HUMAN CAPITAL AND THE DEMAND FOR EDUCATION IN POST-WAR GREECE: INCENTIVES AND REWARDS

by

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ABSTRACT

This thesis examines the dramatic increase in the social demand for education, especially at the tertiary level, in Greece during the past twenty-five years. In the context of Human Capital theory a variety of public and private data sets, covering nearly 29,000 employees, are analysed and presented for the period 1960 to 1987.

The results indicate that **(i)** the rate of return to education has declined considerably during the post-war period. It dropped from about nine per cent in the early 1960s, to almost five per cent in the mid-1970s, then declined further to about four per cent by 1981, and finally levelled at about three per cent in 1987. **(ii)** There is not enough evidence to support the existence of "screening" or the "certification" effect of education in Greece. **(iii)** The teaching profession is found to be relatively underpaid compared with other occupations requiring almost the same levels of human capital. According to this study the main reason for the declining rate of return during the last decades is attributed to the substantial rise in the average years of schooling of the population, that is, from 5.0 years in 1961 to 6.9 years in 1981. Equally interesting has been the change in the number of Greek students abroad. During the period of expansionary policies in the Government sector, the number of Greek students abroad increased from 7,000 in 1960 to a peak of about 45,000 in 1982, and has recently dropped to almost 27,000 with the adverse economic developments in the 1980s.

These findings lend support to the economic explanations of education and, in particular, the Human Capital approach. The thesis is concluded with the examination of some educational policy options which are evaluated against equity-efficiency criteria.

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ACRONYMS AND ABBREVIATIONS

AEI : Higher Education Institution (University status)

ATA : Automatic Inflation Adjustment

DIKATSA : Inter-university Centre for the Recognition of Foreign Degrees

EEC : European Economic Community

EKKE : National Centre of Social Research

ELKEPA : Greek Centre of Productivity

EMP : National Metsovian Potytechnic of Athens

ESAPS : Commercial Employers' Association

ESYE : Greek abbreviation of NSSG

ETBA : Greek abbreviation of HIDB

GNP : Gross National Product

GSEE : General Confederation of Greek Workers

GSEVE : Central Confederation of Artisans

HC : Human Capital

HE : Higher Education

HIDB : Hellenic Industrial Development Bank

HMSO : Her Majesty's Stationary Office

IBRD : International Bank for Reconstruction and Development

IEIR : Institute of Economic and Industrial Research

IIEP : International Institute for Educational Planning

IKY : National Scholarships Foundation of Greece

ILO : International Labour Office

IOBE : Greek abbreviation of IEIR

IRR : Internal Rate of Return

KATEE : Centres for Higher Technical and Vocational Education

KEPE : Centre of Planning and Economic Research

LDC : Less Developed Country

LSE : London School of Economics and Political Science

MIT : Massachussetts Institute of Technology

NBER : National Bureau of Economic Research

OAED : Manpower Employment Agency

OJT : On-the-Job Training

NATO : North Atlantic Treaty Organisation

NSSG : National Statistical Service of Greece

OCDE : French abbreviation of OECD

OECD : Organization for Economic Co-operation and Development

PASOK : Panhellenic Socialist Movement

P/G : Postgraduate

PV : Present Value

RD : Relative Demand

ROSLA : Raising of the School Leaving Age

RS : Relative Supply

RW : Relative Wage

SEV : Confederation of Greek Industries

TEI : Technical Education Institution (non-University status)

U/G : Undergraduate

UK : United Kingdom

UNESCO : United Nations Educational, Scientific and Cultural Organization

USA : United States of America

INTRODUCTION: PURPOSE OF THE STUDY

It has been amply demonstrated that investment in human capital is one of the prime means, if not the sine-qua-non, by which a country develops and sustains economic growth. The link between education and economic development is in the form of an investment in human capital. Empirical evidence has consistently shown that investment in education yields higher returns than other types of investment (for a general review see Psacharopoulos and Woodhall, 1985).

It should follow that education as an investment is subject to the law of diminishing returns. There is, therefore, a point where the returns might fall to the extent where further investment in education might not be justified on economic grounds.

With these considerations in mind, this research presents new estimates of the rate of return to education in pre-1981 and post-1981 Greece. In post World War II history, 1981 is a landmark of the country, as two significant changes occurred in Greek public life. A Socialist Government was elected, and Greece became a full member of the European Community. The former is important for two reasons. First, it was only then that almost 50 years of uninterrupted Right Wing rule came to an end. Second, the Socialist Administration has repeatedly stated its determination for changing public life towards the interests of the "non-privileged". In addition, the then emphasis of the socialists on ta king control of the "commanding heights" of the economy was in direct contradiction to the Community's

established policy of economic and social integration of the Member-States through the release of market forces.

It is now obvious that these proclamations have fallen short of a radical change. The ambitious economic reforms for the equalisation of life-time opportunities among individuals, and socialisation of production, came eventually under the hammer of market forces which proved too challenging for a small, open economy tied to the periphery of capitalism. A programme of severe austerity was introduced in 1985 (after the second election victory of the Socialists) which survives very much intact to-day. However, the educational system at all levels was significantly reformed by statute in 1982 (Yannoulopoulos, 1986; Ministry of Education, 1983). The new legal provisions still remain operative and shape educational processes.

New estimates of the rate of return to schooling in Greece are calculated and subsequently compared to those derived from other sources in 1960 and 1964 (Psacharopoulos, 1982a), and 1977 (Psacharopoulos, 1982a & 1985, and personal estimates). Since economic rates of return to education depend both upon educational input and labour market outcome, they are juxtaposed to the changing characteristics of the labour market from the mid-1960s until today, paying particular attention to the recent government policies in Greece.

