the individual student being in education rather than the labour market.

The estimation of private and public cost per student or per graduate requires careful consideration be given to three factors. First, the number of years required for graduation varies according to the faculties and subjects. It is very common in most universities around the world for scientific subjects to require more years of study than arts subjects and therefore the cost of science graduates is higher than that of arts graduates. Second, costs of "production" vary from one faculty to another, especially between sciences and arts subjects. For example, wages and salaries in scientific subjects are higher than in arts. In addition, scientific subjects require more expensive equipment and laboratories. The third factor which effects the cost per graduate is the number of years repeated or dropped by the student. These years represent an additional cost, and therefore we need efficient and accurate data on the history of every individual student to monitor this wastage.

It is quite easy to identify the first two factors using data provided by the University on the number of students enrolled and the annual expenditures as a whole analysed by department. It was not possible to get historical records on each individual student at the University in order to identify the dropout and repetition rates, nor it was possible to get official indicators from the University.

To calculate the public cost per student in higher education, Government expenditures allocated to SQU for the years 1996 and 1997 were obtained. These expenditures were classified according to the cost centre (department) and to item or type of spending. Two types of expenditures were identified. The first included expenditures on departments and centres which provide services to all students in the University, e.g. Administration, Main Library, Language Centre, Computing and IT Centre. Accordingly, the total cost of these departments was divided by the total number of students. The raw data for expenditures on these departments are presented in tables 8-12 to 8-22 in the appendix.

The second type of expenditure was department specific. This is the budget allocated for each academic department in the University for the same period 1996 and 1997. The raw data for these expenditures are presented in tables 6-23 to 6-29 in the appendixes. The total expenditures for each department were divided by the total number of students in that department. The final step was to add the average cost per student for central services and the average cost per student from academic departments to obtain the average public cost per student in each department. The results of estimating private and public costs are presented and discussed in the next sections.

8.2.1. Estimates of private cost

As indicated above, the private cost is generally defined as the amount of expense incurred by the individual student for her or his education. These expenses might be in the form of direct expenditures such as paying for tuition, and indirect expenses represented mainly by the cost of time spent in education.

8.2.1.1. Direct private cost

Higher Education in Oman is free for all students who are admitted after satisfying the University academic requirements. Every year the University

admits around 1500 students from final year secondary school graduates. This number has been increased to about 2000 annually in the last few years. The admission policy for different faculties is based on the grades achieved by students in the final year of general secondary education. This means that factors such as demographic, economic, and social backgrounds do not influence the admission process. Further more, for students who live far from the University campus, accommodation and transportation are provided free of charge and students from low-income families are supported by a living allowance. Thus there is no direct cost to the student.

8.2.1.2. Indirect private cost

Indirect private cost is defined as earnings forgone while being at the University (the opportunity cost). The estimation procedures were explained in section 8.2.

As it is the case in many developing countries, the absence of accurate data on Omani household income by educational qualification is the main obstacle to establishing realistic age-earning profiles and income growth rate trends for Omani workers with high school qualifications. In this case the wages and salaries provided by the Ministry of Civil Service in Oman was used to estimate the starting salaries and the annual growth rate of income for Omani workers with a high school qualification. Apart from this being the only option, this is a reasonable procedure because the majority of Omani graduate workers are employed by the public sector. Their incomes are governed by the Civil Service System and the Ministry of Civil Service is the main government body in Oman responsible for supervising many public sector organisations.

The Ministry's main task is to design laws and regulations governing employment in the public sector, as well as supervising their implementation. As part of these laws and regulations the Ministry has designed a wages and salaries system to be adopted in public sector employment. This system is

included in an overall structure of employment grades implemented by the public sector. The wages and salaries for each grade as well as the minimum education qualification and years of work experience are defined in this system. This provision was used to estimate the salaries and the average annual income growth rate for Omani workers with high school qualification using data provided by the Ministry of Civil Service for most Omani employees in the public sector.

The following table shows the average annual income forgone by students. As explained above, it is the average salary earned by secondary school graduates who join the labour market immediately after they graduate rather than proceed to higher education.

Table 8-1
Annual wages for secondary school graduates in Oman in 1998

Years of experience	Number of employees	Average wage (000, Omani Rials)
0	584	2.9
1	644	3.4
2	392	3.4
3	225	3.4
4	293	4.2
5	815	4.5
6	489	5.0
Total	3,442	27.5
Average		3.9

Source: Ministry of Civil Service (1998)

We can see that the average annual income forgone by the average university student is 3.5 thousands Omani Rials. However, the cost per graduate varies according to the number of years spent at the University until graduation. This variation in cost is determined by two main factors. First, and the most important are the faculty and the subject area in which the student is enrolled. For example, the estimated private cost for medicine is 27.5 thousands Omani Rials per graduate while in Arts it is 13.6 thousands

Omani Rials only. This is largely due to the fact that Medical students requires 7 years to graduate, while Arts students require 4 years only.

Table 8-2 shows the estimated student income forgone by department. These estimations are based on the data given in table 8-1 above multiplied by the number of years required for completion.

Table 8-2
Estimated income-forgone by Omani students at SQU in 1998
(thousands of Omani Rials)

Department	Completion years	Estimated Income	Total income foregone
Arts	4	3.4	13.6
Education	4	3.4	13.6
Agriculture	4	3.4	13.6
Medicine	7	3.9	27.5
Sciences	4	3.4	13.6
Engineering	6	3.6	21.6
Economics	4	3.4	13.6

Source: table 8-1

8.2.2. Estimates of social cost

The social cost of higher education is defined as the sum of two types of costs; direct and indirect. The direct cost is the total financial resources allocated to the sector from public revenues. In other words, it is the sum of Omani Government's expenditures on higher education. At the same time, the indirect cost to the economy is the lost income or output while the student is in higher education, i.e. the opportunity cost of the students not being in the workforce.

As already explained, this mainly depends on the number of years required to graduate from the university, which will in turn depend on the subject of study. Since, as mentioned previously, the Sultan Qaboos University represents the higher education system in Oman, it is assumed that the total

government expenditures allocated to the University represent the direct social cost. The indirect social cost was thus obtained by multiplying the annual income of high school graduates by the number of years at university as explained in section 8.2.1.2.

8.2.2.1. Direct social cost

The direct social cost is the per student or graduate share of public expenditures allocated to the University. Based on public expenditures and students' enrolment data published by the Ministry of National Economy in Oman the direct social cost per student for the period from 1991 to 1999 is shown in table 8- 3 in the next page. It is clear that the cost per student has been rising in the first three years of the nineties starting at 12.8 thousands in 1991 and reaching 15.1 thousands in 1993 and since then it has continued to decline to reach 8.6 thousands in 1999.

This pattern can be explained by the fact that the University was in the establishment and expansion stages during the last years of the eighties and the first few years of the nineties and therefore public expenditures were much higher in proportion to student enrolment. Since 1993 most of the University infrastructures and facilities have been established and more students have been admitted leading to the fall of the cost per student. It is expected that this pattern of declining cost per student will continue for the coming years as a result of the increasing number of student enrolment and the stable annual growth of public expenditures.

The cost per student in higher education in Oman, shown above, is much higher in comparison to other countries. The estimation given here may give an inaccurate indicator for two main reasons. First, the estimation of one general cost per student without consideration to the cost variation among departments and subjects may be misleading. A more accurate estimation of the cost per student would require detailed public expenditure data for each department in the University. Second, the public expenditure on the University Hospital is included with other departments in the University. The Hospital provides health services to the public as well as education and

training for medical students and will exaggerate expenditure on education and training. The data that are published by the Ministry of National Economy in the Statistical Year Book on which previous estimates of the cost per student were based does not separate different categories of expenditure. Thus, more detailed data were obtained precisely to enable us to get more accurate estimates of the public direct cost per student.

Table 8-3

Direct social cost per student in higher education in Oman in the period from 1991 to 1999

Years	Public expenditures (Million Omani Rials)			Total number of students	Cost per student (thousand Omani Rials)
	Current	Capital	Total		
1991	32.59	5.60	38.59	3,021	12.8
1992	42.02	5.30	47.33	3,266	14.5
1993	42.79	10.01	52.79	3,504	15.1
1994	44.41	3.97	48.37	3,858	12.5
1995	44.17	5.52	49.69	4,296	11.6
1996	43.50	4.90	48.50	4,834	10.1
1997	46.10	2.40	48.50	5,168	9.4
1998	48.40	3.50	51.90	5,855	8.9
1999	53.30	3.30	56.60	6,605	8.6

Source: Ministry of National Economy (1997,1998,1999)

The direct social cost represented by total government expenditures allocated for the Sultan Qaboos University has been divided into two main types according to cost centre; common cost and the department specific cost. The common cost is the sum of the University expenditures on departments to provide services of common interest or shared use among all university students. As shown in table 8-4, these departments include the central office, the main library, the computing services, the languages centre, the education technology centre, student services, admission's office, and housing services.

On the other hand, the department specific cost is the sum of total expenditures allocated to each of the seven academic departments for the same period. As shown in table 8-5, these Departments are; Economics and

Finance, Arts, Agriculture, Education and Islamic Studies, Engineering, Medicine, and Science.

The main aim of separating the two types of costs is to distinguish the cost variations between different departments and therefore to provide a more accurate indicator of the cost per student or per graduate. This variation results in the unit cost (cost per student) in medicine and engineering being higher than in other departments.

As can be seen from table 8-4 and 8-5, the classification of the cost items for both common and specific costs similar so that they can be grouped in eight different categories; salaries and allowances, maintenance and other contracts, telecommunications, electricity and water, furniture, equipment and machinery, transportation, grants, goods supplies, and other dues.

Table 8-4
Average public expenditures for SQU by department of common services and item of spending, for the years 1996 and 1997
(thousands, Omani Rials)

Expenditure	Department								Total
	Central administration	Main Library	Information technology centre	Language centre	Education technology centre	Students affairs	Admission office	Housing services	
Salaries	636	403	313	679	266	352	125	0	2,773
Allowances	859	187	138	105	137	171	74	0	1,670
Other dues	749	13	15	65	8	17	4	173	1,042
Goods	266	995	60	30	27	1	3	0	480
Contracts	3,538.0	63	39	12	4	16	19	4	3,696
Services	1,350.0	0	0	0	0	0	0	0	1,350
Grant	9548	0	0	0	0	0	0	0	954
Suscriptions	5	0	0	0	0	0	0	0	5
Furniture	53	8	3	0	0	2.	0	225	292
Transport	31	0	0	0	0	0	0	0	31
Machinery	17	0	1	0	0	0	0	0	18
Total	8,456.3	769	568	891	441	559	224	401	12,31

Source: raw data in table 8-12 to 8-22 in the appendix.

Table 8-5
Average public expenditures for SQU by academic department and item of spending, for the years 1996 and 1997 (thousands of Omani Rials)

Expenditure	Departments							Total
	Economics	Arts	Agriculture	Education	Engineering	Medicine	Science	
Salaries	523	,391	1,281	1,362	1,347	2,107	1,983	9,993
Allowance	97	280	414	408	443	640	480	2,762
Other Dues	46	121	118	81	122	167	186	840
Goods	30	27	92	53	26	109	56	392
Contracts	20	18	44	8	20	47	61	217
Machinery	0	0	2	0	0	0	0	2
Equipment	2	3	4	4	2	21	11	47
Total	717	,839	1,954	1,911	1,958	3,091	2,777	4,252

Source: raw data in tables 8-23 to 8-29 in the appendix.

The cost of depreciation of fixed assets, such as buildings has not been included here. This is because most of the University buildings and other similar assets are already fully depreciated. The life expectancy of such assets in public organisations including the Sultan Qaboos University is normally fifteen years. Therefore, since most of the University buildings were constructed in the early 1980s, these assets are nearly fully depreciated. In order to calculate the overall direct social cost we first identified the total number of the university students for the academic year 1996/97 by department, and year of study as shown in table 8-6.

Table 8-6
Students enrolled at SQU in the academic year 1996/1997

Department	Males	Females	Total
Arts	201	322	523
Education	660	1,561	2,221
Agriculture	238	29	267
Medicine	269	273	542
Sciences	175	235	410
Engineering	570	0	570
Economics	352	250	602
Total	2,465	2,670	5,135

Source: Ministry of National Economy, (1998)

Second, the total common university expenditures for the year 1996/1997 shown in table 6-4 divided by the total number of students which was 5,135. This gives the average common cost per student which was found to be 2.4 thousands Omani Rials for the year 1996/1997. Third, the average department specific cost per student was established by summing up all university expenditures in each department for the year 1996/1997 and dividing the result by the total number of students in each department. The result of this is the department specific cost which shows variations among different departments.

The fourth step was to add the common cost per student derived in table 8-4 to the department specific cost in table 8-5. This final result represents the overall direct social cost at the Sultan Qaboos University for the academic year 1996/1997. Table 8-7 shows that agriculture is the most expensive area of study per student per year, costing an average of 9,724 Omani Rials, followed by sciences, medicine, arts, engineering, economics, and education. In terms of direct public cost per graduate, it is clear that medicine is the most expensive field of study with an average cost of 56,704.6 Omani Rials per graduate.

The variations of public cost per graduate in general are determined by the three main variables mentioned at the beginning of this chapter. First and most important is that the number of students admitted in each department constitutes a major determinant of the variation in cost per graduate. The smaller the number admitted the higher the cost per graduate, which means that capacity is not fully utilised in the production process and there are no scale economies. For example, the cost per graduate in the College of Agriculture was 38.9 thousand Omani Rials, whereas, in the College of Engineering the cost per graduate was 34.8 thousands Omani Rials even though graduation in Engineering requires one year more than that in Agriculture. The main reason for this is that the number of students admitted in Agriculture was 267 while in Engineering it was 570.

Table 8-7
Direct public cost of higher education in Oman in 1996/1997
(Omani Rials)

Subjects	Number of years	Number of students	Cost (000)				
			Common	Department	Total	Per student	Per graduate
Arts	4.0	523	1,253.7	1,838.9	3,092.6	5.9	23.7
Education	4.0	2,221	5,323.9	1,915.5	7,239.4	3.3	13.0
Agriculture	4.0	267	640.0	1,956.4	2,596.4	9.7	38.9
Medicine	7.0	542	1,299.2	3,091.3	4,390.6	8.1	56.7
Science	4.0	410	982.8	2,776.6	3,759.4	9.2	36.7
Engineering	6.0	570	1,366.3	1,958.4	3,324.7	5.8	34.8
Economics	4.0	602	1,443.0	717.1	2,160.2	3.6	14.4
Total	4.7	5,135	12,309.0	14,254.4	26,563.4	5.2	23.6

Source: table 8-5 above

The second factor is the number of years required for graduation. An additional year of study obviously adds an additional annual cost, making the cost per graduate more expensive in subjects that require more years of study such as medicine and engineering. The number of students admitted at the college of medicine in 1996/1997 was 542 and the estimated average cost per graduate was 56.7 thousands Omani Rials. While the number admitted at the College of Engineering was 570, and the estimated average cost per graduate was 34.8 thousands Omani Rials. This is due to the fact that the completion period in medicine at SQU is 7 years while in Engineering it is 6 years only.

The third factor is the internal cost of inputs in each department (mainly labour). It was demonstrated above that annual average public expenditures on salaries and wages in departments of applied and pure sciences are much higher than in arts and social sciences. It is clear that the annual current expenditures for the College of Medicine is 3,092.6 thousands Omani Rials, the highest of all colleges. It was followed by the colleges of sciences, engineering, agriculture, education, arts, and economics, with average

annual expenditures of 2,776.6, 1,958.4, 1,956.4, 1,915.5, 1,830.9 and 717.1 thousands Omani Rials respectively. In addition to the variations in average spending across departments, data in tables 6-3 and 6-4 show similar variations among items of spending within departments. It is noticeable that employee salaries and allowances are the highest items of spending in all departments in the University.

These variations are attributed to two main elements. The amount of labour input, in terms of quantity, is higher in some departments than others. In the pure and applied sciences, a comparison can be given between the College of Science and the College of Engineering. The total number of academics and professionals employed in the first was 87 in 1995/1996 and the average annual expenditure on wages and salaries was 1,983.4 thousands Omani Rials in 1996/1997. This is higher than Engineering, which employed 47 members only with an average annual expenditure of 1,361.6 thousands Omani Rials on wages and salaries in the same year.

In arts and social sciences, comparisons can be given between the College of Arts and the College of Economics and Commerce. The first employed a total of 122 academics and professionals in 1995/1996 with an average annual expenditure of 1,391.1 thousands Omani Rials on wages and salaries in 1996/1997. While the College of Economics and Commerce employed 14 members only with an average annual expenditure of 522.8 thousands Omani Rials in the same year.

The other element that causes variations in direct public expenditures across departments is the level of wages and salaries in these departments. For example, the College of Medicine employed 70 members in 1996/1997 and spend approximately 2 millions Omani Rials on wages and salaries. By comparison, the College of Arts employed 122 people and spend some 1.4 millions Omani Rials on wages and salaries.

8.2.2.2. Indirect social cost

As pointed out previously, the indirect social cost is the opportunity cost for an individual student, i.e. it is the income foregone while in higher education. It is argued that if the individual student went into the labour market instead of higher education after high school he or she would earn an income. The amount of earnings contributes both to the individual's welfare as well as to the welfare of society as a whole. Accordingly, students who decide to go to higher education will lose (forego) the income from employment they would have enjoyed for the number of years they spend in higher education. Since this income represents lost output, this loss constitutes an indirect social cost as well as an indirect private cost.

8.2.2.3. Total social cost

The discussion so far has been focused on the components of the public cost of higher education in Oman. However, the aggregate social cost is the total of both direct and indirect costs. As explained above, direct social cost is the total government expenditure allocated to the Sultan Qaboos University divided into common and department specific costs and classified by item of expenditure. While indirect social cost is the income foregone by Omani students at the University shown in tables 8-1 and 8-2.

The results of this aggregation revealed unsurprisingly, the same pattern of variation in public cost per graduate between different fields of study as seen in the direct public cost. This is explained by the fact that indirect social cost is a constant and therefore its addition to the direct cost does not change the pattern of the over all results. Table 8-8 shows the total social (public) cost of higher education utilising data from the previous tables in this chapter.

Table 8-8
Total social cost of higher education in Oman, per graduate in 1998, in Omani Rials

Department	Direct Cost	Indirect Cost	Total
Arts	23,653	13,600	37,253
Education	13,038	13,600	26,638
Agriculture	38,898	13,600	52,497
Medicine	56,705	27,470	84,175
Sciences	36,677	13,600	50,277
Engineering	34,864	21,635	56,499
Economics	14,353	13,600	27,953
Average	46,193	24,631	70,824

Source: tables 8-1, 8-2, and 8-7 above

8.3. International comparisons of the cost of higher education

It is interesting to compare the cost of higher education between economies in order to gain some insights into the reliability of estimates for Oman and to give a wider perspective on its policy for higher education. Satisfactory comparisons require that both private and public costs are included, that the data refer to the same time span, and that the countries are at a similar stage in development.