Having estimated the rate of return to education and given the context of rapid educational expansion, we have a fertile ground for explaining the predictions of the Economic approach to education. In spite of rapid domestic educational expansion,

Greece is also an outlier in terms of the number of students abroad and, in general, the demand for higher education.

To what extent have the returns to education changed during the period of expansion? How do they compare to those of other countries for which data are readily available? In addition, what drives the demand for higher education, for domestic study or abroad? What is the role of the public sector as a dominant employer of highly educated labour? What implications can be drawn regarding future educational investment priorities in the country? These are some of the questions we attempt to answer in the chapters which follow. It is interesting to find out whether the Greek case follows the patterns observed elsewhere, and if the post-1981 changes in policies have accelerated/halted the trends.

The thesis is organised as follows: Chapter 1 presents the existing international literature on the Human Capital approach to education. Chapter 2 gives a description of the Greek educational system, the changing profile of educational attainment of the population, and a review on Economics of Education studies in Greece. Chapter 3 documents the characteristics of employment, paying particular attention to the educational level of the labour force and the pay policies, and examines to what extent there has been a wage compression in the economy. Chapter 4 tests the Mincerian specification of earnings functions, and, also, extends the estimation to include the effect of other human capital characteristics on earnings. In Chapter 5 estimates of rates of return to schooling, in general, and to investment in different levels of education, in

particular, disaggregated by gender and economic sector, are presented using data from a variety of sources for the period 1960-1987. In Chapter 6 empirical analyses designed to test the screening hypothesis, and evaluate the position of teachers' pay, are attempted. Chapter 7 further examines the phenomenon of the observed excess demand for higher education, paying particular attention to the issue of the demand for study abroad. Chapter 8 concludes the thesis by attempting to provide an explanation of the apparent puzzle of a strong demand for higher education in Greece, despite the low observed returns to education, and a number of equity-efficiency policy considerations are offered.

CHAPTER 1

SURVEY OF THE LITERATURE

The present chapter summarises the development of the theory of the effect of schooling on earnings.

1.1 ECONOMICS OF EDUCATION

1.1.1 Human Capital

In the last three decades economists have spent a great deal of time and effort in developing the concept of human capital by applying it to education and on-the-job training.

The inclusion of human abilities and skills as a component of capital and the idea of investing in human beings as a means of increasing the economy's productivity are by no means recent innovations (for a comprehensive review of the historical roots of the concept of human capital, see Kiker, 1966). This direction of thought can be traced back to the work of classical economists in the 18th and 19th century such as Adam Smith (1776, Ch. 10) and John Stuart Mill (1878, p. 47). For example Adam Smith talks about 'human machines' and gives an explanation of the higher pay of the more educated. Alfred Marshal (1920), who was also influential in the study of capital formation, notes that the analogy between investment in machines and of human beings in the form of education is imperfect because the worker sells his work but retains his own "property", and this property is inalienable (in a non-slave society). In other words, Marshall recognised the importance of education as a factor in human

progress (Marshall, 1920, p.212).

The first attempt to evaluate the economic significance of education in the United States was made by J.R. Walsh in the 1930's (Walsh, 1935). The "father" of modern ideas on human capital though appears to be Theodore W. Schultz -- who was concerned with the issue of 'human capital formation' -- especially after his promotional efforts in his Presidential Address to the American Economic Association in December 1960 (Schultz, 1961) and later, in 1962, when the Journal of Political Economy published a supplement entitled "Investments in Human Beings". This marked the beginning of what Mary Jean Bowman later described as "the human investment revolution in economic thought" (Bowman, 1966).

Other pioneering works are contained in the Journal of Political Economy 1962 issue but the most important contribution was undoubtedly made by Gary S. Becker, providing the basis of the human capital framework, entitled "Investment in Human Capital: A Theoretical Analysis" (Becker, 1962). The fact that a substantial part of the growth in income in USA remained unexplained, when growth in physical capital and labour had been accounted for, forms the origin of Becker's study (Becker, 1975). The centre of his analysis was formal education and the idea that individuals invest in themselves for the sake of future returns. Consequently and as for any other investment analysis, investment in education embodies costs and returns.

The argument extends to the fact which Denison in "The Sources of Economic Growth in the US" (Denison, 1962) identified

noting that the average labour force member of the US economy in 1960 received 2.5 times as many schooldays as in 1910. He then attempted to quantify the contribution of formal education to economic growth in the context of an aggregate production-function model of the US economy. Clearly part of that increase would have been due to direct government subsidy to education. Human capital theory effectively deals with this by computing a 'social rate of return' so as to assess the correct amount of subsidy, the composition of subsidy (by levels of schooling) and its distributional implications (by social group).

The basic human capital idea, in a nutshell, is that those with more schooling or on-the-job training have incurred a cost in the form of foregone earnings (on the supply of labour side). In addition, their productivity has also increased which in turn results in higher earnings, assuming that workers are paid according to their marginal product (on the demand for labour side). Assuming that this cost is regarded as investment, the extra payment should be just enough to secure the same return on investment in human capital as on a comparably risky physical capital investment. The theory is therefore one of individual earnings differences in a competitive labour market.