8.3.1. International comparisons of private cost

Most comparative studies of the cost of higher education in different countries concentrate on the social cost of higher education. The main reason is the availability of public expenditure data which are processed and published on a regular basis in many countries. However, data related to private cost are less available and therefore comparative studies are very few. The identification of the private cost of higher education requires detailed and accurate data on individual student expenditures and earnings while in education. Such data are difficult to obtain especially in less developed countries where population census and household surveys, the main sources of these data, are very rare.

The data available to us, were based on the work undertaken by Jawad (1993) on Iraq and Yousef (2001) on Malaysia. The fact that these two countries share some common characteristics with Oman provides a solid base for this comparison. The level of socio-economic development and per capita income in Iraq during the 1980s, the period of Jawad's research, are similar to those of Malaysia and Oman at present.

Average overall private cost of higher education in Iraq is given for the year 1987. To standardise the indicators we calculated the average of the first seven years income of high school graduates in Iraq, as this covers the period of university education, and converted the amount from Iraqi Dinar to US Dollar. The free education policy in Iraq and Oman meant that the only private cost incurred by students was the income-foregone. On the other hand, the private cost of higher education in Malaysia includes direct and indirect expenses. Malaysian students pay reduced fees to study in public universities.

The average overall private cost of higher education in these countries shown in table 8-9 indicates that the cost incurred by Omani students is the highest. In the absence of direct private cost at present this finding might be meaningless. However, it is a good indicator for future policies related to students' direct contribution to finance the cost of higher education in Oman. In other words, future policies concerning the mechanism and level of private direct contributions should be assessed in line with the current level of private indirect cost.

Table 8-9
Average overall private cost of higher education in Oman, Iraq, and Malaysia

Country	Year of estimation	Amount (\$ US)
Oman	1998	9,810.7
Iraq	1987	3,363.8
Malaysia	2000	1,630.6

Source: Jawad (1993), Yousef (2001), and own estimates

8.3.2. International comparisons of public cost

The majority of comparative studies on the public cost of higher education tend to concentrate on direct government expenditures. The main reason for this is the availability of data related to direct public cost which is regularly published in many countries on periodical bases. At the same time, the difficulty to obtain data related to indirect public cost, such as age-earning profiles, is a major problem for its inclusion in the estimations. Therefore, most of the comparisons under review are related to direct government expenditures on higher education and do not include indirect public cost.

Three different indicators are used to assess the level of public investment on higher education. First is the ratio of higher education investment to the Gross Domestic Product (GDP), which shows the financial allocation to higher education sector. Second, the student cost which is often estimated on an annual base by estimating graduate cost. However, the annual cost per student is more popular and more widely used than cost per graduate. The third indicator is the ratio of student cost to GDP per capita. It shows the level of student cost as a percentage of an individuals' annual income (per capita income).

According to UNESCO (1998, p. 33): *“Developed countries allocated anywhere from 0.7 per cent to 2.1% of GDP to higher education. In 1995, most Western European countries allocated between 0.1% to 1.9% of GDP to higher education.”*

More detail on the ratios of higher education investment to GDP, students' annual cost, and ratios of students' cost of GDP per capita income in some selected industrial countries in 1995 is show in table 8-10. The comparison of the level of investment in higher education made by industrial countries with that of Oman might not be realistic as those countries are much more developed than Oman. It is often the case that industrial countries invest

more on higher education to meet social and economic demands. At the same time, annual cost per student in these countries might be expected to be higher than in developing countries as a result of higher cost of wages and other inputs. However, the comparison of the annual cost per student in these countries, as shown in the table 8-10, with the annual cost per student in Oman, shows that the latter is higher.

It is more practical to compare direct public investment on higher education in Oman with other similar countries such as the Arab states. The same indicators, which were explained previously and presented in table 8-10, are shown in table 8-11, for the Arab countries.

Table 8-10
Higher education expenditures in some selected industrial countries in 1995

Country	Percentage of higher education to GDP	GDP per capita income \$US (000)	Student cost \$US (000)	Ratio of student cost to per capita income (%)
Norway	2.4	—	8.3	—
Canada	2.1	19.2	11.1	58
Netherlands	1.9	25.5	8.6	34
Sweden	1.5	—	11.7	—
USA	1.4	26.4	14.6	55
UK	1.2	—	8.3	—
Switzerland	1.1	42.9	15.7	37
Germany	1.1	—	7.9	—
Spain	1.0	14.2	—	57
Japan	—	—	7.5	—
France	1.0	26.4	6.0	23
Belgium	0.7	26.6	6.4	24

Source: UNESCO (1998, p. 33)

It is more practical to compare direct public investment on higher education in Oman with other similar countries such as the Arab states. The same indicators, which were explained previously and presented in table 8-10, are shown in table 8-11, for the Arab countries.

Total public expenditures allocated to higher education in Oman in 1996 was 86.7 millions (\$US) representing 1.1 per cent of total public expenditures.

This is below the average rate for the Arab countries, which was 1.2 per cent. The highest rates of public spending on higher education as a percentage of GDP in the Arab countries were in Jordan, Palestine, Lebanon, and Saudi Arabia allocating a percentage of 3.4, 2.3, 2.0, and 1.8 respectively.

Table 8-11

Higher education expenditures in the Arab Countries in 1996

Country	Higher education investment in \$US million	Percentage of higher education investment of GDP	GDP per capita income \$US	Student cost per year \$US	Ratio of student cost to GDP per capita income (%)
Oman	86.6	1.1	6,500	15,701	242
Kuwait	302.7	1.1	16,882	11,313	67
Bahrain	58.7	1.1	8,667	10,351	119
S. Arabia	2,434.9	1.8	7,000	9,868	140
UAE	150.2	0.3	17,958	8,731	47
Qatar	61.3	0.8	12,667	7,620	60
Lebanon	269.0	2.0	4,323	3,067	71
Jordan	238.4	3.4	1,614	2,855	177
Iraq	430.6	0.5	3,892	2,270	58
Algeria	535.3	1.3	1,480	2,162	146
Libya	160.8	0.4	7,115	2,055	29
Tunisia	241.5	1.1	2,319	1,930	83
Palestine	70.5	2.3	1,348	1,717	127
Morocco	409.9	1.2	1,234	1,462	118
Egypt	1,135.7	1.6	1,139	1,191	105
Syria	239.3	1.3	1,199	1,082	90
Djibouti	58.7	0.4	1,000	978	98
Mauritanie	11.3	1.0	478	974	203
Sudan	71.9	1.4	167	621	371
Somalia	2.8	0.2	170	517	304
Yemen	62.7	1.3	310	511	165
Average	335.0	1.2	4,641	4,142	89

Source: UNESCO (1998, p. 35)

On the other hand, the annual direct public cost per student in Oman was 15,701 \$ US in 1996, the highest in the Arab countries. The average cost per student was 4,142 \$ US, which is well below the student cost in Oman.

The comparison between direct public expenditures on higher education in Oman and other countries at different levels of development indicate that the annual cost per student in Oman is one of the highest in the world. This might be caused by two main factors. First is the high cost of production factors such as wages and salaries, and second is the low annual student intake shown in chapter three.

8.4. Conclusions

We have explained that there are no direct costs of higher education to individual students in Oman and have therefore concentrated on the procedures of estimating indirect individual costs. A large set of data on wages and salaries of Omani secondary school graduates employed in the civil service ministries was used to estimate the annual income foregone by students. It was found that years required for completion is the most important determinant of the level of private cost. For example, medicine is the most expensive field of study because it takes seven years to complete.

Public costs are the sum of the direct and indirect expenditures. Direct costs are the common and department specific government expenditures, while the indirect is the wages forgone by students. Medicine was found to be the most expensive field of study from a public point of view. It was followed by agriculture, science, and engineering.

Three main factors were found to determine the level of public costs of higher education. These are; the number of students admitted, the number of years required for completion, and the cost of wages and salaries paid to academics and professionals in each department.

Cross-country comparisons indicated that the present private and public cost of higher education in Oman is one of the highest in the world. The private cost of higher education in Oman is the highest compared to Iraq and Malaysia (table 8-9). At the same time, public cost is the highest in the world (tables 8-10 and 8-11). These findings lead to the conclusion that cost-effective methods and mechanisms should be introduced to finance higher education in Oman. The picture from this point of view will be clearer after analysing the expected private and public benefits from investment in higher education. This is discussed in the next chapter.

CHAPTER NINE

ESTIMATES OF RATES OF RETURN TO HIGHER EDUCATION IN OMAN

9.1. Introduction

In previous chapters we have argued that both from the individual and the national view points expenditures on education can be viewed as an investment. The finance of investment is normally justified on the basis of its productivity and the expected net rate of return. In this chapter we shall describe the data used for estimating rates of return, the method of valuation adopted, and finally, present our results. The major problem which has confronted this study is the lack of appropriate data. However, the data available are sufficient to carry out a serious analysis and to provide useful insights into the issues enclosed in the financing higher education.

9.2. Data sources and reliability

The estimates of both social and private monetary benefits to investment in higher education are derived from the net expected income of the individual graduate during his or her working life. This was done using the data described in Chapter 8. These data have several short-comings which we shall discuss but they are all that are currently available and, as we shall see, they provide us with indicators which are consistent with those for similar countries.

9.2.1. Direct public cost

Estimates of direct public cost were based on average annual expenditures at the Sultan Qaboos University for the financial years 1996 and 1997. The data were classified by cost centre (departments) and item of spending to enable us to establish a better estimation of the cost per student in each department. As explained in Chapter 8, this was derived

by dividing total average common cost and total department specific cost by the total number of students in each department. The data obtained from the Finance Department at the University and estimates of cost per student in each department are given in the appendix tables 8-1 and 8-2 and summarized in tables 8-3 and 8-4 in chapter 8. While it would be reassuring to have had a longer series of observations, only these two years were available. However, the pattern of expenditures and revenues of SQU are stable so that these two years do give an accurate picture.

9.2.2. Indirect costs: private and public

Estimates of indirect costs were determined from the income foregone by university students during their years of study. As explained in Chapter 8, estimates are based on age-earning profiles for Omani workers with secondary school qualifications. It is assumed that the opportunity cost for students at Sultan Qaboos University was equivalent to the income earned by non-graduates with a secondary school education for the appropriate number of years of study. Data on the annual income of secondary school graduates in Omani Rials for the year 1998 was obtained from the Ministry of Civil Service in Oman. These are shown in table 8-1 in Chapter 8, and table 9-3 in the appendix to this chapter. These data are based on a sample of 6,408 of the total of 8,825¹ secondary school graduates working in the Civil Service in 1998, some 73 per cent of the total.

A further indicator of reliability is provided by the work of Al-Masker (1992) who found that the majority of university students at the Sultan Qaboos University estimated their wages foregone to be in the range of 200 to 300 Omani Rials monthly which aggregates to an annual wage of between 2,400 to 3,600 Omani Rials. This is consistent with our estimates of 3,411 Omani Rials.

The sample of observations is high but 68 per cent is in teaching. This is to be expected. The late introduction of the education system in Oman which started in 1970 focused on early levels of education. Thus

¹ The source of this figure is the 1998 Statistical Year Book published by the Ministry of National Economy in Oman.

Government favored a policy of training more teachers through teacher training programs in order to meet the development and expansion requirements of the education system. Most of the Omani graduates employed in the labour market up to the 1980s in fields other than education were educated in universities outside Oman.

9.2.3. Direct benefits: private and public

Estimates of public and private benefits were based on the average annual income expected by graduates. Income expectations were derived from a large sample public sector workers classified by level of education, occupation, and years of experience. A sample of 4,002 graduates representing some 60 per cent of all Omani graduates working in the civil service was supplied by the Ministry of Civil Service. Table 9-1 below shows the sample size of secondary school and university first-degree workers classified by years of work experience. More details on average annual income are presented in the appendix tables 9-3 to 9-9. Also the fact that there were relatively few Omani graduates two or more decades ago means that complete age earning profiles for the whole working life of a graduate are not available.

9.2.4. Civil Service incomes as a representative of other occupations

Finally, the question arises as to how well these civil service data represent incomes in other public and private sector occupations. Previous empirical work shows that the majority of Omani graduates prefer to work in the public sector because of the economic benefits. Al-maskary (1992, p. 228) found that above 90 per cent of students he surveyed at the Sultan Qaboos University wanted to work in the public sector. He found that the main motive for Omani students to enter higher education was the higher salaries paid by public sector.

“Interestingly, students perceive government employment as equivalent to the lender of the first resource in fulfilling all their motivations. As has been indicated by the results of bivariate

analysis between the importance of getting a government job and each of the three motivation dimensions, students regard government employment more as a place where they can achieve economic and career incentives than personal development incentives. It is true that public employment in Oman provides more economic incentives, such as higher salaries, job opportunities, and financial security, than any other employment organization. Government employment also is a source of career incentives, such as social prestige, career opportunities, and good employment opportunities.”

Thus the majority of Omani graduates who work in the public sector are in the civil service. Second, wage system in the public sector is constructed on the basis of a positive relationship between educational qualifications and income, in addition to years of work experience. This type of structure is also adopted by the private sector and so it characterizes the whole of the professional labour market.

In general then the data while weak in comparison with more advanced economies are sufficient to enable us undertake albeit a preliminary analysis which in addition to assisting in future investment discussions also indicates to the Government the data required to resume sound planning and monitoring of higher education in the future.

9.3. Estimation method

A significant number of studies in different countries have adopted rate of return analysis to analyze investment in education. The main objective is to provide policy makers in the education field with financing options so that decisions can be made on the level of financial resources required, and on the allocation of these resources to different levels of education. This method is widely used by financial analysts and policy makers to evaluate investment options and to allocate resources for different projects.

The most common method of estimating rates of return to investment in public services in the case of education is the internal rate of return method. The basic purpose of this method is to define the rate of interest that equates the value of expected benefits is equal to the value of present

cost. The advantage of using the internal rate of return method in comparison to other similar tools was discussed in Chapter 6.

Table 9-1

Sample size of Omani secondary school and university first-degree graduates in the Civil Service in 1998 classified by years of experience

Years of experience	Type of qualifications						
	Secondary	Science	Medicine	Arts	Economics	Engineering	Education
0	584	11	9	18	19	38	1166
1	644	25	12	6	18	59	688
2	392	14	58	19	10	36	422
3	225	20	11	28	6	14	321
4	293	57	3	20	5	48	361
5	815	28	2	13	5	12	73
6	489	27	95	17	4	24	27
7	544	5	0	4	6	11	15
8	495	0	0	3	3	0	6
9	236	0	0	4	1	0	3
10	286	0	0	3	1	0	47
11	248	0	0	2	0	0	12
12	187	0	0	4	0	0	0
13	200	0	0	0	0	0	9
14	158	0	0	0	0	0	0
15	125	0	0	0	0	0	10
16	102	0	0	0	0	0	0
17	121	0	0	0	0	0	2
18	88	0	0	0	0	0	2
19	52	0	0	0	0	0	0
20	25	0	0	0	0	0	0
21	17	0	0	0	0	0	0
22	25	0	0	0	0	0	0
23	31	0	0	0	0	0	0
24	15	0	0	0	0	0	0
25	5	0	0	0	0	0	0
26	6	0	0	0	0	0	0
Total	6408	187	190	141	78	242	3164

Source: Ministry of Civil Service (1998)

9.3.1. The internal rate of return

The internal rates of return (IRR) is used to estimate both private and social rates of return by deriving the rate of interest r where expected benefits B are equal to present costs C . Private and social costs defined in chapter 6, and expected benefits estimated here are the inputs required to

calculate IRR. The same function is used to estimate both private and social rates of return with some modification to its components. In estimating social rates of return, direct cost has to be added to cost side of the function and income tax is added to benefit side.

9.3.1.1. Private internal rates of return

The private internal rates of return (PIRR) to investment are calculated for the purpose of evaluating the individual's decisions to continue in higher education. The PIRR provides a clear picture of the profitability of the investment made by students while they are in higher education.

In order to derive the PIRR, total benefits are measured as total individual earnings during the period from graduation to retirement, and the total cost is measured as earnings foregone during university years. Therefore, if the private rate of return is denoted by r , total benefit is B , and total cost is C then PIRR function is as follows:

$$\sum_{t=1}^{35} B_t(1+r)^{-t} = \sum_{t=1}^4 C_t(1+r)^{-t} \quad \text{or,} \quad (9-1)$$

$$\sum_{t=1}^{35} B_t(1+r)^{-t} - \sum_{t=1}^4 C_t(1+r)^{-t} = 0 \quad (9-2)$$

To estimate private benefits age-earnings profiles were estimated using simple linear regression analysis for secondary school graduates and university graduates in Education, Medicine, Engineering, Science, Arts, and Economics. Data on income for Agriculture graduates were not available and therefore we assumed that their expected benefits are the same as science graduates. Direct and indirect cost as well as wages and salaries in those subjects are similar.

The simple linear regression equation used to compute the results is:

$$\hat{Y} = a + bx \quad (9-3)$$

Where \hat{Y} is estimated annual income, a is the starting salary, b is constant measuring the average annual change, and x is years of work experience.

The equations for each subject are shown in table 9-2 in the next page. The estimates for each year are presented in appendix tables 9-3 to 9-9.

Table 9-2
**Simple Linear Regression Equations used to Estimate Expected
Income in Each Subject of Study**

Subject	Equation
Secondary	$\hat{Y} = 3411.327 + 228.997x$
Education	$\hat{Y} = 6107.67 + 202.278x$
Engineering	$\hat{Y} = 6167.402 + 342.800x$
Economics	$\hat{Y} = 5665.321 + 325.759x$
Arts	$\hat{Y} = 5961.793 + 276.078x$
Sciences	$\hat{Y} = 5666.071 + 336.588x$
Medicine	$\hat{Y} = 7789.338 + 560.505x$

The age-earnings profile for secondary school graduates is used for comparison. It is utilized to quantify income foregone by university students, and to calculate their marginal (net) income until the age of retirement. It is assumed that employees would definitely earn an income equivalent to a secondary school income without going to university. Therefore the monetary benefit for university graduates is the additional (marginal) income earned compared with secondary school salaries. This is calculated by deducting secondary school graduate income from university graduates' total income.

It is clear that this is a very simple earnings function which uses level of education and years of experience as the only explanatory variables for income. No adjustment was made to control for other factors such as innate ability, personal intelligence, inherited wealth and income earned

from part time jobs. The lack of appropriate data makes it difficult to identify and measure the impact of these factors. Many researchers use different guessed values as an Alpha (α) coefficient to solve this problem. Nevertheless, we assumed that the average total wages in the civil service in Oman are a good representation of the overall average income from education. In other words, there was no need to use Alpha values to control for other factors for two main reasons. First, the Civil Service wages used in this estimation are based on the level of educational qualification as the main income determinant. Second, there is some empirical evidence that controlling for these potential biases does not affect the estimation results very much. For example Dearden (1999) found that:

“When we consider the combined effects of measurement error bias and composition bias, we found that the conventional OLS estimates, which ignore all these factors, appear to be good approximations of the true causal affect of education on wage outcomes”.

9.3.1.2. Social internal rate of return

The main objective of identifying the social internal rate of return to investment in higher education is to evaluate the (expected) profitability of public expenditures allocated to higher education in order to provide evidence to help to determine government funding and provide support for decisions on future expansion.

The method used to estimate the private rate of returns was also used to estimate the social rate of return. The only modification to equation 9-1 above is the addition of direct public cost to individual cost (i.e. the income foregone by students). It has already been explained in Chapter 8 that social cost in general has two main components; indirect social costs and expenditures on university education.

9.4. Other influences on rates of return

In addition to the many non-monetary benefits of higher education which are difficult to measure, the accurate identification of monetary benefits is

a difficult task. The main limitation of this method is the difficulty in defining the amount of income to be attributed to the level of education. To discuss this issue several questions have to be answered. First, is there any relationship between education and productivity and income? Second, if so, what type of relationship is there? In other words, if education has a positive impact then how much of the growth in productivity and income can be attributed to education? Third, what are the factors influencing the relationship between education and productivity and income?

In general, education has a positive impact on productivity and income. However, the level of this impact varies according to several factors which can be defined as internal and external according to their source. Internal factors are related to the education system itself and include quality, level and type of education. For example, workers with higher levels of education are more productive in comparison with those with lower levels. It has also been proved that the productivity of technical and vocational education graduates is higher than general education. There are many external factors which might influence the relationship between education and productivity. For example, on a macro level, a country's economic, social and political environments, as well as, globalization and technological change are few examples. At the same time, individual or personal characteristics such as intelligence and innate ability are very important. The impact of these internal and external factors has to be analysed in more detail.

9.4.1 Internal factors

The internal factors are those elements within the education system which influence the relationship between education attainment and productivity and income. Quality and level of education are the most important. Quality of education is explained by the degree to which education output can meet or satisfy the requirements of the labour market. An important element is the amount of general and cognitive skills gained from the

education process. Blaug (1976, p. 20) mentioned that types of education had a positive impact on earnings.

“The direct effect of years of schooling on earnings is significant, except for earnings at age 43 when the effect is nevertheless very weak. But type of schooling does exert a strong and increasing effect on earnings, both directly and indirectly as a mediator of family background and early cognitive ability.”

Blackaby, Murphy, and O’Leary (1999) found empirical evidence of substantial variation between graduates’ earnings in Britain according to subject. For example, they found that graduates of economics, accountancy, law and management receive higher wages in comparison with graduates of other subjects. Further more, Al-Maskery (1992) indicated that students of medicine, engineering and other applied sciences at the Sultan Qaboos University have higher economic expectations than students of other faculties.

On the other hand, the level of education or years of schooling play a positive and significant role in productivity and income variation. Blackaby, Murphy, and O’Leary (1999) found a positive effect of the level of education on marginal wages in Britain. They described their finding as follows:

“As is clearly demonstrated for both male and female employees, the marginal wage effects to investing in education are considerable. For example, whilst those males (females) whose highest qualification is an O-level can expect their weekly earnings to be 25.0 (25.7) per cent higher than a comparable worker with no qualifications, the earnings markup to having an A-level is even greater at 50.1 (49.0) per cent. The benefits from having a first degree are even greater at 88.9 and 112.5 per cent for male and female employees respectively.”

The effect of this factor is partially eliminated in the present work because the wages and salaries scale at the civil service in Oman is constructed on the basis of educational qualifications and years of experience.

9.4.2. External factors

The country's economic structure often shapes the demand and supply for labour. For example, industrial economies require different types of skills and professions in comparison with less developed economies.

On the other hand, the fast development and expansion in higher education systems in some countries increased the supply of labour causing wages and salaries to decrease and to lower rates of return. (See Psacharopoulos (1994) and Johnes (1993)).

Social and political environments influence the supply and demand for labour positively or negatively depending on the nature of the social and political system. In less democratic countries personal and family relations are very important in order to get access to certain jobs. For example, many Omani graduates believe that they have to use the influence of their family or some one important in the society in order to be employed in their preferred jobs.

Technological change is an important determining factor in the relationship between education and productivity. Workers must have an appropriate level and type of education to benefit from fast technological developments in the work place. If education and training programs are not planned to provide required skills and knowledge then the effect of education is minimized. A clear example is the use of modern information technology in management. If management and business schools do not equip graduates with these skills then they would find it difficult to adapt to the new working environment.

At the same time, personal attributes can be an important source for higher labour productivity resulting in a downward effect of education. For this reason, all personal attributes such as innate ability, cultural, social, and family factors need to be identified in any attempt at measurement.

These are only examples of the many determining factors of the relationship between education and productivity and income. To identify them all is very difficult and to quantify them is nearly impossible. Blaug

(1976, P. 19), while reviewing the shortcomings of the earnings function, summarized these problems as:

“The major shortcomings of all these investigations may perhaps be summarized under three headings: the identification problem; the problem of proxy variables; and the problem of data sources”.

For this reason, a range of alpha (α) values are given to control for factors influencing income other than education. In some cases these values range from 60 per cent to 80 per cent which means that 20 per cent to 40 per cent of rates of return values are due to non-education factors such as innate ability, intelligence, family backgrounds and inherited wealth.

Much empirical work has been devoted to this issue in the United States and in some European countries. For example, in the United Kingdom, Steel and Sausman (1997) pointed out that:

“Education is only one of several factors influencing pay. Innate ability and family background also play a strong role. Graduates are likely to have been more able on average than those with two or more A levels who did not continue to higher education. So part of the graduate pay premium will reflect factors other than education . . . There is a range of research evidence on this topic. The broad conclusion from the literature is that education remains by far the most important factor in explaining earnings differences, even when we control for ‘ability’ and other background factors. The evidence suggests that between 60 per cent and 80 per cent of the graduate earnings premium reflects the skills gained through higher education, with the remaining 20 per cent to 40 per cent of the graduate earnings premium reflecting underlying ability and background factors. A range is given because this research evidence on the link between education and earnings is uncertain (with some studies falling outside this range).”

To analyze the impact of these elements, accurate and reliable data are required. It is difficult to find information on these issues in Oman. The only population census undertaken in 1993 did not provide enough information in these matters. Most of the data provided by this census is

related to population distribution by gender, region, nationality, social status, occupation, and family size.

Domestic labour market structure often plays a significant role in shaping the relationship between education and labour income. In a perfectly free labour market the level of wages and salaries is decided by market mechanisms. Levels of wages and salaries are determined, to a certain extent by labour supply and demand. If labour demand for university graduates exceeds supply then wages and salaries will increase and vice versa. Empirical evidence in support of this relationship was found in several countries including USA and UK. (Psacharopoulos (1994) and Johnes (1993)).

In the case of Oman, the impact of the domestic labour market on graduate income is minimized. From the indicators presented in chapter 4 it is clear that the future demand for Omani graduates will be higher than the supply given the current capacity of higher education even beyond the year 2020. (See appendix to chapter 4, tables 4-5 to 4-8).

Another limitation of the ability to make accurate estimation is the use of long term forecasting in estimating the expected monetary income from higher education during the whole working life of individuals. The identification of monetary benefits and rates of return to investment in higher education requires the construction of age-earning profiles for workers by occupation groups, level of education and years of work experience. As shown in the appendix tables 9-3 to 9-11, these profiles are extended up to forty years in some cases. The difficulty in predicting changes in economic, political, and social environments accurately for such long period causes such forecasts to be subject to substantial error.

9.5. The results

The estimates of rates of return are presented in full in appendix tables 9-15 and 9-16. Table 9-15 shows the estimated marginal (net) benefit for the individual employee, while table 9-10 shows the marginal social benefit. For more clarification these data are plotted in figures 9-a and 9-b below.

Figure 9-a shows the estimated private benefits and figure 9-b shows the social benefits.

It follows from the discussion above that the gross private and social benefits measured in terms of wages and salaries will be the same because there is no income tax in Oman; however, net benefits will differ because private and social costs are taken into account. Most empirical research in this subject has found that the private rate of return in public higher education institutions is always higher than social rates of return (Psacharopoulos 1994). This is the result of public subsidies for higher education that exist in most countries. As mentioned in Chapters 3, 4 and 8, higher education in Oman is fully funded by the government so that there is no direct cost incurred by individual students. This, therefore, has contributed to the widening of the gap between private and social rates of return.

Second, estimated age-earnings profiles show that the annual rate of growth is higher in the early years of employment and then starts to decline until the age of retirement. As shown in appendix 9-17 and in figure 9-c, the highest average growth rate during the whole period is for graduates of medicine which was 3.67 per cent followed by secondary school graduates at 3.29 per cent. Wages for graduates in the arts and teaching have the lowest overall growth rates at 2.73 per cent and 2.07 per cent respectively.

Figure 9-a
Estimated private (individual) rates of return to investment in higher education in Omani in 1998

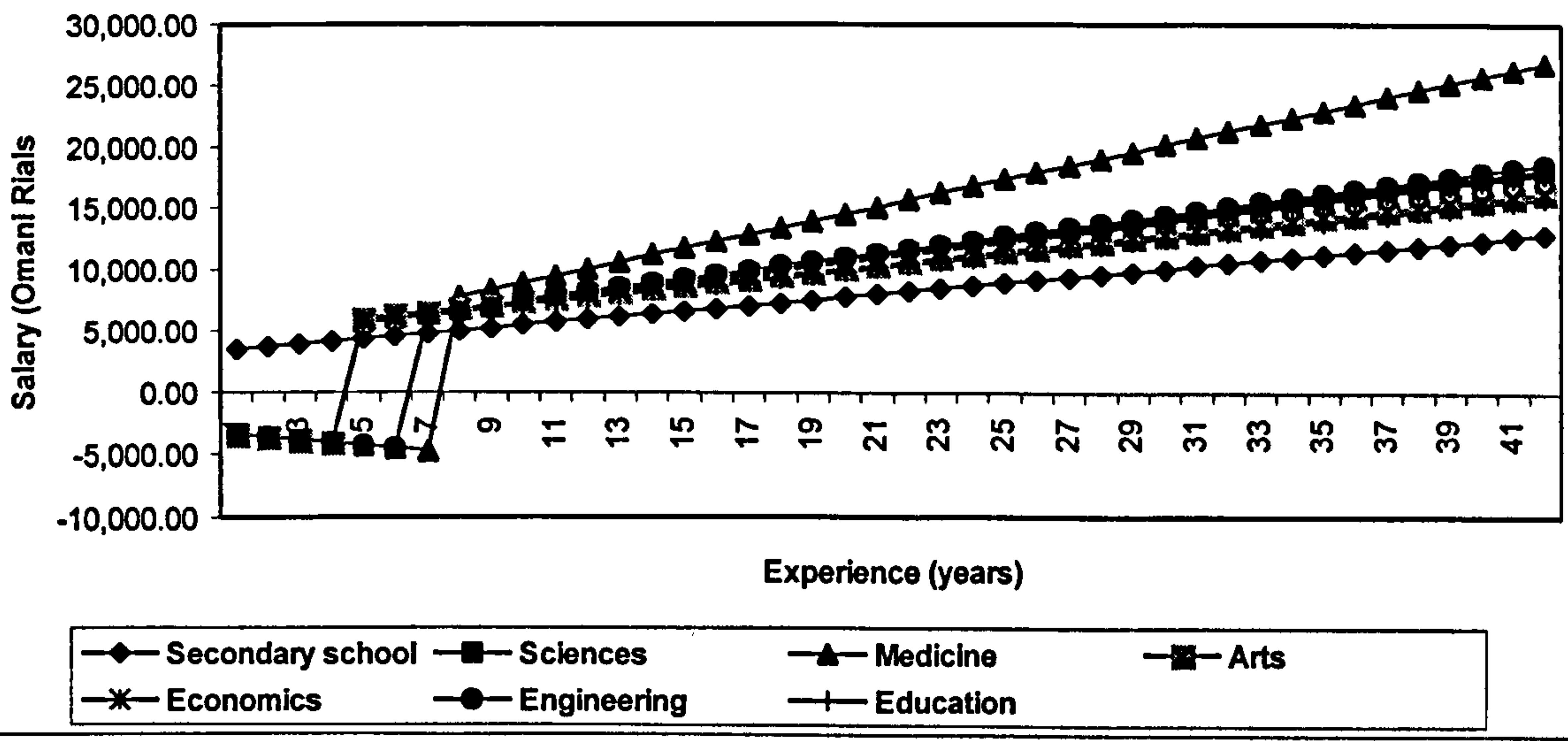
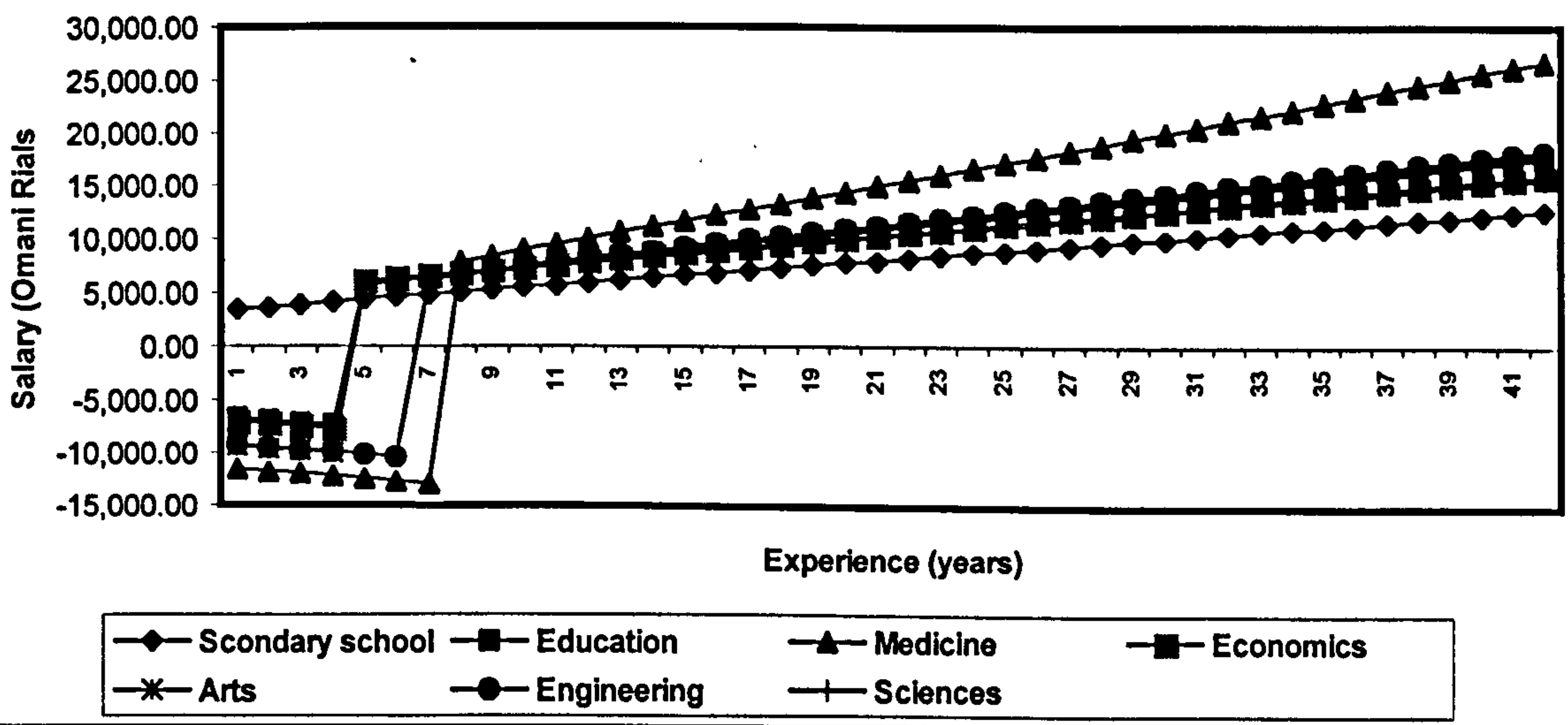
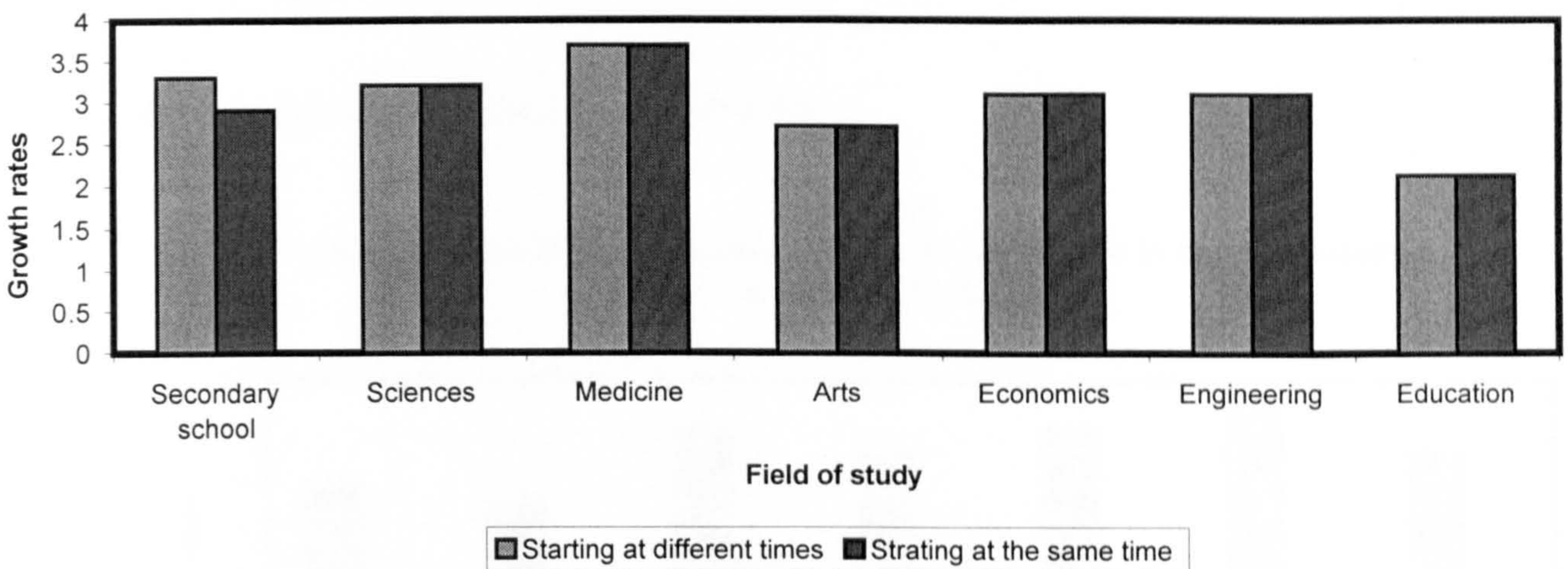


Figure 9-b
Estimated Social (public) rates of return to investment in higher education in Oman in 1998



This picture indicates that medicine has the highest net benefit in the labour market while arts and education have the lowest. Internal rates of return analysis will provide a wider scope because it will add the private to social cost. The higher over-all rate of growth of the secondary school graduate compared to other university graduates income might seem surprising. It is explained by the high growth rates in secondary school graduate salaries during the first four years of employment. This is the income foregone period when other graduate workers are at university. If annual growth rates of income for secondary school graduates are calculated for the same period as other graduates, the over all growth rate is reduced as shown in figure 9-c below.