It is worth noting, that although human capital initially started as a growth theory (see the recent work of Psacharopoulos, 1984 including a comment by T.W. Schultz with his revised views on the effect of education on growth) it later emerged as a theory of income distribution in the sense that it measures costs and returns to education by the earnings differential as different amounts of human capital between the

individuals (see Tinbergen, 1975 and for an alternative view see Tzannatos, 1988, pp. 60-61).

Since the phoenix-like birth of the economics of education in the early 1960s, the concept of human capital has been applied widely by educational planners and "has had a powerful influence on the analysis of labour markets, wage determination, and other branches of economics, such as the analysis of economic growth, as well as expenditure on health care and the study of migration. For it is recognised that these also represent investment in human capital, since they can help to determine the earning capacity of individuals, and therefore increase their lifetime incomes" (Woodhall, 1987).

In the economics of education literature the screening hypothesis, credentialism, or the sheepskin effect of education -- as Mark Blaug prefers to put it -- challenges directly human capital theory. In the context of human capital theory education is viewed as a productivity augmenting process (Blaug, 1972). Contrary, screenists argue that education -- and by extension degrees -- primarily serves to screen individuals as opposed to enhancing their productivity (see Berg, 1970; Arrow, 1973; Spence, 1973; and Stiglitz, 1975). A number of empirical studies, designed to test the validity of the screening hypothesis have employed alternative data sets and techniques, suggesting no clear consensus on the matter by reporting contradictory results. The majority of these studies however, have reached the conclusion that there is no solid evidence to support the presence of screening.

1.1.2 Rate of Return Analysis

Three general approaches have been proposed and discussed in the literature to date. They are (i) the manpower requirements -- or forecasting --approach, (ii) the cultural approach, also referred to as the social demand approach to education and (iii) the rate of return approach (for a comprehensive review see Blaug, 1967). In the context of human capital theory, rate of return analysis has become a powerful approach in educational planning.

The educational planning practice pursued in most Western countries uses a mix of the social demand approach and the economic needs (implying both the rate of return and the manpower requirements approach) of the country. Briefly, the fundamental philosophy of the social demand approach is to provide education to all those who wish to receive it or are capable of receiving it. In contrast, the economic needs consideration implies regulation of investment in education, either on the basis of the manpower requirements of the economy or on the basis of the economic efficiency of investment in education, in a manner similar to any other sector of the economy. There are ample number of empirical applications of these three approaches in the context of educational planning in the literature (for the Rate of Return approach see Psacharopoulos & Loxley, 1985; for the Manpower Requirements approach see Parnes, 1962, Harbison and Myers, 1964, OECD, 1965a, and Armitage, 1971; for the Social Demand approach see Soumelis, 1979; and, for a combination of the Social Demand and the Manpower Requirements approach see, Robbins Report, 1963, and Moser & Layard, 1964).

In this thesis, we are mainly concerned with the issue of

rate of return analysis as a whole as applied to education, rather than questions of social demand. Rates of return to schooling are generally computed either by the Internal Rate of Return (IRR) method or by the Earnings Function (Mincer, 1974) method. In the former, the costs and benefits of education are compared through the IRR discounting procedure. In the latter, schooling is entered in the earnings function either as a continuous variable (measured in years of schooling) resulting to an average rate of return to one extra year of schooling, or as a separate dummy for each level of education, resulting to an education level specific rate of return, hopefully holding all other relevant factors -- such as experience, ability -- constant (for a detailed discussion and presentation of the human capital earnings function and its extensions/variations see Section 1.2 of the thesis). A brief review will be presented below.

Undoubtedly, the most frequently cited author in the economics of education literature throughout the 1970s and 1980s, in general, and on the rate of return analysis, in particular, is George Psacharopoulos (Blaug, 1989). Following the enthusiasm of academics in the field during the 1970s, especially after the introduction of Mincer's seminal work "Schooling, Experience and Earnings" (Mincer, 1974), rate of return analysis gained the ground lost by the neo-classicists in the 1950s and in conjunction with Psacharopoulos' work became an even "more frequent and less suspicious practice" (Blaug,1970, p. 234) aiding economists and educational planners in deriving investment criteria in the field of education. The scattered evidence was

summarised by Psacharopoulos who presented a book entitled "Returns to Education: an International Comparison" in 1973 where he attempted to group existing sporadic rate of return estimates and identify/trace any patterns that might exist between the economic returns to education and other economic characteristics of the countries involved. A total of 53 rate of return case-studies were reviewed covering 32 countries.

Following the 1973 monograph, Psacharopoulos updated the earlier rate of return evidence by considering studies that have been conducted in the seventies which included 13 new country cases (Psacharopoulos, 1981). The latter reference includes a review of rate of return estimation procedures (ibid. pp. 322-326). This resulted in a series of controversial arguments associated with the rate of return literature of the 1970s, such as data quality, the issue of the social productivity of education, screening, the differential ability argument, the idea of the dual labour market, the problem of graduate unemployment and so on. Four underlying patterns were revealed (ibid. p. 326), which were based on this universal survey:

> (a) Returns to primary education (whether social or private) were higher than other levels of education;
>
> (b) Private returns were always in excess of social returns, especially at the university level;
>
> (c) All rates of return to investment in education (both private and social) were well above the 10 percent common yardstick of the opportunity cost of capital; and
>
> (d) Returns to education in less developed countries were higher relative to the corresponding returns in more advanced countries.

He gives four specific points of policy, following the previously cited patterns (ibid. pp. 333-334):

1. Top priority should be given to primary education as a form of human resource investment;

2. Secondary and higher education are also socially profitable investments;

3. The observed large discrepancy between the private and social returns to investment in higher education suggests that there is room for private finance in this level;

4. Returns to education fall as a country develops and/or the educational system expands.

In 1985 the same author updated the 1981 paper in the Journal of Human Resources (Psacharopoulos, 1985). In this paper, in addition to the enrichment of the existing data set with evidence on new countries and more recent figures, a very thorough grouping of rates of return to investment in education around the world is presented by different variables. A detailed assessment of market returns to education by sex, region, economic sector, selected university faculties, alternative school curricula, and type of country is made, aiding further the formation of efficient public policy on education.

Behrman and Birdsall (1987, p. 603) however, argue that Psacharopoulos neglects to "discuss a number of studies that challenge the conventional wisdom about the market returns to education in developing countries". Their fundamental proposition is based on earlier empirical research conducted by the authors (see Behrman and Birdsall, 1983 and 1985) where they incorporated a measure of schooling quality into an analysis of the determinants of earnings for males in Brazil and argue that the quantity of schooling as an explanatory variable alone -- as often utilised by human capital theory -- is misleading and tends to give upwardly biased results. As an alternative, they suggest

that school quality should be taken into account in the estimation procedure (e.g. the average years of schooling of teachers in the area of the country in which the individual grew up). That is so because schooling quality and years of schooling interact with each other. Their major finding was that the standard procedure overstated the private rate of return in Brazil by almost 90 percent (Psacharopoulos gives 20.5% in his study compared with their finding of 11.5%). Similarly, Boissiere et al (1985) in an analysis of data from Kenya and Tanzania reported that the inclusion of cognitive achievement in standard earnings functions reduces the coefficient of schooling by about two-thirds in both countries.

Notwithstanding the above criticisms and other objections on the theoretical foundation of human capital (e.g. the alpha coefficient and screening hypothesis, which are presented in later sections of the thesis -- see Chapter 4, Section 4.3), a plethora of empirical studies have been conducted by several authors, conforming the available literature. It is worth noting briefly here that Carnoy and Marenbach (1975) for the United States for the year 1969 and the monographs by Adrian Ziderman (1973) and Psacharopoulos and Layard (1979) on the United Kingdom experience, for the years 1967 and 1972 respectively. The latter study also includes interesting advancements on computational complications of the Mincerian specification of earnings functions and a critique (results appear in Table 1.1).

The general conclusion from the majority of studies in the literature confirms that investment in education is present and profitable (for both the individual and the society). There is

Table 1.1. Estimates of Private Rates of Return to Education given by Studies in the USA and England and Wales (1967-1972) (%)

Incremental Schooling Level	USA 1969			
	Male		Female	
	White	Black	White	Black
High School (12 vs. 8 years)	14	20	15	19
College (16 vs. 12 years)	16	14	15	19

Incremental Schooling Level	England and Wales			
	1967		1972	
	Male	Female	Male	
High School plus University (18 vs. 10 years)	15.0	20.5	...	
'A' Level only (14 vs. 12 years)	10.0	...	11.7	(9.2)*/
University Degree	22.5	...	9.6	(7.7)*/

Source: Siebert, S., 1985, Table 2.2, p. 29
for USA: Carnoy and Marenbach, 1975
for England and Wales: 1967 - Ziderman, 1973;
1972 - Psacharopoulos and Layard, 1979

Notes: (...) not applicable
All figures relate to annual earnings
*/Refer to weekly earnings

still a question as to whether human or physical capital represents the more profitable form of investment. This is because the rate of return to schooling is expected to be similar to the equally risky physical capital and to the market interest rate. It should be admitted that, although relevant studies on the difficulties in interpreting rates of return to schooling have been conducted (Harberger, 1965 and Psacharopoulos, 1973) and some clouds have cleared away, a question still remains that has no straight forward answer and is of vital concern to

economists and planners. As far as the private rates of return appearing in Table 1.1 are concerned, it could be said that, on the one hand, they are of a plausible order of magnitude (see Becker, 1975) and, on the other hand, they are on the high side when judged against the return to physical capital. As Siebert (1985, p. 30) notes: "The point remains that the numbers are reasonable, and this corroborates the model. Had the figures been much above or much below 10 per cent, this subject would not have received the attention it has".

Summarising, one could argue that all methods have something to offer. On the one hand, the manpower requirements approach is more appropriate where there are fixed-type coefficients. On the other hand, the costs of producing an ideal ratio of occupations for educational profile and the population should be considered as well and, it is here where Human Capital theory intervenes. Human Capital theory as an approach is important as it evaluates the costs and benefits associated with the educational investment simultaneously. As manpower planning became gradually less important -- except in some fundamental sectors -- throughout the period, the profitability of education, or rate-of-return, approach, has instead increasingly been utilised. All in all, the sensitivity of the frequent use of the rate-of-return approach during the past 25 years pulls the threads together and assesses what we have learned, including the provision of valuable information to us on the computation methods, various adjustments, interpretation, and the philosophy beyond the approach itself.

1.2 EARNINGS ANALYSIS

Among various explanations of the positive correlation between education and earnings there is the so-called "Economic Explanation" as discussed in Blaug's paper "The Correlation Between Education and Earnings: What does it Signify?" (Blaug, 1972). Human capital theory forms the basis of this economic explanation. This is accomplished by asking a number of questions such as:

1. What are the sources of earnings differentials?
2. Are they associated with differences in education? and
3. If they are, how much of the variance of earnings of the more educated is explained by education?