Figure 9-c
Average annual growth rates of salaries for Omani secondary school and university graduates



9.5.1 Private rates of return

Private internal rates of return shown in table 9-15 and illustrated in figure 9-e are estimated according to equation 9-1 described above. In order to provide a context within which to evaluate these estimates, long-term rates of return on private investment would normally be used. Unfortunately there are no such data available for Oman and therefore the rate operating on American bonds was used on the basis that USA Government Bonds are an option available to Omani investors. It is clear that the private internal rate of return to investment in higher education in Oman is high

compared to a reliable long-term investment options such as 30 years American Government bonds. The yield of these bonds is 5.9 at present (2000) while the estimated average private rate of return to investment in higher education in Oman is 11.2 per cent.

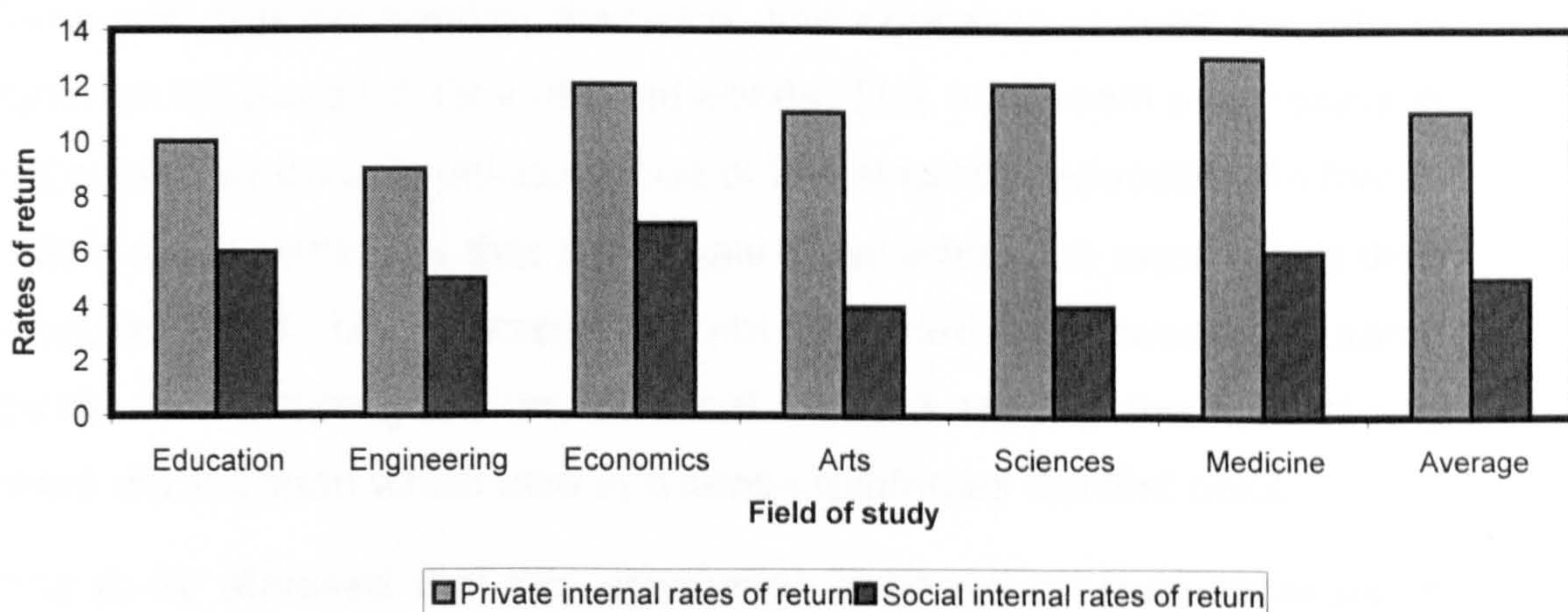
Table 9-12

Private and social internal rates of return to investment in higher education in Oman

Subject	Private rates (per cent)	Social rates (per cent)
Education	10	6
Engineering	9	5
Economics	12	7
Arts	11	4
Science	12	4
Medicine	13	6
Average	11.2	5.3

Source: appendix tables 9-15 and 9-16

Figure 9-d
Private and social internal rates of return to investment in higher education in Oman in 1998



Private rates of return for different subjects show that Medicine is the most profitable field of study followed by Science, Economics, Arts, and Education respectively. Engineering has the lowest rates of return at 9 per cent only. This variation is explained by two main factors. First, the level of

wages and salaries among different professions is an important determinant factor of the rate of return. For this reason Medicine has the highest rate of return and Engineering has the lowest. Wages and salaries received by doctors are much higher than those earned by engineers. The estimated average starting wage for medical doctors is 7,789 Omani Rials annually while for engineers it is 6,167 Omani Rials. Tables 9-2 to 9-8 show the estimated annual income for Omani graduates in different subjects, and tables 9-9 to 9-14 show the marginal income of graduates in comparison to secondary school income. It is this marginal income (benefit) which is used to estimate the private and social rates of return.

Another major factor influencing private rates of returns is cost variation. The low rate of return in engineering in comparison to other social and pure sciences is caused by its high cost. The required period for graduation in engineering is 6 years compared to 4 years in other subjects.

9.5.2. Social rates of return

Estimated social rates of return are presented in table 9-12 and illustrated in figure 9-d above. All are well below the comparable private rates of returns and only economics, medicine, and education exceed the rate of returns on 30 years US Government bonds. This may seem paradoxical in an economy which is in obvious need of investment in education. In formal terms, it clearly indicates that individuals value education more highly than society at large, i.e. education is not regarded as possessing some aspects of a public good. In technical terms it reflects the lack of any income tax in Oman which also in a sense reinforces the first point.

It has to be stressed that this conclusion is based on pure measurable economic benefits. Inclusion of all social benefits from higher education might produce higher rates of return. Complexity and diversity of spillovers and externalities make the attempt to measure and quantify all social benefits from higher education a difficult task. Some economists refer to the unexplained part of economic growth to education in an attempt to

shed some light on the importance of these externalities (Barro 1997). As well, there are other social and political factors influencing governments' decisions to invest in higher education apart from the measurable economic ones. This issue was discussed at length in chapters four and five.

Social rates of return for each subject under study varied from 4 per cent in Science, Agriculture and Arts, to 7 per cent in Economics. This indicates that rates of return to investment in Economics, Medicine and Education are just above long-term investment in American Government bonds mentioned above. Accordingly, on the basis of this criteria government expenditures on these subjects are justified. On the other hand, expenditures on Science, Agriculture, and Arts are not justified as their rate of return is well below the return of long-term American Government bonds. Three main reasons are causing this variation. First, the high cost as explained in the previous chapter. It was found that cost per student at the Sultan Qaboos University is one of the highest in the region. Second is the absence of a student contribution towards the cost of education. Third is that the absence of an income tax policy as another tool of private contributions for public services provision including higher education.

9.5.3. Comparison with other countries

A comparison of current level of rates of return to investment in higher education in Oman with rates in other countries provides a further indicator of the profitability of this investment and the reliability of the estimates. However, we have to be cautious when selecting cases for comparison. Biases may arise in comparing results from cases where different data sets and different methods of analysis are used. To avoid this problem we have tried to select results from similar data sets and methods of estimation.

Other factors which produce biased indicators are the countries' level of development and time span of the research. Empirical research has already proved that the more the country is developed, the lower the rate

of return (Psacharopoulos 1994). For example, it is clear from table 9-13 below that OECD countries have lower rates of return than other less developed countries. This can be explained by the fact that the supply of graduates is high due to the development and expansion of the higher education systems in these countries, as well as the higher direct and indirect private cost.

The other factor is the time span or the age of the research. It has been found that those rates of return to investment in higher education decline over time in most countries. This again is a result of the continuing development and expansion of higher education systems on a universal level (Psacharopoulos 1994). The minimization of this problem requires the selection of the most recent results for comparison. Accordingly, the comparison of Oman's rates of return with results from middle-income countries will provide better indicators.

Psacharopoulos (1994) produced a global update of the return to investment in different levels of education. These rates of return are presented in the following table.

Table 9-13
Rates of return to investment in higher education, regional averages

Region	Social	Private
Sub-Saharan Africa	11.2	27.8
Asia	11.7	19.9
Europe/Middle East/North Africa	10.6	21.7
Latin America/Caribbean	12.3	19.7
OECD	8.7	12.3
World	10.9	20.3

Source: Psacharopoulos (1994)

One important factor to bear in mind when reading these results is that they were calculated during the 1980s and before. This casts some doubt on their validity as good indicators for rates of return at present. The empirical evidence mentioned earlier suggests that current rates of return are likely to be lower than the rates shown in table 9-13. However, they

are the only results available and at the time of the estimates these countries were at a comparable stage of development to Oman today.

Another comparison can be made with rates of return to higher education in some Asian countries shown in table 9-14. They also indicate higher rates of return than Oman. The closest are those for Malaysia. More recent evidence in the United Kingdom by Steel and Sausman (1997) who found that when using an 0.8 Alpha coefficient for graduate income, social and private rates of return are 9 per cent and 13 per cent respectively.

These rates are well above private and social rates of return in Oman which were found to be 11.2 per cent and 5.3 per cent respectively. We have attributed this to the full public subsidization of higher education cost; the absence of any student contribution towards their education and the absence of income tax. When calculating social benefit, the amount of tax collected on individual incomes represents the marginal social benefit. This means that while total benefits are the same, social costs are much higher than the private, causing the variations between private and social rates of return on one hand and lowering all rates in comparison with other countries on the other.

Table 9-14

Rates of return to investment in HE in Some Asian Countries

Country	Year of estimation	Social	Private
India	1978	10.8	13.2
Indonesia	1982	10.0	Not available
Korea	1982	13.0	Not available
Malaysia	1983	7.6	12.2
Papua New Guinea	1982	2.8	8.1
Philippines	1985	11.6	12.5
Thailand	1985	13.3	17.4

Source: Hammer (1996)

However, the low social and private rates of return to investment in higher education in Oman in comparison to other countries should not be used as

the final indicator to the level of investment profitability in education from both the private and the public points of view. Total reliance on these indicators might underestimate the true level of rates of return. As explained in the theoretical Chapters (Chapters 4, 5, 6, and 7) a large amount of the benefits of education that are in the forms of externalities and spillovers to the individuals and societies are not captured in the calculations of the pure monetary rates of return¹. In the case of Oman (a developing country), the externalities and spillovers benefits might be large to the extent that it might justify public investment in higher education despite the low financial rates of return. Personal judgment and the use of evidence from other developing countries are useful to look at this issue in the absence of an empirical research in Oman.

9.6. Non monetary benefits

Quantifiable or direct monetary benefits represent part of total benefits gained by individuals and societies from education. However there are many direct and indirect benefits which are difficult to measure and quantify. Mahdi (1997, P. 28) said:

“Public provision of HE everywhere entails a major divergence between private and social costs of education. This has sometimes provided the rationale for reducing commitments to state expenditure in this area. The problem is that it tends to be easier to measure private and public costs than it is to measure or even define private and public benefits, which are long term and involve externalities and unquantifiable variables”.

The interaction between private and public non- monetary benefits makes it difficult to distinguish between the two. In other words, the categorization of these spillovers into purely private and public is nearly impossible. Some empirical work on this issue was reviewed in Chapters 5, 6, and 7. No attempts were made to measure or identify those benefits or even some of them in Oman or in the other Arab Gulf States. It would be a an opportunity to analyse it in this research, however, time constraints, scarcity of data, and lack of resources to survey those benefits on a

¹ For more detail on this issue see pages 77 to 79 in Chapter 4 and pages 105 to 111 in Chapter 5, and pages 139 to 141 in Chapter 7.

national level, were the main problems. It is suggested that future research should focus on the identification and evaluation of those benefits in Oman.

9.7. Conclusions

Quantifying and measuring private and social benefits of investment in higher education is a difficult task. The benefits of higher education do not accrue at one particular time, to one individual, and to one part of society only. Its spillovers and externalities are very diverse and therefore very complicated to identify and isolate for measurement purposes.

Nevertheless, the private and social benefits represented by the impact of higher education on productivity and income can be used as partial indicators of the profitability of investment in education. Estimates of benefits or profitability are measured by the internal rate of return to investment in higher education. These are obtained by comparing the expected private and social monetary benefits with the costs incurred while in higher education.

The estimation of rates of return to higher education investment in Oman has shown that both subject specific and overall average private rates are much higher than the social rates of return. The highest private rates of return were in medicine, sciences, economics, and arts while the highest public rates were in economics, education, and medicine. Low social rates of return are the result of mainly the high cost per student in most subjects, especially sciences, arts and engineering.

The average private rate of return was found to be 11.2 per cent while the social rate was 5.3 per cent only. Both of these results are lower than the world average which was found to be 20.3 per cent for the private and 10.9 per cent for the social (Psacharopoulos 1994). However, it is interesting to note that the social is roughly twice the private in each one. This may reflect the additional individual benefits that accrue to society as a whole but it may also reflect the lack of an income tax in Oman.

This indicator shows that there is a need to reform the current mechanisms of funding higher education in Oman. It should be stressed that a new system should be introduced to improve both private and social rates of return. The analysis of funding mechanisms and different options to finance higher education in Oman is the subject of the next Chapter.

CHAPTER TEN

ALTERNATIVE POLICY OPTIONS

10.1. Introduction

We have shown that the social rate of return to higher education is relatively low in Oman. This might appear to question the economic justification for public investment in higher education but it arises because, on the one hand, the intangible benefits to the individual rather than society as a whole cannot be measured, and that there is no income tax to recapture some of these benefits. On the other hand, it also reflects the high cost of providing free public higher education. The low social rate of return can be said to reflect the Government's enthusiasms for higher education and hitherto it has been irrelevant to investment decisions.

Thus the problem for Oman is to find an objective way of determining the appropriate level of investment in higher education and the method of its funding. Here rate of return analysis could be useful. Thus the questions arise as to whether the present policy can or should, be continued given its high cost and possible future limitations on provision, and what, if any, are the alternative policy options available.

An important issue to mention is that any policy instrument that can be suggested or adopted to finance higher education in Oman must not produce any negative impacts on equity. In other words, these policies should not act as barriers or deterrents to talented students from enrolling in higher education. Access to the system should be maintained for all those who are able and qualified regardless of their economic or social backgrounds. For example, private and social rates of return, as presented in Chapter 9, indicate that graduates of higher education benefit more than the rest of society, however, it is over simple to suggest that all students must pay fees to cover the cost of their education. Such policy might have negative consequences on the access to higher education. Many

students, especially those from low income families, do not have the financial resources to cover the high cost of studying and living. The high population growth that has been taking place in Oman since the 1970s resulted in an increase in the dependency ratio which might have an effect on the ability of the Omani families to finance the full cost of educating their children¹. At the same time, efficient utilization of public resources concerns the whole society, and therefore, the allocation of these resources must be based on an economic rationale and justification.

Accordingly, an appropriate policy instrument for financing higher education is one which achieves a balance between efficiency and equity.

Another important issue is that future policies should try to guarantee the maximization of externalities and spillover benefits that accrue to society from higher education. It was explained in Chapters 5, 6, and 7 that these benefits are very important for both the individual and the society and that they represent a large portion of the overall benefits of education. Therefore, a policy that would reduce public direct cost and improve social rates of return but at the same time might reduce or eliminate public externalities and spillovers would not be appropriate. For example, a scholarship policy to send students to cheaper foreign universities might reduce public cost and improve social rates of return but it is likely to yield minimum externalities and spillovers to the society as a whole. Public investment in local higher education institutions promotes their growth and development which provide many indirect or unmeasured benefits as well as direct benefits to the whole society such as the employment of local people, the training and research activities in collaborations with local organizations and so forth.

It might be argued that it is cheaper at present to send students abroad for their higher education. This, however, would leave Oman at the mercy of the foreign exchange market and the policy of foreign governments with regard to fees. Moreover, if as would appear to be the case, the

¹ This issue has already been discussed in Chapter 2 (The Socio-Economic Development in Oman).

Government rather to establish a thriving higher education sector in Oman such a policy would only serve to delay its development. The foundation of SQU and Sohar private University suggest that the Government wishes to develop indigenous higher education and, while costly at the start, this will ultimately yield the many benefits discussed above. For this reason we decided not to include scholarships in our analysis.

10.2. Public investment in higher education

Pure economic or financial returns are not the only justification for public investment. For example, it is the responsibility of the state to provide pure public goods and services such as defense and security and other similar goods and services, which cannot be delegated to the private sector. Governments also intervene in the provision of mixed goods and services such as education and health. Market failure, external social costs and benefits, and other political factors are main reasons for public provision for these goods and services. Wilkinson (1993, p. 17-18) explained this role as follows:

“The price mechanism allocates resources, but a government sector intervenes where the market fails. Thus the public sector’s function is to produce public goods, control monopoly, and change resource allocation by regulation and by taxes and subsidies where external effects lead to over- and under-production. It also ensures that people have minimum income.”

Psacharopoulos and Woodhall (1985) mentioned that externalities, equity and equality of opportunity, and economic of scale are the main arguments for public funding of education. Wilkinson described external effects as follows:

“The external effects of economic activities are an important reason for markets failing to provide an efficient allocation of resources. Externalities happen when costs are imposed on, or when benefits are given to, firms or households who are not parties to the transactions which have these effects” (Wilkinson 1993, p. 45)

Further more, Wilkinson pointed out that the level of external benefits is one of the main determinants of public and mixed goods.

“Goods that provide external benefits are known as mixed goods and are under-provided by the market. Mixed goods are a sub-category of public goods, the main category being pure public goods” (Wilkinson 1993, p. 56).

Popular examples of mixed goods are education, health services, and public transport. Wilkinson continued:

“Some claim that education, too, provides only small external benefits, but others take an opposing view, arguing that a well-educated workforce raises productivity, exports and economic growth, which benefits everyone in an economy” (Wilkinson 1993, p. 61).

In the case of higher education, OECD (1990, p. 12) explained that:

“When participation in post-school education was confined to an elite group, the private economic benefits were considerable, and any policies which would allow these benefits to be shared by a large number of people were self-evidently desirable. Similarly, if there is clear evidence that shortages of highly-qualified people are a serious constraint on the economic growth, it is obviously appropriate to use public funds to increase the number of people with qualifications that are needed.”

Many of these externalities were reviewed and analysed in the Chapter 5, including economic growth, income distribution and other economic, social and political benefits.

The second reason for government financial subsidies is to achieve equity and equality in the provision of education. Psacharopoulos and Woodhall (1985, p.137) demonstrated that:

“... If education was provided under market conditions, only those who could afford to pay tuition fees could enroll. Not only there would be under-investment from the social point of view, but income inequalities would be preserved from one generation to the next since education is itself a determinant of lifetime income.”

In other words, if education is treated as a private good and its provision is left to the private market without any financial subsidies from the public sector, it will be difficult for students who cannot afford to pay tuition fees to benefit from education. The main factor here is that, capital market imperfections will act as a deterrent. Psacharopoulos and Woodhall (1985, p. 137) pointed out that:

“Individual students cannot normally borrow to finance their education without providing collateral, and investment in education is risky and uncertain. Therefore governments in many countries provide loans or loan guarantees to help students finance their education.”

In support of this view, OECD (1990, p. 9) indicated:

“The rationale for financial aid for students has been based on both equity and efficiency considerations. Without some form of financial support, lack of money would prevent many able people from undertaking and completing higher education courses. This is widely considered to be politically unacceptable on grounds of economic efficiency as well as equity.”

These arguments provide a strong justification for public investment in higher education. However, the fact that a large portion of the benefits are private, as we have already seen in previous chapters, raises questions about the level and mechanisms of private and public financing of higher education. In this respect, OECD (1990, p. 12-13) mentioned that:

“The acquisition of knowledge has become the acquisition of specific human capital; and the benefits of this capital are appropriated by the individuals concerned in the form of higher earnings, and by their employees in the form of higher output. Such considerations point to the need for reappraisals of the balance between public and private financial support for higher education institutions and students.”

Accordingly, the balance between private and public funding of higher education should provide the basis for the funding sources and mechanisms. The analysis which follows is based on this approach. It should be emphasized that it is not possible to address the equity and efficiency issues which arise. This analysis is concerned with the broad policy issues.

10.3. Sources of higher education funding

In general, there are three sources of higher education funding. It is either fully public, fully private, or a public private mix. The dominant and most popular is the full public subsidization whether in the form of direct or indirect expenditures. In this case, the majority of higher education institutions and activities are fully funded by the government and higher education is free of charge to all people.

“In all the participating countries except Japan, where exactly half of total institutional income in 1985 came from private contributions, the main source of funding for higher education is the public sector” (OECD 1990, p.19).

Most of the higher education institutions in the Arab Countries including the Arab Gulf States are fully funded by the public sector. We have already pointed that the total cost of higher education in Oman, as represented by the Sultan Qaboos University, is fully financed by the Government.

Private investment is another important source of higher education funding especially in the United States, Japan, and other developed countries. The total income of higher education institutions is generated from sources other than the public. Tuition fees paid by students and their families, research and consultancy services to other organizations, and financial donations from other organizations are examples of private funding.

Some countries, such as the US and Japan, have a traditional higher education system along side the public sector, which is totally dependent on private investment. Many other countries are trying to motivate and support the expansion of private higher education as a long-term strategy for the overall expansion and development of the higher education system.

Nevertheless, there are some critical issues, which have to be tackled. The core issue concerns the willingness of the private sector which is motivated by profit, to provide long-term investment in quality higher education. The issue of the profitability of investment and the quality of services in private higher education is under intensive debate at present, however, it is beyond the scope of this research.

The third source, which is becoming popular in many countries, is the public private mix of funding. In this respect, institutions of higher education generate its funding from a combination of government subsidies as well as private investment. This type of funding has the advantage of giving higher education institutions more flexibility to generate more income from more than one source, and therefore, provide the flexibility for expansion and development. At the same time, it reduces

the burden on the public sector resources by allowing for a private contribution. This subject was discussed in Chapter 7.

10.4. Funding mechanisms for higher education

Full public funding for higher education takes two main forms. It is either a direct annual allocation from the government to the higher education institutions, or it is indirect through the students and the purchase of other services provided by these institutions. It is a common practice in many countries for the level of direct annual subsidization to each institution to be allocated according to negotiations between the finance authorities and these institutions. These negotiations are based on plans and requirements of the higher education institution, as well as requirements and conditions set by the government. Some of these conditions might be related to academic performance and other input and output requirements. However, the discussion of these requirements and conditions, which are mostly technical are beyond the subject of this research. The transfer of payment is made either directly to the universities or to another agency, such as a ministry of higher education or a funding council. Albrecht and Ziderman (1992) described these agencies as “*buffer organizations*”.

Indirect public funding is the transfer of public resources to higher education institutions through the students. The main objective of this method of funding is to make efficient utilizations of public resources. In this case universities charge tuition fees and payments on most of the services provided and the public sector subsidizes students and other beneficiaries. Popular examples of this type of subsidy are vouchers and loans, which are provided by governments to university students in many countries.

10.5. Policy instruments and options for Oman

The analysis in Chapter 8 indicated that the public direct cost of higher education in Oman is very high which results in the lower of social rates of return to investment in all subjects (Chapter 9). Therefore, several measures can be suggested in order to reduce direct public cost and

improve social rates of return, some of which have already been implemented by the Omani Government.

- i. Encourage public higher education institutions to reduce the cost per student (unit cost) by economizing as possible and increasing enrollment rates to levels that will not affect the quality of education.
- ii. Encourage and promote the establishment of high quality private higher education institutions and provide the necessary support for their development and growth. These institutions can provide extra places, especially for wealthy students, and therefore, can contribute to the reduction of public cost and the expansion of higher education system.
- iii. Encourage students of wealthy families and other able students to contribute to the direct cost of their education by charging them fees in public institutions and motivating them to enroll in private higher education. This will be an indirect support for private higher education.
- iv. Provide lower-cost scholarships for students to enroll in private higher education. This might reduce direct public cost per student and will provide an indirect public financial support for private higher education.

However, these measures will not be enough to facilitate the desired expansion of higher education in Oman. The enrollment of 40 per cent of secondary school graduates annually will require higher increase in the level of financial resources. Therefore, it might be appropriate to review several funding instrument and assess their implications for equity and for social and private rates of return.

The main objective in considering several options is to present several scenarios for the funding of higher education to facilitate the selection of the most appropriate method to finance the future expansion of higher education in Oman. Maximum improvement of social and private rates of

return is the fundamental principal in this selection. Five options are considered below.

It has already been indicated that private and social demand for higher education is increasing rapidly in Oman. The high population growth rate and the structure of the population, with more than 50 per cent under the age of fourteen are all factors contributing to private demand. At the same time, the implementation of socio-economic development plans and the reality that the majority of the professional labour force in the economy is expatriates are major influences on social demand. As we have seen, current estimates of the social cost of higher education are very high and accordingly, rates of return are low.

All these elements need to be taken into account when evaluating and analyzing alternative policy options or scenarios that might be relevant as future funding mechanisms for higher education in Oman.

In what follows we shall consider five alternatives for funding higher education, viz. direct funding, charging fees, student subsidies, student loans, and a form of graduate tax. The estimated future rates of return for these options in comparison to the current rates of return as analyzed in the previous Chapter are presented in table 10-1. These policy options can be defined precisely as follows:

(A) Direct funding to the institutions (the current situation).

(B) The introduction of an annual fee for students in all subjects. (In this example, the annual fees is 2000 Omani Rilas.)

(C) Student subsidies according to subject of study. It is suggested as an example that the annual subsidy for a student undertaking arts, humanities, and social science subjects is 3000 Omani Rilas, and 4000 Omani Rials for those who enroll in engineering, medicine, agriculture, and other applied sciences.

(D) Student loans to cover total direct cost with an annual interest rate of 6 per cent. The main provider to be the private sector (banks or any financial institution). The Government to provide the guarantees to secure these

loans and to subsidize the 6 per cent annual interest rate. However, the student should pay the original amount of the loan (the original cost of study) which will vary from one subject to another. This payment will be in the form of 5 per cent of the total amount of the original cost annually starting from the first year of employment until final repayment of the loan.

(E) The repayment of the total direct cost by individual students after graduation and as soon as they start working. Students will spread the repayment over twenty years. The example shows the effect of a rate of 5 per cent of the total direct cost deducted annually from their income. This represents a form of graduate income tax.

The purpose of this analysis is to compare in an elementary fashion the effects of using alternative policy instruments to the present system of subsidizing the institutions to take greater number of students.

It is obvious that in order to devise alternative policy options combinations of some or all these instruments may be used. The arrival at an optimal system is a highly complex matter which will depend on the circumstances of an individual economy and the objectives of the government. It has been shown that social investment in education may be justified on the basis of its contribution to productivity growth, the positive externalities which accrue, and capital market imperfections. The contribution to productivity is difficult to measure precisely² and, similarly, positive externalities are difficult to establish empirically³, and the capital market does not seem to be very important⁴.

The case for subsidizing education in some instances can be based on how it affects the distribution of income taxes on the accumulation of human capital. Bovenberg and Jacobs⁵ (2001) have shown that subsidies

² Heckman, J and P. J. Klenow (1997) Human Capital Policy, mimeo: University of Chicago.

³ Kruger, A. B. and M. Lindahl (1999) Education and Growth: Why and for whom? NBER Working Paper, 7591.

⁴ Cameron, S. and C. Tayler (2000) Borrowing Constraints and Returns to Schooling, NBER Working Paper 7761.

⁵ Bovenberg, L A and B. Jacobs (2001) Redistribution and Education Subsidies are Siamese Twins, CEPR 3099.

to individuals which result in them earning higher incomes in the future and, therefore, in them paying more (income) taxes. Oman, at present, does not levy an income tax and so any redistributive effects would only be effective through taxes on goods and services.

10.6. Analysis and evaluation of policy options

The identification of the most appropriate option for the future financing of higher education in Oman requires practical as well as theoretical facts to be taken into account. The selected option should have maximum positive contribution to the wealth of nation and the overall social welfare. In other words, the best policy option is the one that maximizes private and social rates of return.

Therefore, we need to take into consideration all social and economic factors influencing the private and social costs and benefits of higher education, such as family size and level of income. These factors will have an impact on the willingness of families and individuals to pay for higher education if, for example, fees are introduced.

Another problem to be considered is the availability of future resources given the continuation of the present full public subsidies for higher education. One of the main tasks of governments is to maximize social welfare by allocating limited public resources to areas yielding the highest rates of return to society. Therefore, a systematic and practical method to prioritize resource allocation according to rates of return is required. Many governments have used different methods and techniques based on cost-benefit analysis (for example, Layard and Glaister 1994, Peters 1973, and Nas 1996).

Even though public resources are allocated according to some sort of annual and five yearly economic and financial plans, these methods have not been widely used in Oman. It is not possible to find rates of return to public investment in services and infrastructures. Such rates of return would be very useful to compare with the present estimation of rates of return to higher education. Accordingly, the only source of comparison is

with the rates of return to investment in higher education in other countries which was presented in the previous Chapter.

As we have pointed out in section 10.5 above, the main objective of introducing these five different options is to assess the implications of changing the sources and mechanisms of financing higher education in Oman from the public (the Government) to the private (individuals) and vice versa. This assessment will include efficiency and equity aspects. The level of economic efficiency of a particular option or policy instrument will be determined by the social and private rates of return. A general role is that the most efficient policy instrument, from an economic point of view, is that which improves both social and private rates of return. At the same time, equity is determined by the level of accessibility, and therefore, the most equitable policy instrument is that which facilitates access to higher education for the largest number of students regardless of their economic or social class. Contradictions between efficiency and equity might exist in some of the policy instruments. For example, a particular policy might yield the highest social rates of return, however, its implementation will reduce the level of equity to the minimum. In this case a balance between efficiency and equity has to be established and this will entail that the best policy instrument does not have to be that of the highest social and private rates of return.

The results of the analysis are examined in table 10-1. The average rates of return seem to be consistent with expectations given the assumptions on which the analysis is based. Under the present funding system, as we have seen, the private rate of return is more than double that of the social rate. The expansion of higher education by changing the funding mechanisms in order to maximize social welfare, in effect would transfer resources to the public sector reducing the private rates of return and raising the social rates. As might be expected, the results differ for subject areas but the direction of change is the same in all areas. In what follows we shall indicate how this comes about by a detailed discussion of the effect of each option.

Table 10-1

Estimated rates of return to investment in higher education in Oman under different methods of funding (Percentages)

Options		A	B	C	D	E
Education	Private	10	7	10	8	8
	Social	6	8	6	7	7
Engineering	Private	9	6	6	6	6
	Social	4	5	5	5	6
Economics	Private	12	9	11	9	9
	Social	7	9	8	9	8
Arts	Private	11	8	8	7	7
	Social	4	6	7	7	7
Science	Private	12	9	7	6	6
	Social	4	5	7	6	6
Medicine	Private	13	10	8	9	9
	Social	6	7	8	8	8
Average	Private	11.2	8.2	8.3	7.5	7.5
	Social	5.3	6.7	6.8	7.0	7.0

Source: Column A from table 9-15 attached to Chapter 9. Columns B, C, D, E, are estimated from data in tables 10-2, 10-3, 10-4, 10-5, 10-30, 10-31, 10-46, 10-47 attached to this Chapter.

Since unit costs are calculated by taking account of student numbers in each subject area, the averages shown in table 10-1 are simple arithmetic means of the six areas. (The first five of these areas are of approximately the same size. Medicine is by far the largest one being some four times the size of any other area.)

10.6.1. Policy (A): the current situation

The rates of return shown in column A in table 10-1 represent the current method of financing higher education in Oman. Thus was estimated and discussed in detail in Chapter 9. Even though the estimated average private rate of return is high at 11.2 per cent, the average social rate of return under this method of financing, which was 5.1 per cent, might be the lowest in the world. It is as well below the 30 years rate on American Government bonds which at the time of writing (January 2002) was 5.899. Thus, on this basis the economic efficiency justification for current

government funding of higher education is weak and therefore does not appear to support further expansion of the system. However, it has to be stressed that this conclusion is based purely on current economic and financial factors. This is a very simple decision model. Most real world investment decisions are made on expectations of future returns rather than simply on current rates. Moreover, such decisions are also made on the basis of political and social factors the discussions of which will take us beyond the subject of this thesis.

The fact that there is no private cost makes this option the most equitable policy if access to higher education is guaranteed to all qualified students. The restrictions which are imposed on secondary school graduates in the form of admission requirements deny a large number of those students from continuing to higher education. It is true that these requirements are necessary to improve the quality of higher education, and that they are adopted in most higher education institutions in the world, however, they must not be exaggerated so that they become barriers to access, in front of many talented students. The (free of charge) admission policy in most higher education institutions in Oman is guaranteed in most departments for those who achieve 90 per cent and above in the final secondary school examinations. Therefore, it is very difficult to find a place for students who achieve lower than this result, and it is nearly impossible for those with less than 70 per cent. Consequently, a large number of secondary school graduates, every year, end up looking for lower level jobs or stay unemployed and become a burden on the society as a whole. This issue was discussed in Chapters 3 and 4.

However, to make access to higher education universal or to increase enrollment to the levels we suggested in Chapter 4 (40 per cent of secondary school graduates annually) would require the expansion of the current capacity of higher education institutions. This would be very costly for the public as we indicated by the estimated social and private rates of return. Accordingly, from an economic point of view, other funding policies have to be introduced to expand the capacity of higher education in Oman.

10.6.2. Policy (B): the introduction of 2000 Omani Rials annual fees

Option B represents a form of student contribution to the funding of education. For illustrations, we assume here that all students in Oman will pay a fixed amount of 2000 Omani Rials as enrollment fees annually. The rest of the cost would be met by the Government, and the method of payment to higher education institutions will be made according to the traditional system. Higher education institutions have to estimate the cost per student of which the individual student will have to pay a fixed amount of 2000 Omani Rials, and the balance will be transferred from the public finance authority to the institution. It will be up to the individual students and their families to decide on the source of this funding such as family income, part time jobs, private loans, and so forth. The main objective of introducing this policy instrument is to examine the efficiency and equity impacts of shifting some of the cost of higher education from the public to the individual students.

Estimated social and private costs and benefits according to this option are given in tables 10-2 and 10-3 attached. Social and private rates of return are shown in column B in table 10-1 above. It can be seen that in all subject areas other than Engineering where the fall is 2 per cent, the private rate of returns declined by 1 per cent in all subject areas other than Science. Compared with option A, the decline in the private rate of returns is about 3 per cent and the increase in the social rate is between 1 and 2 per cent. This is due to the fact that part of the direct cost which is fully met by the public under the current situation (option A), is transferred to the individual students. As pointed out above, an annual amount of 2000 Omani Rials have to be paid by students to the higher education institutions.

It is clear that the implementation of this policy will improve the economic efficiency of public investment in higher education as indicated by the increase of the social rate of returns, however, the equity aspect cannot be guaranteed. Imposing a fee of 2000 Omani Rials might be an obstacle to students who do not have the financial resources and, therefore, will be

prevented from continuing to higher education. Access will be limited to students from rich families and those who are able to find the financial resources to cover this cost and this will create an elite higher education. Consequently, the economic and social objectives of income distribution and improving the income for the disadvantaged groups in the society will not be achieved from higher education. In other words, a balance between efficiency and equity will not be achieved with this method, and therefore, it is not recommended as a future policy instrument for funding higher education in Oman.

10.6.3. Policy (C): direct student subsidies

This option has two objectives: first, it is assumed that efficient utilization of public resources will be achieved by subsidizing the individual students for parts of the cost of their education instead of paying the full cost directly to the institution as it is the case at present (option A). Students will have the choice between a wide range of higher education institutions and different fields of study. This will encourage institutions to attract more students by providing better services (quality education) with cost effectiveness. The level of subsidies will need to be under constant revision by the government for quality control and resource efficiency reasons.

Second, it will allow for student private contributions towards their education. The level of direct public subsidy will not be enough for fees, tuition, and living expenses, therefore individual students have to pay the extra cost from their private sources. In this option it is suggested that an annual public subsidy for each student will be 3000 Omani Rials for arts, humanities, and social science, and 4000 Omani Rials for engineering, agriculture, and other applied sciences. The payments will be made directly to students in the form of cheques or vouchers from the public finance authority and which they can pay to the higher education institutions. Payments might as well be made direct from the public finance authority to higher education institutions on approval of students enrollment and all information that are required in these matters.

This differential contribution is intended to reflect the expected future income of these categories of graduates rather than the current cost of higher education in Oman. Variations in cost ratios between different subjects and other economic factors such as labour supply and demand requires data that are, as yet, not available. Other countries have tried this option including the USA, UK, Canada, and Australia (OECD 1990, p. 43) with different forms with the objective of achieving a better utilization of public resources and a wider access for disadvantaged students.

The estimated social and private benefits with this option are presented in tables 10-4 and 10-5 attached to this Chapter. Rates of return are given in column C in table 10-1 above. In comparison with the present situation (option A) as may be seen from the table the private rate of returns for Education will remain unchanged at 10 per cent, however, it will decline by 5 per cent in science and Medicine, by 3 per cent in Engineering and Arts, and by 1 per cent in Economics. Social rates of return will also remain unchanged in Education at 6 per cent, but it will increase by 3 per cent in Arts and Science, by 2 per cent in Medicine, and by 1 per cent in Engineering and Economics. Average private rates of return will decline by 2.9 per cent from 11.2 per cent to 8.3 per cent and average social rates will increase by 1.6 per cent from 5.2 per cent to 6.8 per cent.