The notion that an individual must have a certain degree of skills in order to earn his living is common sense. It is argued that these skills are partly genetic but they can also be acquired through learning. Learning is not an end-in-itself process, but it takes place throughout the life of the individual in various forms, such as transfers of information from parents, friends, schools, media etc. In theory it should be possible to estimate the effect of such additional skills on the earnings capacity of the individuals. However, in practice the only measure that is usually available is the amount of formal education of the individual and the time spent in the labour market acquiring information, which in turn result to higher earnings (assuming a competitive world) by increasing his/her productivity, thus marginal product.

Following standard economic theory, Blaug overcomes this problem by suggesting that wage differences are a by-product of

the demand and supply mechanism where scarcer types of labour secure higher wages. In such a manner, a more productive factor represents itself as a scarcer type.

1.2.1 The Basic Human Capital Framework

Having indicated the above, it is time to proceed with the development of a simple but formal model of the Human Capital theory.

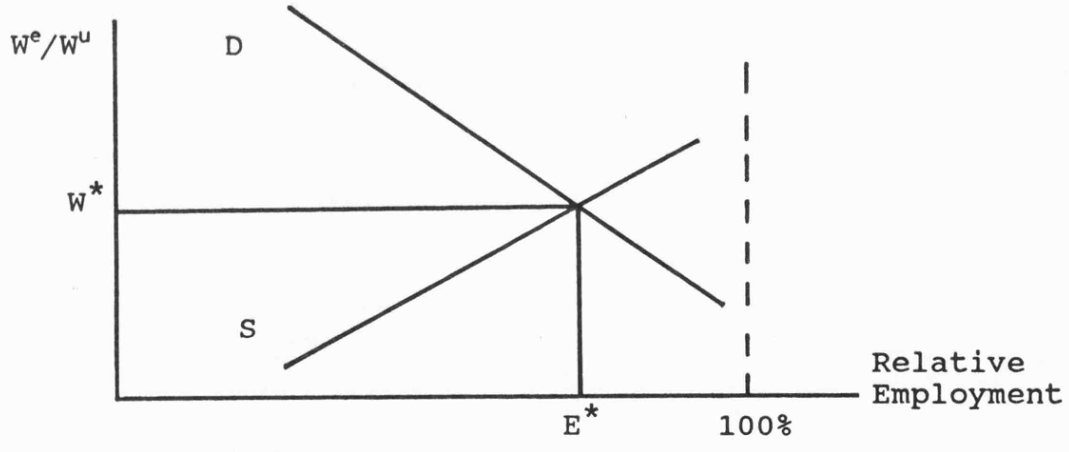
Let us begin by supposing that there is only one type and level of education. This implies that first present workers either have this education or not, and second prospective workers can either undertake this education or not.

As usual, one can think of a demand (**D**) curve for and a supply (**S**) curve of education, where **D** is the demand for educated labour by employers and **S** stands for the supply of educated labour (or the demand for education by individual workers). If we denote the wage rate of the educated worker as W^e and that of the uneducated worker as W^u, then the relative wage rate ($W = W^e/W^u$ is depicted on the vertical axis in Figure 1.1. This is on the price side. On the quantity side (horizontal axis) we will use not the number of educated workers but the percentage of the workers who are educated (E^*).

This is illustrated, where the two curves have the usual slopes, ie. **D** is negatively sloped while **S** is positively sloped. In detail, **D** indicates the education mix of the demand for labour force at various **W**s. It is negative because as **W** rises, firms will tend to substitute the cheap factor (uneducated labour) for the expensive factor (educated labour). This is a standard

prediction of the economic theory of the demand for inputs in the theory of the firm. Additionally, **S** traces out the proportion of the labour force who would acquire education at different **W**s. It is positively sloped because the psychic and pecuniary costs of acquiring education rise as more people become educated. This is so because, on the one hand, the supply of education services has a positive slope and, on the other hand, people have different financial endowments or time preference or satisfaction from learning or, in a catch-all word, different tastes. Consequently, at each and every different **W** only some of them will undertake education while the rest would be attracted only if the **W** rises.

Figure 1.1
Relative demand and supply of educated and uneducated workers



One can also add differences in education in the model, which can be incorporated in two ways. First, differences in education or completed years of schooling rather than one type and level of schooling whereby some undertake it and others do not. Second, differences in education can be seen as differences

in the ability to learn, so less able people find it more difficult/costly to acquire education and need to be compensated accordingly -- through higher wages -- in order to stay on in the educational system. These refinements can be easily incorporated into the basic model mentioned earlier (that is, the "all identical individuals" case) to which we stick for reasons of simplicity.

So far, we have firmly established that the demand and supply curves would have the expected slopes. The intersection of the two curves determines the equilibrium W, that is W^*. This wage reflects exactly, in theory, the ratio of marginal products of the educated to uneducated workers (on the demand side) and the compensating differential for the marginal worker who is just indifferent between becoming educated or not (on the supply side).

The comparative statistics of the model are the expected ones. A shift of the demand curve to the right, that is increase in the demand for more educated workers, will result in both higher Ws and higher equilibrium level of the education mix of the labour force. Alternatively, a shift of the supply curve to the right will, as before, increase the percentage of the labour force who is educated but the equilibrium wage will now fall.