As it is the case in the previous option (option B), the implementation of this policy instrument will reduce the current direct public cost per student (option A) which will improve the economic efficiency of public resources as reflected by the increase of the overall social rates of return to public investment. However, the fact that students have to cover the extra cost of their education might have negative influences on equity aspects similar to those discussed on the previous policy instrument (Option B). Therefore, this option is not recommended.

10.6.4. Policy (D): interest free loans

The main objective of this option is to introduce a funding mechanism where the individuals and societies contribute to the direct cost of higher

education. In this option it is assumed that all the direct cost of higher education will be funded by student loans from private financial institutions on a 6 per cent annual interest rate, which is the average for long-term borrowing in Oman. The Government will provide the guarantees required to secure these loans and will subsidize the interest rate. Students will have to repay the original amount of the loan after their graduation on the bases of a 5 per cent of the total amount of the original cost of education payable as soon as they start full employment⁶. The total amount of loans will depend on the number of years required for completion and the repetition years, which is not taken in consideration in this estimation due to lack of data in this matter.

Several steps were followed to estimate social and private rates of return under this option. First the calculation of the total amount of loans required to cover the cost of studying in each subject and the annual interest rate to service these loans during years of study is shown in attached table 10-6. The estimation of the annual amount of loans is based on the annual direct cost per student in each subject, which was presented and analysed in Chapter six. It is clear that the cost varies from as high as 56,705 Omani Rials for medicine to a low level as for education, which was estimated at 13,038 Omani Rials. The reason for this variation was explained in Chapter six.

Second is the estimation of annual public and private installments of repaying the original cost and the interest on loans which have to start after graduation and as soon as the graduate find a job. The repayment of interest by the Government is based on a 6 per cent annual interest rate and the repayment of the original loan will be on 5 per cent of the total cost annually. The results of these calculations are shown in the attached tables 1-7 to 10-12. Third is the estimation of the impact of these installments on public and private marginal income (benefits). These are

⁶ It is assumed that there will be no graduate unemployment and graduates will start paying their installments from the first year after graduation. It is already been explained in Chapters 3 and 4 that the labour market demand for graduates in Oman will be more than the supply for the foreseeable future.

shown in appendix tables from 10-13 to 10-18. Fourth is the estimation of social and private rates of return using the new net income (benefit) after making adjustments for the repayments. The results are shown in column D in table 10-1 and they are explained in more detail in the attached tables 10-19 and 10-20.

The introduction of this policy will result in increasing social rates of return in all subjects though with some variation. Social rates of return will increase by 3 per cent in Arts, by 2 per cent in Economics and Medicine, and by 1 per cent in Education, Engineering and Science. The average rate will increase by 1.7 per cent. At the same time, private rates of return will decrease in all subjects. It will be decreased by 6 per cent in Science, by 4 per cent in arts and Medicine, by 3 per cent in Engineering and Economics, and by 2 per cent in Education. The average private rate of return will be decreased by 3.7 per cent.

From a social point of view, this option is the most efficient in comparison to the other options that were presented and analysed in this chapter so far. This is due to the fact that the only direct social cost will be the payment of interest rates on loans, and therefore, the improvement of social rates of return from 5.3 per cent to 7 per cent is attributed to this reduction in social cost. On the other hand, the repayment of the original cost by graduates during the first twenty years of their working life will reduce their income (benefits) and therefore the private rates of return will decline from 11.2 per cent to 7.5 per cent. However, both rates of return are above the 6 per cent rate of investment in American Government bonds that can be used as an indicator to justify long-term investment as in education.

This option looks favorable in comparisons to the others presented so far. The fact that student repayments of the cost of their education will have to be deducted from their future income should not have a negative impact on the demand for higher education. In other words, improvements in efficiency and equity aspects can be better achieved with this method of financing.

However, it has to be stressed that student loans are associated with several problems. Experiences from other countries proved that the cost of establishing and managing the loan mechanism is very high. The more serious problem is that the recovery rate for these loans is very low. This might be due to dropout, reputation, unemployment, and other socio-economic factors. Many of these problems have already been addressed in Chapter four. These problems have proven to be very serious to the extent that they undermined this method as an alternative for funding higher education systems (OECD 1990, P. 45-48).

10.6.5. Policy (E): cost repayment based on 5 per cent of total cost deducted annually from graduate income

It is assumed in this option that a 5 per cent of total cost of higher education will be deducted from the graduate salary annually. This will be a form of graduate income tax for a period of twenty years to cover the whole direct cost. The main objective of introducing this option is to explore the possibility of improving social rates of return by recovering the cost of education from individual students after their graduation and as soon as they start working. In this respect this method is very similar to the previous option (D), however, they differ in the fact that in this option there is no interest rate to be paid on commercial loans and the Government (public) is the main provider of all resources that will be required to cover the cost of provision at the beginning.

In order to estimate the social and private rates of return under this policy instrument we had followed several procedures. First is to estimate the impact of deducting 5 per cent of total education cost from the graduate income on an annual basis. This is done by calculating the amount of the annual installment to be deducted from the private marginal income (benefits) of higher education qualifications. These calculations are presented in the attached tables 10-21 to 10-32. Second is to estimate the impact of cost repayment (cost recovery) on the social income (benefits) by adding the annual installments that are deducted from private income to the social marginal income. The results are shown in the attached

tables 10-33 to 10-44. Third, these marginal private and social benefits are used to estimate social and private rates of returns which are shown in the attached tables 10-45 for the social rate of returns and 10-46 for the private rates. The average social and private rates of returns are also shown in table 10-1 above.

It is clear that the repayment of a 5 per cent of total direct cost annually in the form of graduate income tax for twenty years will improve the social rates of return in all subjects. Social rates of returns will improve by 1 per cent in Education and Economics, by 2 per cent in Engineering, Science, and Medicine, and by 3 per cent in Arts. The average social rates will consequently be increased by 1.7 per cent from 5.3 per cent to 7 per cent. However, private rates of return will be reduced for all subjects. It will decrease by 6 per cent in Science, by 4 per cent in Arts and Medicine, by 3 per cent in Engineering and Economics, and by 2 per cent in Education. The average private rates of return will be decrease by 3.7 per cent.

The implementation of this policy instrument will have several advantages. First, even though, the performance of both private and social rates of returns is worse than the previous options (A, B, and C) they are still acceptable and economically beneficial for both sides. The average social and private rates of return at 7 and 7.5 per cent respectively are above the rate of return to investment in long-term American Government bonds of around 6 per cent and which can be used as an indicator for long term investment as in education. This means that the economic efficiency of public resources can be improved.

Second, the fact that the cost of education will be recovered after graduation means that student access to higher education will not be determined by their ability to provide financial resources to cover the cost during years of study. In other words, equity aspects will be maintained with the implementation of this policy.

Third, the forecast of the future labour supply and demand for higher education graduates in Oman, as analysed in Chapter 6, indicates that the demand will be higher than the supply for many years to come, even if

enrollment were to be increased to the level of admitting 40 per cent of secondary school graduates annually. This eliminates the risk of having graduate unemployment in the foreseeable future, and therefore, most students will be able to cover the cost of their education. This comprises efficiency without reducing equity.

Fourth, the cost associated with implementing and managing this policy instrument will be much cheaper than those of similar policies, especially the student loan method (Option D). For example, there will be no private sector involvements and the Government does not have to pay interest on loans to banks and give financial guarantees. Therefore, this policy is an effective way for the Government to pursue its objectives.

Fifth, it is expected that the public acceptance of this method in Oman, especially among students will be much better than the other methods (mainly the student loan). Social, cultural and religious backgrounds will have an influence on this matter. Even though, modern banking systems are widespread in the Arab countries including Oman many people still appose the idea of paying interest on money that are borrowed from whatever sources.

Sixth, this policy will be a first initiative towards public contribution to the cost of public services in general. In other words, in an economy where public finance is based purely on oil revenues and there is no income tax, the introduction of this policy instrument can help the Government to prepare the people for a greater contribution to fund public utilities especially in a post-oil era.

Accordingly, in addition to improving the balance between economic efficiency and equity, all these advantages provide sound support for the recommendation of this option as an alternative policy instrument to finance higher education in Oman.

10.7. Conclusion

It is clear that pure economic and financial returns are not the only justification for public investment in higher education. There are other

factors, such as social external benefits, efficiency and equity, economies of scale, and imperfect capital markets. At the same time, the analysis of rates of return of private and public investment in higher education proved that a large share of the benefits is private. This means that higher education services have the elements of a public and private mix. Accordingly, some sort of private contribution to the cost of higher education is required to facilitate further developments and expansions in the system.

The future expansion of higher education in Oman is required to meet increasing demand. It needs to be achieved in an efficient and cost-effective manner. We have indicated in Chapter 4 that the annual admission of up to 40 per cent of secondary school graduates will be desirable in Oman in order to meet social and economic demands. This means that total annual admission will increase by more than 90 per cent⁷, and therefore. Consequently, similar increase in financial resources has to be allocated for higher education institutions, assuming that current resources are fully utilized.

It will be difficult for the public sector to continue providing all the funding and some sort of private contribution is required. However, to be acceptable this contribution should not have negative affects on the efficiency and equity aspects. For this purpose we presented several policy options for consideration as future funding mechanisms. To select the most efficient, we analyzed each of them and compared them in turn with each other.

The analysis of social and private rates of return to investment in higher education with these policy instruments has shown that the student loan (option D) and the cost repayment (option E) yielded identical results. Both would bring improvements in equity (i.e. access to higher education) but option E would be more cost effective since it would not require the creation of any new administrative machinery. However, the experience of other countries that have already adopted the student loan system pointed

⁷ See Chapter 4 page 16.

to serious problems in the implementation and management of the scheme. Accordingly, it was found, taking most factors into account, that the introduction of cost recovery policy instrument, option E, would be the most desirable as a future funding mechanism. Under this policy, students will have to repay the cost of their education during the first twenty years of their working life in the form of an annual installment of 5 per cent of the total cost. This private contribution to the cost of higher education will help the public sector to reclaim the cost in the long term, which in turn will improve the social rate of return. The implementation of this policy instrument would therefore improve equity without reducing efficiency, the corner stones of public finance. In short, the desired expansion of enrollment in higher education in Oman would be achieved with minimum public cost.

Option E is therefore the most preferable of the policy options for Oman at its present stage of development and given its fiscal structure. A policy which is widely favored among analysts in advanced economies is that of the graduate tax on income. As we have shown in Chapters 5, 6, and 7 the economic justification for (higher) education is that it increases productivity and, ultimately, national income. It would appear fair to use some of the growth in income to defray government investment costs and increase resources required for expanding the system. The use of a graduate income tax based on a fixed proportion of income satisfy the requirement of equity such those with the higher incomes would contribute most and income would flow back into the public sector providing resources for future expansion. Income taxes are argued to reduce economic efficiency by acting as a disincentive to work and, in this case, to enter higher education. Thus the size of the tax would, therefore, have to be reduced so that the incentive to earn a higher income remains worthwhile, i.e. the tax would be limited to a proportion of the increase in income.

In a country which does not have an income tax system then this policy option may seem academic but economic logic suggests that it would

provide the fairest and most efficient way of confronting the education challenges in Oman. Obviously, this would be a radical change which would require a fundamental change in the fiscal system.

CHAPTER ELEVEN

SUMMARY, FINDINGS, AND RECOMMENDATIONS

11.1. Introduction

In previous chapters we have demonstrated that the massive socio-economic development that took place in Oman during the last thirty years has created continuing pressure to expand the capacity of higher education. However, the achievement of the desired expansion is faced by several challenges. First is the dependency on the public sector as the main provider and financier of higher education. Second, the appearance of some economic and fiscal problems that might limit the possibility of allocating public resources to facilitate this expansion. Third, is the high unit cost which reduces the rates of return to public investment. Therefore, new policies need to be introduced to finance the future expansion of higher education in Oman. We argued that a cost recovery policy in which students can repay the cost of their education after graduation would be the most appropriate. Improvements in both economic efficiency and equity can be achieved with the implementation of this policy.

In this chapter, we will provide a general overview of what have been discussed in this research, will summarize the results, main findings, and recommended policies, and will identify the most important issues that are related to this subject for future research.

11.2. Summary of the research

In simple terms, the main question of this research is how the desired expansion of higher education in Oman can be financed. In Chapter two, we reviewed the most important features of the social and economic development in Oman during the last thirty years based on the available social and economic indicators. It was made clear that social and economic demand for education in general, including higher education

was as a result of this massive development. The availability of public services that were established by the Government and made available to all people lead to the rise in living standards and the increase in the population growth rate. For example, the annual growth rate was in the range of 3.7 per cent in 1993 which is one of the highest rates in the world. Another demographic feature of this period is that more than 50 per cent of the population is under the age of 15. Another phenomenon is that the majority of the labour force which is employed, especially in the private sector is expatriate. Together these factors have created a sharp increase in the social and economic demand for higher education which is expected to continue for many years to come as shown in Chapter four.

It is anticipated that it will be difficult to increase enrollment in higher education to the desired level and achieve the required expansion under the current funding method which is mostly subsidized by the public finance. The macro economic performance indicators that were reviewed and analysed in Chapter two pointed to several fiscal problems. The sharp increase of the population growth demanded the continues expansion and development of public services and utilities such as health, general education, housing, electricity, water, and so forth which has lead to the sharp increase of public spending. At the same time, the dependency on oil production and exports as the main source of revenue for public finance placed it under the mercy of the international oil market which was fluctuating sharply most of the time. The fall in oil prices or the cut in the level of exports reduces the level of public revenues which leaves the Government with two difficult choices. The first is to continue its public spending policies by using other sources of funding such as withdrawing from public reserve funds¹ or by borrowing from private sources. The first source might be a short term solution as the amount of fund available might be limited, and the second will lead to a further increase in the deficit. The second is to freeze or to cut public spending which will affect

¹ The Reserve Fund in Oman was established by the Government to invest some of the surplus of oil revenues during the boom years so it can be used in emergency situations such as the sudden fall in oil prices.

the provision of public services such as higher education. This situation which is expected to continue for the foreseeable future casts doubt on the practicality of expanding the higher education system in Oman with the same method of funding.

The process of tackling this issue has led to the necessity of reviewing and analyzing the theoretical and empirical work in the field of financing higher education. In this regard, human capital theory is the most dominant. Its usefulness lies in the fact that it provides an economic explanation to justify the provision of education and public and private decisions to invest in education and training. As explained in Chapters 5, 6, and 7, the human capital concept regards education as a form of investment. Societies and individuals allocate resources (cost) during the education process with the aim of reaping pecuniary (higher productivity and income) and non-pecuniary (externalities and spillovers) benefits. The pecuniary benefits are explained by the fact that education enhances and develops labour skills which lead to the increase in productivity and income.

Therefore, public and private investment in education can be evaluated and analysed using cost-benefit and rates of return techniques as described in chapter 6. However, several criticisms were directed at the application of these tools in the measurement of rates of return to investment in education. Some economists believe that this relationship between education and productivity cannot be generalized. The increase in marginal productivity is not solely due to the level of education. Other factors such as personal ability might have an influence on this issue. The other problem lies in the difficulty of identifying and measuring all the benefits of education such as externalities and spillover that are widespread and accrue in different times and places.

Despite these criticisms cost-benefit and rates of return analysis are the most popular tools that have been used by economists to analyse and evaluate investment in education. Therefore, we decided to apply them to estimating the rates of return to public and private investment in higher education in Oman. The results provided us with some indicators of the

profitability of this investment which was analysed and discussed in Chapters 8, 9, and 10.

Education is a mixed good with both public and private costs and benefits. The estimates of the social and private rates of return can be used as indicators of the level of public and private benefits which in turn provide an indication of the economic efficiency of resource allocation. However, it is important not to neglect equity. For example, rates of return analysis might indicate a need to shift the cost of education to the individuals which would result in many students being prevented from continuing their education. In other words, a balance between efficiency and equity must be established. Most of the funding methods of higher education that were reviewed and discussed in Chapter 7 were based on this concept of balance.

The seriousness of the funding problem facing most higher education systems in the world encouraged many countries, especially in the advanced world, to develop several methods and mechanisms to finance their systems. Efficient utilization of existing public resources and the attraction of more private sources of funding are the most important features of these policies. The first focused on encouraging and motivating higher education institutions to utilize public resources that are allocated to them in a more efficient way which was followed by the introduction of policy measures to regulate this matter, such as the move from traditional methods of resource allocation to input and output funding. The second was concentrated on cost recovery by encouraging able students to contribute to the cost of their education, as well as facilitating the availability of private financial sources to the others. The introduction of fees and student loans are examples of this.

These developments provided the theoretical background to this research. Therefore, the analysis of social and private rates of return to investment in higher education in Oman gives some indicators of the profitability of investment and its future optimal level which assists in suggesting an appropriate funding mechanism. The estimations of the public and private

costs and rates of return to investment in higher education in Oman are analysed and discussed in Chapters 8 and 9.

The full public subsidization for higher education meant that most of the cost is born by the Government. Individual students do not pay fees and therefore the only cost they incur is the indirect (opportunity) cost while being in education which is measured by their income forgone. Therefore, the main determinant of the private cost was found to be the number of years required for completion. For example, Medicine was found to be the most costly subject for individual students as a result of the long period required for completion which extends to 7 years. However, public cost is determined by three main factors: the number of students admitted, the number of years required for admission, and the cost of wages and salaries.

This cost pattern was reflected in the results of the social and private rates of return estimations that were analysed and discussed in Chapter 9. These results had shown that the private rates of return are much higher than the social rates. The main reason is that most of the cost of education is incurred by the Government and that there is no income tax system to improve public benefits. Accordingly, these results were useful in formulating alternative funding mechanisms that would balance efficiency and equity.

In Chapter 10 we examined several policy instruments that can be adopted and assessed their implications on the social and private rates of return (efficiency) and equity (access to higher education). The main objective was to explore the possibility of improving social rates of return without affecting the enrollment level negatively. The results of the analysis in Chapters 8 and 9 pointed to the need of establishing a cost recovery method in order to achieve this objective. The four options that were examined focused on the following policy instruments:

- i. Charging fees (immediate recovery for some of the cost).

- ii. Student subsidies (public direct subsidies to students for some of the cost).
- iii. Full cost recovery (repayment after graduation).
- iv. Full cost recovery (Student loan).

The social and private rates of return to investment under each of these options were compared with the rates of returns under the current financing system. Shifting some of the direct cost to the individual student reduced the private rates of return and improved the social rates. The comparisons of these options with the present situation as well as with each other from efficiency and equity aspects showed that the full cost recovery policy (repayment after graduation) is to be preferred in pursuing the stated objectives of higher education.