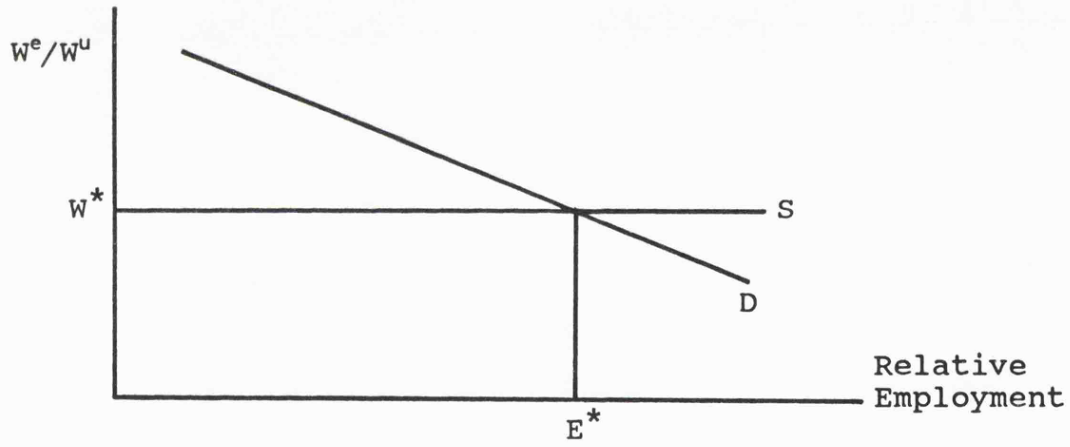
Despite the lack of realism in the above model, the previous remarks are common sense and were noticed as early as in Adam Smith's "Wealth of Nations" where they were expressed as compensating differentials from the supply side point of view. A further refinement of the theory, although at the cost of additional abstraction, has come from Mincer's (1974) formulation

of the problem.

1.2.2 Mincerian Refinements

Assuming perfect competition and supposing that all individuals are ex ante identical in all respects (tastes, ability, health, socio-economic background, financial endowments or access to capital markets and so on), then the **S** curve will be horizontal at that level measuring the common compensating differential for all individuals (see Figure 1.2).

Figure 1.2
The demand for educated and uneducated workers implicit in the fixed-supply hypothesis



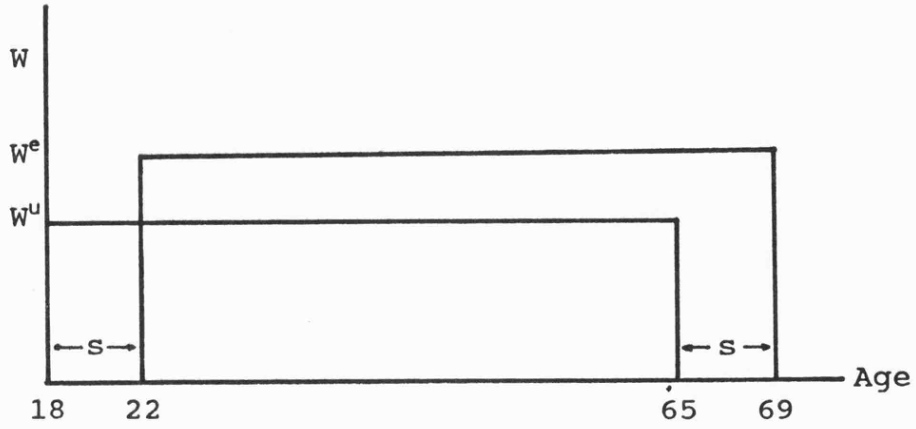
In this case **W** is given at the height of the supply curve. The only role that demand fulfils is to determine the equilibrium education mix between educated and uneducated labour (or the length of schooling under the alternative interpretations outlined earlier). This approach enables us to construct an explicit formula for estimating **W**.

To do that, Mincer utilised a few more assumptions. First, that there are no costs to education other than foregone

earnings. Second, that education lasts for a given number of years, **s**, and is full-time (thus, to become educated is an all or nothing decision). Thirdly, that all workers have the same working life (in terms of length of time), irrespective of whether they undertake education or not. Fourthly, there are only two wage rates, one for uneducated and another for educated labour, which are invariant over time (this implies that there is no on-the-job training (OJT)). Fifthly, that with the exemption of the wage rate, other characteristics of jobs requiring educated and uneducated labour are identical -- or, they evaluated equally by the prospective workers. Sixthly, and finally, that the rate of interest is **r** and also for reasons of simplification continuous discounting is assumed (that is, through the use of "e", the base of the natural logarithms which is approximately equal to 2.7183).

Most of these assumptions are captured in the following Figure 1.3.

Figure 1.3
Flat age-earnings profiles of educated and uneducated workers implicit in Mincer's assumptions



On these assumptions, the present values (PV) of uneducated and educated workers at the point they start work are respectively:

$PV^u = (W^u/r).(1 - e^{-rA})$ (eq. 1.1)

$PV^e = (W^e/r).(1 - e^{-rA}).e^{-rS}$ (eq. 1.2)

The interpretation of the two equations is given as follows. The ratio of wages to the interest rate (first parenthesis) is simply the PV of an annuity paid for ever; the term in the second parenthesis is simply the finite life correction factor; and the third term in equation 1.2 takes into account the fact that earnings for educated workers will start to be paid at **s** years ahead.

With individuals ex ante identical, the two PVs should, at equilibrium, be equal for both types of careers -- that is wages. Thus, equating the right hand sides of equations 1.1 and 1.2, eliminating the finite life correction factor from both sides, and rearranging we obtain:

$W^e = W^u \cdot e^{rS}$ (eq. 1.3)

and taking the logarithms on both sides:

$\ln(W^e) = \ln(W^u) + r.S$ (eq. 1.4)

The model given by equation 1.4 is usually referred to as the "Schooling Model" (Mincer, 1974, pp. 24-28).

In conclusion, this simple model provides a linear relationship between the logarithm of earnings for educated workers and years of schooling, with the coefficient of schooling being the rate of interest or, in perfect markets, the rate of time preference in the society or, the average rate of return to an additional year of schooling. Obviously, the theory

predicts the sensible result that $W^e > W^u$.

Consequently, if one runs a regression of earnings of workers with different level of schooling on a constant and the length of schooling, the coefficient of schooling would be the rate of return to education, as it is easy to extend the analysis beyond the case outlined so far where the length of schooling has been assumed to be fixed (equal to **s**). In theory, the regression coefficient for the constant term should be equal to the pay of the uneducated worker.

The merit of this approach lies in the fact that it is derived from an explicit and relatively meaningful foundation which dictates the functional form (log-earnings -- lnY -- on years of schooling) that econometric estimation should take.

The disadvantages are that it ignores all other aspects of human capital (HC) formation such as on-the-job training. For example, for many jobs not much HC from schools and universities is required but other ways of acquiring HC are necessary (ie. employer provided training). In the case of training, the usual practice is for the employers to pay part of the trainees' costs unlike in the case of formal education where everything is usually paid by the individual before he enters the labour market.

It is reasonable to regard experience as a significant determinant of HC and, this "makes it possible to expand the schooling model to include post-school investments in an econometric analysis of the distribution of earnings" (Mincer, 1974, p. 83).

To accommodate this criticism, one can amend the last equation as follows:

$\ln Y$ = Constant + r.s + (some function of EX)

where Y is annual earnings and EX is years of labour market experience.

This is what Jacob Mincer (1974, pp. 83-96) did when he estimated the relationship between earnings, length of schooling and experience for pre-tax annual earnings of male, urban, non-student workers below the age of 65 in USA in 1959, having derived the human capital earnings function as:

$$\ln Y_i = a + b.s_i + c.EX_i + d.EX_i^2 + u_i \qquad \text{(eq. 1.5)}$$

where $b = \partial \ln Y / \partial s = r$ or, the average private rate of return to one extra year of schooling. That is, the rate of return is nothing else than the relative change in earnings ($\partial \ln Y$) following a given change in schooling (∂s), and u is the error term.

The important implication of the above model is that unobserved post-school investment is now transformed into an observed variable, namely years of work experience (EX). It is also noteworthy, that variable EX was been calculated from the formula:

EX = Age - Schooling - Age of starting education

This indirect estimation of labour market experience assumes that people have been employed since the end of their formal education without interruption. This is not as unrealistic as it may sound today as Mincer's sample was based only on men and the unemployment rates then were not as high as those which have prevailed since the early 1970s. Moreover, experience may be

included as an explanatory variable in the regression equation in a quadratic form on ad hoc but intuitive grounds, meaning that it becomes successively less important in the determination of earnings (for an implicit justification of the inclusion of Experience see Psacharopoulos & Layard, 1979).

The main disadvantage of computing equation 1.5 and deriving r is that it does not account for any direct cost except income foregone for the individual at any given level of education. However, it has been shown that foregone earnings are the prime cost of education. Additionally, because of its inability to incorporate any other form of cost data, one cannot use it for social rate of return estimates. Coming back to the former point, one should also emphasise that this method by definition understates the returns to primary education by automatically assigning foregone earnings to all levels of education even at the compulsory stage (see Psacharopoulos, 1981). Therefore, one should have this understatement in mind when interpreting the results.

1.2.3 Other Extensions

Having computed the average rate of return to one extra year of schooling, the next question is that of the rate of return to any particular level of schooling. There are two regression techniques suggested by Psacharopoulos (1981) where an "educational level" dimension is added to the "average" rate of return concept, thus enabling us to derive "marginal" rates of return to education.

According to the first technique the regression line of

equation 1.5 becomes:

$$\ln Y_i = a + b.s_i + c.EX_i + d.EX_i^2 + e.s_i^2 + u_i \qquad \text{(eq. 1.6)}$$

where e is the coefficient on years-of-schooling squared. By differentiating eq. 1.6 with respect to **s** we obtain that the rate of return (r) is:

$$r = b + 2es. \qquad \text{(eq. 1.7)}$$

Having defined completed educational levels according to years of schooling completed, we substitute the respective values of **s** in the right hand side of equation 1.7 and derive a regression rate of return.

The second way of adding an educational level dimension in the HC earnings function, is by redefining **s** into given educational levels in a form of a series of dummies (D_i) having the value of 1 if observation lies in the particular educational level and 0 otherwise. Thus, by substituting **s** in equation 1.5 we result the following function:

$$\ln Y_i = a + b_k.D_{ki} + c.EX_i + d.EX_i^2 + u_i \qquad \text{(eq. 1.8)}$$

where subscript k, k=1,2,3, stands for the level of education (i.e. primary, secondary, tertiary).

In this specification the rate of return to the kth level of education (r_k) has been estimated by comparing the coefficient of D_k with that of D_{k-1}, the latter acting as the control group. Then, this is divided by the difference in the number of years of schooling (Δs) between the kth level (n_k) and the control group or, in detail

$\Delta s = (n_k - n_{k-1})$. That is,

$$r_{k \text{ vs } k-1} = (b_k - b_{k-1})/\Delta s \qquad \text{(eq. 1.9)}$$

Equation 1.9 is based on the rationale that one computes

effectively the rate of return (r_k) by comparing the logarithm of the potential earnings of the desired educational level k with the one of the control group k-1, ie.

$$r_k = (\ln Y_k - \ln Y_{k-1})/\Delta S \qquad \text{(eq. 1.10)}$$

The advantage of the "Step" (eq. 1.8), as compared to the "Non-linear in **s**" (eq. 1.6), method is that a great deal of sensitivity is added in the former, while the latter suggests a smoother descending (or ascending) pattern of the rate of return to schooling, favouring the educational levels where **s** is lower (or higher) depending on the sign of the coefficient **e** (see eq. 1.7).