11.3. Main findings

The main findings of this research can be summarized as follows:

- a) As a result of increasing social and economic demand, there is an urgent need to expand the current capacity of higher education in Oman which at present admits approximately 16 per cent of secondary school graduates into four years higher education institutions to the level of 40 per cent. This was discussed in more detail in Chapters 2, 3, and 4.
- b) It is expected that fiscal and other macro economic problems will hinder the Government's capacity to provide all the financial resources for this expansion under the current funding mechanism.
- c) In general, the cost of higher education in Oman is high in comparison to other countries. The main causes are low enrollment rates, long duration of courses, and higher wages and salaries.
- d) The high cost of higher education led to lower rates and especially social rates of return to investment.
- e) It is assumed that the efficient utilization of current resources will not be sufficient to the desired expansion in the level of enrollment

at the same quality standard. Therefore, additional resources have to be generated to the system.

- f) The higher private rates of return to investment in higher education and the low social rates point to the need to shift some of the cost to the individuals who are benefiting most from education.
- g) This shifting has to be achieved through a practical policy instrument which will enable individual students to contribute to the cost of their education without restricting their access to higher education. In other words, both efficiency and equity have to be achieved.
- h) The most desirable policy in this respect can be based on the concept of cost recovery where students repay the cost of their education after graduation and during their early years of employment. This take the form of a graduate income tax or student loans.
- i) The difficulty associated with the financial and administrative implementation of student loans as experienced in other countries makes this policy unfavorable.

11.4. Policy recommendations

Based on the above findings, most of the policies that this research has identified to tackle the problem of future funding of higher education in Oman were analysed and discussed in detail in Chapter 11. However, it is useful to summarize them in this chapter for the purpose of highlighting their importance.

First, several measures are suggested in order to reduce direct public cost and improve social rates of return such as:

- i. Encouraging public higher education institutions to reduce the cost per student (unit cost) by economizing and increasing enrollment rates.

- ii. Promoting the establishment of private higher education to provide extra places, especially for wealthy students, which will contribute to the expansion of higher education system. The Omani Government has already started implementing this policy.
- iii. Encouraging students of relative wealthy families to pay fees in public institutions.
- iv. Providing scholarships for students to enroll in private higher education. In this respect, it is important to mention that the Omani Government has provided about 3000 scholarships to students from low income families during the last two years.

Second, as indicated in the above findings, the desired expansion of higher education in Oman will require additional financial resources. Therefore another mechanism is needed to achieve this objective. This research suggests that a policy instrument based on the concept of cost recovery that would facilitate access (equity) is the most desirable. Accordingly we recommended the introduction of a graduate repayment mechanism where the individual student has to pay the cost of his or her education after graduation and during the first twenty years of working life.

It is important to note that even though these findings and policies are applicable to the case of higher education in Oman they can be generalized to other countries which share similar characteristics as Oman. For example, they can be of use in other Arab Gulf states which have a similar social, political, and economic setting.

11.5. Future research

This research is the only attempt to utilize existing theories in the economics of education to tackle the problem of financing higher education in Oman. Several issues were encountered during the course of research which need to be addressed in future research activities.

First, the empirical analysis of the cost of higher education and the social and private rates of return which was discussed in Chapters 8, 9, and 10,

relied on limited data obtained from the Ministry of Civil Service and SQU. Accordingly, the results might not as perfect as wished, however, as a first step it provided good indicators. In order to have an efficiently functioning system, efficient data collection needs to be integrated to enable the system to be monitored. This will enable a judgment to be made on the efficiency of policies and progress in dealing with problems in higher education. This will enable future research this area to be undertaken using larger sets of data over a long period of time.

Second, another area that is of concern in this field of study is the identification and measurement of externalities and spillover benefits of higher education. It was indicated in Chapter 5, 6, and 7 that theoretical and empirical studies in other countries point to the fact that externalities and spillovers represent a large portion of educational benefits which are often not captured in the estimates of the social and private rates of return. It would be interesting to investigate this issue in the case of Oman. Studies can focus on specific externalities such as the relationship between education and economic growth, income distribution, population growth, the reduction of crime rates, female participation at work, consumption behaviors, public health, democracy, and the respect of civic law. The results of these studies would be of great benefit in adjusting rates of return estimates that are based solely on income and productivity.

Finally, expanding private higher education might be a crucial factor for the development and expansion of the overall higher education system in Oman. The private sector can provide more places for students, thus lowering public expenditures and improving social rates of return to investment. Future research needs to focus on the development of the private sector especially the relevant policy instruments to promote its growth and development without compromising efficiency, equity, and quality standards in education provision.

Bibliographic References

Adams, D. and Robert, M. (1968) *Education in Developing Areas*. New York: David Mckay Company Inc.

Adams, Walter (ed.) (1968) *The Brain Drain*. New York: The Macmillan Company.

Addison, J. T. and Siebert, W. S. (1994) Vocational Training and The European Community. *Oxford Economic Papers*, 46, pp: 696-724.

Aghion, P. and Bolton, P. (1997) A Theory of Trickle-Down Growth and Development. *Review of Economic Studies*, 64, 151-172.

Agrawala, A. N. and S. P. Singh (eds.). (1966) *The Economics of Underdevelopment*. England: Oxford University Press.

Ahlroth, S. and Bjorklund, A. and Forslund, A. (1997) The Output of the Swedish Education Sector. *Review of Income and Wealth*, Series 43, No.1, pp: 89-104.

Ahmad, B. and Blaug, M. (eds.). (1973) *The practice of Manpower Forecasting*. Washington: Jossey-Bass Inc.

Albrecht, D. and Ziderman, A. (1992) *Funding Mechanisms for Higher Education, Financing for Stability, Efficiency, and Responsiveness*. World Bank Discussion papers number 153. The World Bank, Washington, D.C.

Al-hajry, M. N. (1997) *Oman General Budget Deficit During The Third Five- Year Plan, Period 1986- 1990: Causes, Macroeconomics Effects and Policy Evaluation*. PhD thesis, Durham University, UK.

Al-harthy, A. (1999) *Drug Abuse in the Gulf States and Oman; an Evaluation of the Death Penalty as a deterrent*. PhD thesis, The University of Manchester, UK.

Al-Maskary, M. (1992) *Human Capital Theory and the Motivation and Expectations of University Students in the Sultanate of Oman*. PhD thesis, the University of Missouri, Sant Lewis, USA.

Al-Qudsi, S. (1998), 'Labour Participation of Arab Women: Estimates of the Fertility to Labour Supply Link', *Applied Economics*, 30, 931-941.

Anderson, C. and Bowman, M. J. (eds.) (1965) *Education and Economic Development*. Chicago: Aldine Publishing Company.

- Anosika, J. O.** (1977) Education and Economic Development in Nigeria: The Need for New Paradigm. *African Studies Review*, Vol. XX, No. 2, 27-51.
- Arrow, K. J.** (1973) Higher Education as a Filter. *Journal of Public Economy*, vol. 2, pp. 193- 216.
- Ashenfelter, O. and Rouse, C.** (1998) Income, Schooling, and Ability: Evidence From A New Sample of Identical Twins. *The Quarterly Journal of Economics*, Vol. CXIII, Issue. 1, pp. 253-254.
- Atal, Y. (ed.).** (1974) *Social Science in Asia*. New Delhi.
- Azariadis, C. and Drazen, A.** (1990) Threshold Externalities in Economic Development. *The Quarterly Journal of Economics*, May, pp. 501-526.
- Baba, M. and Tanaka, T.** (1997) Government Funding Versus Private Funding in Japanese Universities. *Quality in Higher Education*, Vol. 3, No. 3, pp. 263-276.
- Baffes, J. and Shah, A.** (1998) Productivity of Public Spending, Sectoral Allocation Choices, and Economic Growth. *Economic Development and Cultural Change*, Vol.46, No.2, pp. 291-304.
- Baldwin, R. E.** (1966) *Economic Development and Growth*, USA.
- Bairoch, P.** (1977) *The Economic Development of the Third World since 1900*. Berkeley and Los Angeles: University of California Press.
- Barnes, W. F.** (1975) Job Search Models, The Duration of Unemployment and the Asking Wage: Some Empirical Evidence. *The Journal of Human Resources*. vol. X, No. 2, Spring : 230- 240.
- Barr, N.** (1993) *The Economics of the Welfare State*. Oxford University Press.
- Barr, N.** (1993) Alternative Funding Resources for Higher Education. *The American Economic Review*, 193, pp. 718-728.
- Barr, N.** (1997) Student Loans: Towards a New Public/Private Mix. *Public Money and Management*, July- September.
- Barro, R. J.** (1991), 'Economic Growth in a Cross Section of Countries', *Quarterly Journal of Economics*, 106 (2), May, 408-443.
- Barro, R. J.** (1998), '*Determinants of Economic Growth, A Cross-Country Empirical Study*', The MIT Press, Cambridge, Massachusetts, USA.

Bauer P. T. and Basil S. Y. (1957) *The Economics of Under-Developed Countries*. Chicago: University of Chicago Press.

Becker, G. S. (1964) *Human Capital*. Princeton University Press. USA.

Benhabib, J. and Spiegel, M. M. (1994), 'The Role of Human Capital in Economic Development Evidence from Aggregate Cross-country Data', *Journal of Monetary Economics*, 34, 143-173.

Bennett, R. and Glennerster, H. and Nevison, D. (1992) Investing in Skill: To Stay or Not to Stay On?. *Oxford Review of Economic Policy*, Vol. 8, No. 2, pp. 130-145.

Birdsall, N. (1996) Public Spending on Higher Education in Developing Countries: Too Much or Too Little?. *Economics of Education Review*, Vol. 15, No. 4, pp. 407-419.

Blackaby, D. H., Murphy, P. D., and O'leary, N. C. (1999). Graduate Earnings in Great Britain: a matter of degree? *Oxford Economics Letters*, 6, 311-315.

Blackburn, M. L. and Neumark, D. (1995) Are OLS Estimates of the Return to Schooling Biased Downward? Another Look. *The Review of Economics and Statistics*, Vol. LXXVII, No.1, pp: 217-229.

Blaug, M. (1976), 'The empirical Status of Human Capital Theory, a slightly jaundiced survey', In M. Blaug (ed), *The Economic Value of Education: Studies in the Economics of Education*, Edward Elgar Publishing Limited, England, p. 3-31.

Blaug, M. (1970) *Introduction to the Economics of Education*. Baltimore: Penguin Books.

Blaug, M. (1972) *Introduction to the Economics of Education*. London: Penguin Books.

Blaug, M. (1983) *Where are We Now in the Economics of Education*. A Special Professorial Lecture delivered at the University of London Institute of Education.

Blaug, M. (1992) *The Economic Value of Education*. England: Edward Elgar Publishing Limited.

Blundell, R., Dearden, L., Meghir, C. and Sianesi, B. (1999) Human Capital Investment: The Returns from Education and Training to the Individual, the Firm and the Economy. *Fiscal Studies*, Vol. 20, no. 1, pp: 1-23.

Blundell, R., Dearden, L., Goodman, A. and Reed, H. (2000), 'The

Returns to Higher Education in Britain: Evidence from a British Cohort', *The Economic Journal*, Vol. 110, No 461, pp: F82-F99.

Boltho, A. and Holtham, G. (1992), 'The Assessment: New Approaches to Economic Growth', *Oxford Review of Economic Policy*, Vol. 8, No. 4, 1-14.

Bratton, M., Alderfer, P., Bowser, G., Temba, J. (1999), 'The Effects of Civic Education on Political Culture: Evidence from Zambia', *World Development*, Vol. 27, No. 5, pp. 807-824.

Brudett, K. (1978) The Testing and Sorting Function of Higher Education. *Journal of Public Economics*, 10, pp: 117-122.

Caballe, J. (1995) Endogenous Growth, Human Capital, and Bequests in a Life Cycle Model. *Oxford Economic Papers*, 47, pp: 156-181.

Carnoy, M. (1971) Class Analysis and Investment in Human Resources: A Dynamic Model. *Review of Radical Political Economics*, Fall-Winter .

Carnoy, M. (1980) *Educating, Work and Employment, II. Segmented Labour Markets*. Paris: UNESCO.

Carnoy, M. and Marenbach, D. (1975) The Return to Schooling in the United States, 1939-69, in Blaug, M. (ed) *The Economic Value of Education: Studies in the Economics of Education*, Edward Elgar Publishing Limited, UK, pp. 31-51.

Cartiglia, F. (1997) Credit Constraints and Human Capital Accumulation in the Open Economy. *Journal of International Economics*, 43, pp. 221-236.

Cave, M. and Weale, M. (1992) The Assessment: Higher Education: The State of Play. *Oxford Review of Economic Policy*, Vol. 8, No. 2, pp. 1-18.

Chapman, B. J. and Harding, A. (1993) Australian Student Loans. Discussion Paper No. 287. Centre For Economic Policy Research, The Australian National University.

Chapman, B. (1997) Conceptual Issues and the Australian Experience with Income Contingent Charges for Higher Education. *The Economic Journal*, 107, pp. 738-751.

Chen, S., Datt, G. and Ravallion, M. (1994) Is Poverty Increasing in the Developing World?. *Review of Income and Wealth*, Series 40, No.4, pp: 359-376.

Corvers, F. (1997), 'The Impact of Human Capital on Labour Productivity in Manufacturing Sectors in the European Union', *Applied Economics*, 29, 975-987.

Denison, E. F. (1962) *The Sources of Economic Growth in the United States and Alternatives Before us*. Committee for Economic Development, New York.

Denison, E. F. (1993) Robert J. Gordons Concept of Capital. *Review of Income and Wealth*, Series 39, No1, pp: 89-102.

Dolton, P. (1992) The Market for Qualified Manpower in the UK. *Oxford Review of Economic Policy*, Vol. 8, No. 2, pp. 103-129.

Dolton, P. and Makepeace, G. H. and Treble, J. G. (1994) The Youth Training Scheme and The School-To-Work Transition. *Oxford Economic Papers*, 46, pp: 629-657.

Dolton, P. and Greenaway, D. and Vignoles, A. (1997) 'Whither Higher Education?' An Economic Perspective for the Dearing Committee of Inquiry. *The Economic Journal*, 107, 710-726.

Epple, D. and Romano, R. E. (1996) Public Provision of Private Goods. *Journal of Political Economy*, Vol. 104, No. 1, pp: 57-84.

Falaris, E. M. (1995), 'The Role of Selectivity Bias in Estimates of the Rate of Return to Schooling: The Case of Married Women in Venezuela', *Economic Development and Cultural Change*, vol. 43, No. 2, pp. 333-350.

Fershtman, C. and Murphy, K. M. and Weiss, Y. (1996) Social Status, Education, and Growth. *Journal of Political Economy*, Vol. 104, No. 1, pp: 108-132.

Fields, G. S. (1975), 'Higher Education and Income Distribution in a Less Developed Country', *Oxford Economic Papers*, 27(2), July, 245-249

Garcia-Penalosa, C. (1995) The Paradox of Education or the Good Side of Inequakity. *Oxford Economic Papers*, 47, pp: 265-285.

Garratt, R. and Marshall, J. M. (1994) Public Finance of Private Goods: The Case of College Education. *Journal of Political Economy*, Vol. 102, No. 3, pp: 566-582.

Gemmell, N. (1997), 'Externalities to Higher Education: a review of the New Growth Literature', in the National Committee of Inquiry into Higher Education (the Dearing Committee Report on Higher Education in Britain), *Higher Education in the Learning Society*, HMSO Publication, report 8, pp. 09-149.

General Secretariat, Gulf Cooperation Council (GCC) (1990) *The Matching of Higher Education Graduates and the Demand of the Labour Markets in the Member States of the Gulf Cooperation Council* (in Arabic Language). Riyadh, Saudi Arabia.

General Secretariat, Gulf Cooperation Council (GCC) (2001), 'Diversifying the Finance of Higher Education in the Cooperation Council of the Arab Gulf States' (in Arabic Language). Riyadh, Saudi Arabia, (Document in Arabic Language).

Gertler, P. and Glewwe, P. (1990) The Willingness to Pay for Education in Developing Countries, Evidence from Rural Peru. *Journal of Public Economics*, 42, pp: 251-275.

Geske, T. G. (1996) The Value of Investments in Higher Education: Capturing the Full Returns. In Honeyman, D. Wattenbarger, J. and Westbrook, K. (eds) *A struggle to Survive: Funding Higher Education in the Next Century*. Seventeenth Annual Yearbook of the American Education Finance Association 1996. Corwin Press, Inc. Claifornia, US. P: 29-48.

Giora, H. (1967) An Economic Analysis of Earnings and schooling. *Journal of Human Resources* 2, Summer : 310-29.

Glewwe, P. (1996) The Relevance of Standard Estimates of Rates of Return to Schooling for Education Policy: A Critical Assessment. *Journal of Development Economics*, Vol. 51, pp. 267-290.

Gordon, R. J. (1993) Reply: The Concept of Capital. *Review of Income and Wealth*, Series 39, No1, pp: 103-110.

Goto, A. and Suzuki, K. (1989) R & D Capital, Rate of Return on R & D Investment and Spillover of R & D in Japanese Manufacturing Industries. *The Review of Economics and Statistics*, Vol. LXXI, No. 4, pp: 555-564.

Gould, D. M., and Ruffin, R. J. (1995), 'Human Capital Trade and Economic Growth', *Weltwirtschaftliches Archiv* (Review of World Economics), Band 131, 425-444.

Greedy, J. and Francois, P. (1990) Financing Higher Education and Majority Voting. *Journal of Public Economics*, 43, pp: 181-200.

Grogger, J. (1996) School Expenditures and Post-Schooling Earnings: Evidence From High School and Beyond. *Review of Economics and Statistics*, 77 (4), pp. 628-637.

Groot, W. and Oosterbeek, H. (1994) Earnings Effects of Different Components of Schooling: Human Capital Versus Screening. *The Review of Economics and Statistics*, Vol. LXXVI, No. 1, pp: 317-321.

Gullason, E. T. (1989), 'The Consumption Value of Schooling: An Empirical Estimates of One Aspect', in Elchanan Cohen and Geraint Johnes (eds), *Recent Developments in the Economics of Education*, Edward Elgar Publishing Limited, England.

Hammer, J. S. (1996). *The Public Economics for Education*. The World Bank, Public Economics Division, Policy Research Department. Washington D.C.

Hansen, W. L. (1963) Total and Private Returns to Investment in Schooling. *Journal of Political Economy*, 71, April, 128-40.

Hansen, W. L. (1970), 'Income Distribution Effects of Higher Education', *The American Economic Review*, 60 (2), May, 335-340.

Hansen, W. L. and Burton, A. and William J. S. (1970) Schooling and Earnings of Low Achievers. *American Economic Review*, 60, June, 409-418.

Hanushek, E. A. (1996) Measuring Investment in Education. *Journal of Economic Perspectives*, Vol. 10, No. 4, pp. 9-30.

Harding, A. (1995) Financing Higher Education: An Assessment of Income-contingent Loan Options and Repayment Patterns Over the Life Cycle. *Education Economics*, Vol. 3, No. 2, pp. 173-203.

Hare, P. and Wyatt, G. (1992) Economics of Academic Research and its Implications for Higher Education. *Oxford Review of Economic Policy*, Vol. 8, No. 2, pp. 48-66.

Haveman, R. H. and Wolfe, B. L. (1984), 'Schooling and Economic Well-Being: the Role of Nonmarket Effects', in Elchanan Cohn and Geraint Johnes (eds), *Recent Development in the Economics of Education*, Edward Elgar Publishing Limited, England, pp. 153-183.

Hersch, J. (1991) Education Match and Job Match. *The Review of Economics and Statistics*, Vol. LXXIII, No.1, pp: 140-144.

Hines, F. and Luther, T. and Martin, R. (1970) Social and Private Rates of Return to Investment in Schooling, by Race-Sex Groups and Regions. *Journal of Human Resouces*, Summer, 318-40.

Hoogland, E. (1995) 2020, Oman Charts its Next 25 years. *Middle East Insight*, Volume XII, Number 1.

Hoxby, C. M. (1996) Are Efficiency and Equity in School Finance Substitutes or Complements?. *Journal of Economic Perspectives*, Vol. 10, No. 4, pp. 51-72.

- Imhoff, E. V.** (1989) Optimal Investment in Human Capital Under Conditions of Nonstable Population. *Journal of Human Resources*, XXIV (3) Summer, 414-32.
- Information and Documentation Centre, Ministry of Development.** (1996) *Statistical Year Book, Twenty Fourth Issue*. Muscat, Sultanate of Oman.
- Irleland, N.** (1990) The Mix of Social and Private Provision of Goods and Services. Voting. *Journal of Public Economics*, 43, pp: 201-219.
- International Bank for Reconstruction and Development,** (1974) *Appraisal of an Education Project in the Sultanate of Oman, Report No. 301 a-OM,*). The World Bank, Washington, D. C.
- Izadi, H. and Johnes, G.** (1997) Stochastic Frontier Estimation of A Ces Cost Function: The Case of Higher Education in Britain. Centre for Research in the Econoomics of Education (*CREEd1/97*). UK, Lancaster University.
- Jawad, H.** (1993) *Rates of Return to Investment in Umiversity Education: A case study of Iraq*. PhD thesis, the University of Leicester, UK.
- Johnes, G.** (1992) Performance Indicators in Higher Education: A Survey of Recent Work. *Oxford Review of Economic Policy*, Vol. 8, No. 2, pp. 19-34.
- Johnes, G.** (1993), '*The Economics of Education*', THE MACMILLAN PRESS LTD, London.
- Johnes, G.** (1997) Costs and Industrial Structure in Contemporary British Higher Education. *The Economic Journal*, 107, 727-737.
- Johnes, G. and Johnes J.** (1994) Policy Reform and the Theory of Education Finance. *Journal of Economic Studies*, vol. 21 no 1, pp. 3-15.
- Johnson, G. E.** (1984) Subsidies for Higher Education. *Journal of Labour Economics*, Vol.2, No. 3, pp: 303-18.
- Johnson, S. L. and Kidwell, J. J.** (1996) *Reinventing the University, Managing and Financing Institutions of Higher Education 1996*. John Wiley & Sons, Inc. New York.
- Jones, C. I.** (1995) R & D- Based Model of Economic Growth. *Journal of Political Economy*, Vol. 103, No. 4, pp: 759-784.
- Kedney, B. and Jeans, T.** (1993) Funding and Valuing Further Education. *Coombe Lodge Report*, Vol.23, No.4, The Staff College, Blagdon, Bristol.

Keep, E. and Sisson, K. (1992) Regulatory Reform in Higher Education in the UK: Incentives for Efficiency and Product Quality. *Oxford Review of Economic Policy*, Vol. 8, No. 2, pp. 67-78.

Kiker, B. F. (1966) The Historical Roots of the Concept of Human Capital. In Wykstra, A. (ed.) *Human Capital Formation and Manpower Development*, The Free Press, New York, P: 2-24.

King, M. A. and Robson, M. H. (1992) Investment and Technical Progress. *Oxford Review of Economic Policy*, Vol. 8, No. 4, pp:43-56.

Kodde, D. A. and Ritzen, J. M. M. (1985) The Demand for Education Under Capital Market Imperfections. *European Economic Review*, 28. pp: 347-362.

Layard, R. (ed) (1972) *Cost-Benefit Analysis, Selected Readings*, Penguin Books, England.

Layard, R. and Psacharopoulos, G. (1974) The Screening Hypothesis and the Return to Education. *Journal of Political Economy*. 82, 985- 998.

Layard, R. and Glaister, S. (1994) *Cost-Benefit Analysis*. Cambridge University Press.

Levin, A. and Raut, L. K. (1997), 'Complementarities between Exports and Human Capital in Economic Growth: Evidence from the Semi-industrialized Countries', *Economic Development and Cultural Change*, Vol. 46, No. 1, 155-174.

Liu, Z. (1998) Earnings, Education, and Reforms in Urban China. *Economic Development and Cultural Change*, Vol. 46, No. 4, pp. 697-725.

Lundberg, L. and Wilker, P. (1997) Skilled Labour and International Specialisation in OECD Countries. *International Review of Applied Economics*, Vol. 11, No. 3, pp. 369-385.

Maglen, L. R. (1990), 'Challenging the Human Capital Orthodoxy: The Education-Productivity Link Re-examined', *The Economic Record*, Vol. 66, No. 195, 281-294.

Mahdi, K. (1997), 'Some Economic Aspects of Higher Education in the Arab Gulf', in K. E. Shaw (ed), *Higher Education in The Gulf Problems and Prospects*, University of Exter Press, UK, pp. 19-41.

Malathy, R. (1994) Education and Women's Time Allocation to Nonmarket Work in an Urban Setting in India. *Economic Development and Cultural Change*, Vol. 42, No. 4, pp. 743-760.

Marenbach, D. (1973) *The Rates of Return to Education in the U.S. from*

1939-1959, a PhD thesis, Stanford University, U.S.

Marshall, A. (1961) *Principles of Economics*, 9th ed. The Macmillan Co. London.

McPherson, M. S. and Schapiro, M. O. and Winston, G. G. (1993) *Paying the Piper, Productivity, Incentives, and Financing in U.S. Higher Education*. The University of Michigan, USA.

Ministry of Civil Service (1998) *Wages and Salaries of Omani Employees in the Civil Service*. (Unpublished data in Arabic). Muscat, The Sultanate of Oman.

Ministry of Development (1996) *Fifth five Years Development Plan (1996- 2000)*. Muscat, the Sultanate of Oman.

Ministry of Development (1993) *General Census of Population, Housing, and Establishments*. Muscat, the Sultanate of Oman.

Ministry of Education (2001) *Secondary School Graduates* (unpublished official communication document in Arabic language). Muscat, the Sultanate of Oman.

Ministry of Higher Education (1997) *Report on the Evaluation of Scholarships System in Oman*. Muscat, the sultanate of Oman.

Ministry of Higher Education (2000) *Student Enrollment in Higher Education Institutions*, (Unpublished internal communication document, in Arabic Language). Muscat, Sultanate of Oman.

Ministry of Higher Education (2001) *Student Enrollment in Higher Education Institutions*, (Unpublished internal communication document, in Arabic Language). Muscat, Sultanate of Oman.

Ministry of Legal Affairs (1998) *The Official Gazette*, No. 632, (in Arabic Language). Muscat, Sultanate of Oman.

Ministry of National Economy (1997) *Statistical Year Book 1997*. Muscat, Sultanate of Oman.

Ministry of National Economy (1998) *Statistical Year Book 1998*. Muscat, Sultanate of Oman.

Ministry of National Economy (1999) *Statistical Year Book 1999*. Muscat, Sultanate of Oman.

Ministry of National Economy (2000), '*Facts and Figures, Special Issue on Development Efforts 1970-2000*', Muscat, the Sultanate of Oman.

- Mountford, A.** (1997) Can a Brain Drain be Good for Growth in the Source Economy?. *Journal of Development Economics*, Vol. 53, pp. 287-303.
- Murray, M. and Wallace, S.** (1997) The Implications of Expanded School Choice. *Public Finance Review*, Vol. 25, No. 5, pp. 459-473.
- Nas, T. F.** (1996) *Cost-Benefit Analysis; Theory and Applications*. SAGA Publications, Inc.
- National Committee of Inquirey into Higher Education** (1997) *Higher Education in the Learning Society, Report of the National Committee, Main Report*. HMSO Publication, London, UK.
- Nickell, S. and Bell, B.** (1995) The Collapse in Demand for the Unskilled and Unemployment Across the OECD. *Oxford Review of Economic Policy*, Vol. 11, No. 1, pp:40-62.
- Nelson, R. R.** (1998) The Agenda for Growth Theory: A Different Point of View. *Cambridge Journal of Economics*, 22, pp. 497-520.
- O'Neill, D.** (1995) Education and Income Growth: Implications for Cross-Country Inequality. *Journal of Political Economy*, Vol. 103, No. 6, pp: 1289-1301.
- Organisation for Economic Co-operation and Development (OECD)** (1990) *Financing Higher Education; Current Patterns*. Paris.
- Palme, M. and Wright, R. E.** (1993) Changes in the Rate of Return to Education in Sweden: 1968-1991. *Discussion Paper in Economics, No. 9312*. University of Glasgow.
- Papanicolau, J. and Psacharopoulos, G.** (1979) Socioeconomic Background, Schooling and Monetary Rewards in the United Kingdom. *Economica*, 46, pp: 435-439.
- Pissarides, C.** (1996), 'Economic Growth: How Much Does Education Count?', *Centre Piece, The Magazine of Economic Performance*, Issue 3 1996, 2-5.
- Peters, G. H.** (1973) *Cost-Benefit Analysis and Public Expenditure*. The Institute of Public Affairs. London.
- Ploeg, F. V. D. and Tang, P. J. G.** (1992) The Macroeconomics of Growth: An International Perspective. *Oxford Review of Economic Policy*, Vol. 8, No. 4, pp:15-28.
- Preston, A.** (1997), 'Where Are We Now With Human Capital Theory in Australia', *The Economic Record*, Vol. 73, No. 220, March, 51-78.

Psacharopoulos, G. (1973), 'Returns to Education: An International Comparison', Jossey-Bass Inc., Publishers, USA.

Psacharopoulos, G. (1980), 'Higher Education in Developing Countries: a Cost-Benefit Analysis', Washington, DC: World Bank.

Psacharopoulos, G. (1981), 'Returns to Education: an Updated International Comparison', in Mark Blaug (ed.), 'The Economic Value of Education: Studies in the Economics of Education', Edward Elgar Publishing Limited, England, pp. 81-101.

Psacharopoulos, G. (1984), 'The Contribution of Education to Economic Growth: International Comparisons' in Mark Blaug (ed.), 'The Economic Value of Education: Studies in the Economics of Education', Edward Elgar Publishing Limited, England, 470-490.

Psacharopoulos, G. (1994). Returns to Investment in Education: A Global Update. *World Development*, Vol 22, No. 9, pp: 1325-1343.

Psacharopoulos, G. (1996) Public Spending on Higher Education in Developing Countries: Too Much Rather Than Too Little. *Economics of Education Review*, Vol. 15, No. 4, pp. 421-422.

Psacharopoulos, G. (1996) Economics of Education: A Research Agenda. *Economics of Education Review*, Vol. 15, No. 4, pp. 339-344.

Psacharopoulos, G, and Woodhall, M. (1985), 'Education for Development An Analysis of Investment Choices', A World Bank Publication.

Psacharopoulos, G. and Morley, S. and Fiszbein, A. and Lee, H. and Wood, W. D. (1995) Poverty and Income Inequality in Latin America During the 1980s. *Review of Income and Wealth*, Series 41, No.3, pp: 245-264.

Ram, R. (1990), 'Educational Expansion and Schooling Inequality International Evidence and Some Implications', *The Review of Economics and Statistics*, Vol. LXXII, No. 2, pp: 266-273.

Ram, R. (1996) Level of Development and Rates of Return to Schooling: Some Estimates from Multicountry Data. *Economic Development and Cultural Change*, vol. 44, No. 4, pp. 839-858.

Redding, S. (1996) The Low-Skill, Low-Quality Trap: Strategic Complementarities Between Human Capital and R&D. *The Economic Journal*, 106, pp. 458-470.

Richard, E. (1973) *Estimating the Returns to Education: A Disaggregated Approach*. Berkeley, Calif.: The Carnegie Corporation.

Robertson, D. (1998) Who Won the War of Dearing's Ear? *Higher Education Review*, Vol. 30, No. 2, pp. 7-22.

Robinson, P. and Manacorda, M. (1997) Qualifications and the Labour Market in Britain: 1984-94, Skill Biased Change in the Demand for Labour or Credentialism?. *Discussion Paper No. 330*. Centre for Economic Performance, UK.

Rothschild, M. and White, L. J. (1995) The Analytics of Pricing of Higher Education and Other Services in Which the Customers Are Inputs. *Journal of Political Economy*, Vol. 103, No. 3, pp: 573-586.

Ryan, P. (1992) Unbalanced Growth and Fiscal Restriction: Public Spending on Higher Education in Advanced Economies Since 1970. *Structural Change and Economic Dynamics*, Vol. 3, No. 2, pp. 261-288.

Samuel, B. (1971) *Class Power and Mass Education*. Cambridge, Mass.: Harvard University.

Sander, W. (1995) Schooling and Quitting Smoking. *The Review of Economics and Statistics*, Vol. LXXVII, No.1, pp: 191-198.

Sanyal, B. C. (1998) Diversification of Sources and the Role of Privatization in Financing Higher Education in the Arab Region, (Working Paper Presented in the Arab Regional Conference on Higher Education, Beirut, 2-5 March 1998). UNESCO Regional Office for Education in the Arab States.

Sapsford, D. (1981) *Labour Market Economics*. George Allen & Unwin, London.

Schultz, T.W. (1961) Investment in Human Capital. *American Economic Review*. Volum 51, 1-17.

Schultz, T. W. (1963). *The Economic Value of Education*. Columbia University Press, USA.

Schultz, T. W. (1981) *Investing in People. The Economics of Population Quality*. University of California Press. USA.

Scott, M. (1992). A New Theory of Endogenous Economic Growth. Economic Growth. *Oxford Review of Economic Policy*, Vol. 8, No. 4, pp:29-42.

Siphambe, H. K. (2000), 'Rates of Return to Education in Botswana', *Economics of Education Review*, 19 (2000), 291-293.

Skidelsky, R. (1995) Public Finance and Education. *Oxford Review of Economic Policy*, Vol. 11, No. 3, pp:59-66.

Smith, A. (1776) *The Wealth of Nations*. Penguin Books, Edition 1973, Edited by Andrew Skinner, England.

Soskice, D. W. (1993) Social Skills from Mass Higher Education: Rethinking the Company-Based Initial Training Paradigm. *Oxford Review of Economic Policy*, Vol. 9, No. 3, pp:101-113.

Steel, J. and Sausman, C. (1997). The Contribution of Graduates to the Economy: Rates of Return. in the National Committee of Inquiry into Higher Education (the Dearing Committee Report on Higher Education in Britain), *Higher Education in the Learning Society*, HMSO Publication, Report 7, pp. 83-106.

Stiglitz, J. E. (1988) *Economics of the Public Sector*. W. W. NORTON & COMPANY, USA.

Subbarao, K. and Raney, L. (1995), 'Social Gains from Female Education: A Cross-National Study', *Economic Development and Cultural Change*, vol. 44, No. 1, pp. 105-128.

Teichler, U. (1996) Higher Education and Employment Twenty-Five Years of Changing Debates and Realities. *Higher Education Management*, Vol. 8, No.3, pp. 25-37.

Teulings, C. N. (1995) The Wage Distribution in a Model of the Assignment of Skills to Jobs. *Journal of Political Economy*, Vol. 103, No. 2, pp: 280-315.

Thirlwall, A. P. (1983) *Growth & Development; with special reference to developing economies*. Macmillan Education Ltd., UK.

Todaro, M. (1985) *Economic Development in the Third World*. Third edition. Longman, New York and London.

Trostel, F. E. (1996) Should Education be Subsidized?. *Public Finance Quarterly*, Vol. 24 No. 1, pp 3-24.

UNESCO, Regional Office for Education in the Arab State. (1974) *A report on Oman's Strategy for Educational Development*. Beirut, Lebanon.

UNESCO (1996) *The UNESCO statistical Year Book 1996*. UNESCO, Paris.

UNESCO (1998) *Higher Education Systems in the Arab States: Development of Science and Technology Indicators 1998*. Prepared for the UNESCO Cairo Office by Subhi Qasem.

UNESCO (2000) *World Education Report 2000*. UNESCO, Paris.

Usher, D. (1997), 'Education as a Deterrent to Crime', *Canadian Journal of Economics*, XXX No. 2, pp. 367-384.

Weale, M. (1992), 'The Benefits of Higher Education: A Comparison of Universities and Politechnics', *Oxford Review of Economic Policy*, Vol. 8, No. 2, pp. 35-47.

Weale, M. (1992), 'Externalities from Education', *The Market: Practice and Policy*, Frank Hahn (ed.), Basingstoke: Macmillan, 112-35.

Weale, M. (1993) A Critical Evaluation of Rate of Return Analysis. *The Economic Journal*, 103, pp. 729-737.

Weisbrod, B. (1966) Investing in Human Capital. In Wykstra, R. A. (ed) *Education and the Economics of Human Capital*, the Free Press, New York, pp. 68-88.

Westoby, A. (1977), 'The Individual's Private Investment in Education', in *The Open University, Educational studies and Social Science: A Third Level Course, Economics and Education Policy I, The Planning of Higher Education, The Private Demand*, The Open University Press, UK, pp. 51-79.

Whitehead, A. K. (1981) Screening and Education: a Theoretical and Empirical Survey. *Br. Rev. Econ. Issues* 2(8), 44-62.

Wilkinson, M. (1993) Equity and Efficiency, Studies in the UK Economy. Heinemann Educational, Oxford, UK.

Williams, G. (1992) British Higher Education in the World League. *Oxford Review of Economic Policy*, Vol. 8, No. 2, pp. 146-157.

Williams, G. (1996) *Paying for Education Beyond Eighteen, An Examination of Issues and Options*. The Council for Industry and Higher Education, London, UK.

Williams, G. and Gordon, A. (1981), 'Perceived Earnings Functions and Ex Ante Rates of Return to Post Compulsory Education in England', in Blaug, M. (ed), *The Economic Value of Education: Studies in the Economics of Education*, Edward Elgar Publishing Limited, England, p. 52-80.

Winegarden, C. R. (1979) Schooling and Income Distribution: Evidence from International Data. *Economica*, 46, pp: 83-87.

World Bank. (1995) *Priorities and Strategies for Education*. Publication of the World Bank, Washington, D.C.

World Bank. (1996) *From Plan to Market, World Development Report*