Taking a mathematical approximation of $\ln(1+x) \simeq x$, which is good for values of x of the order of the rate of return to education (i.e. if x < about .20), we obtain from 1.10:

$$r_k = (\bar{Y}_k - \bar{Y}_{k-1})/(\Delta s.\bar{Y}_{k-1}) \qquad \text{(eq. 1.11)}$$

where Y refers to mean earnings of employees with the subscripted educational level. In other words, estimation of equation 1.11 or what Psacharopoulos (1981) calls the "Short-Cut" method, is doing in an explicit way what the earnings function is doing implicitly under the following assumptions:

(a) the age-earnings profiles are either flat or equidistant between adjacent educational levels throughout their range;

(b) the age-earnings profiles last for ever; and

(c the only cost of schooling is the forgone earnings of the individual.

Thus, the great advantage of this simple formula (eq. 1.11), where the rate of return to schooling is easily computed by using already tabulated information on earnings of various groups of

workers by educational level. Though, since the method depends on mean earnings -- and not median as suggested earlier in the literature (e.g. Renshaw, 1960) -- the experience or earnings standardisation is absent. A rectifying procedure owing to the previously described problem is that when the data are grouped for experience or age, a choice of a particular experience or age group (e.g. 35-45 age group) will prevent biases associated with the early experience profiles (see Psacharopoulos, 1981, p. 323). However, because of the simplistic nature of the method an "aggregation bias" as compared to results from the previously described methods is evident. Besides the above disadvantages, it is worth mentioning that the great advantage of this formula is that it easily overcomes assumption (c) to the extent that it allows any average direct cost to education to be added in the denominator. This offers a greater sensitivity on cost issues, as well as allows a social rate of return calculation by adding in the denominator the average resource cost of schooling.

Lastly, some studies in the literature have utilised the internal rate of return (IRR) calculation procedure -- or what Psacharopoulos (ibid.) calls "Elaborate" method -- in deriving rates of return to education. This method stems from investment theory, where the rate of return of a project is summarised by a statistic (that is the IRR) describing the costs and benefits associated with the project. Coming to the application of this method, which uses detailed data on age-earnings profiles of individuals, the problem of small cells (appearing as a saw-tooth pattern) is tackled by employing a smoothing-out regression

procedure, where absolute earnings are regressed against the age of the individual. This, eventually allows for the construction of an idealised age-earnings profile within each subgroup of workers with the same educational level, thus the effective calculation of the IRR, offering a marginal rate of return to schooling (ibid., p. 323). The advantage of this rate-of-return calculation method is that one can easily incorporate any direct cost of schooling as well, on top of the indirect one -- that is the earnings forgone -- in the estimation procedure. Nevertheless, the main disadvantage associated with the utilisation of this calculation method in deriving rates of return to education is that the procedure is quite lengthy, as well as the assumptions implicit in the IRR methodology as applied to education.

1.2.4 The Choice of the Dependent Variable

We now come to the question of which dependant variable to use. Mincer's basic Human Capital model was explicitly presented in Section 1.2.2 (and its extensions in the previous Section 1.2.3). This model has been widely used in the literature of economics of education offering a pioneering framework for the estimation of the returns to education and post-secondary school investment. The model suggested by Gril iches (1977) has concentrated on estimating a version of the following equation:

$$y_i = \ln Yi = a_1 + a_2 . S_i + a_3 . X_i + u_i \qquad \text{(eq. 1.12)}$$

where, Y is a measure of income, earnings or wage rates, S is a measure of schooling (usually in units of years or grades completed), X is a set of other variables assumed to affect earnings, u is a disturbance representing the other not

explicitly measured forces affecting earnings, assumed to be distributed independently of X's and possibly S, and i an index identifying a particular individual in the sample.

Concentrating on Y it is noteworthy that Griliches continues by posing certain questions to be answered relative to the above equation, commonly referred to as earnings or income-generating function, and he proceeds by stating, "Obviously, I don't intend to, nor I am able to, answer all these questions today". This is simply to elaborate on the complexity of the application of the above "straight-forward" model, even after its theoretical assumptions and validations.

Here, we are concerned with the left-hand side of the equation, namely $y_i = \ln Y_i$. What Y should really be? Does it really matter if somebody chooses any form of Y? What is the "right" specification of Y in the equation? Answers to the previously mentioned questions will be given in accordance with the available theory.

Psacharopoulos offers a stimulating discussion on the matter and some of the clouds clear away. Initially, one should point out that income data should not be the measure of Y, but rather earnings, simply because it will distort the required measure inasmuch as individuals differ in wealth (Psacharopoulos, 1973). Some authors, however, have used total income as the dependent variable in the absence of data on earnings (see for example Chiswick and Mincer, 1972).

Secondly, the question moves towards earnings, suggesting a choice between salary and wage rates. Should therefore, the

measure of earnings be in a monthly or annual basis? Blinder in his paper "On Dogmatism in Human Capital Theory" (Blinder, 1976), documents the use of wage rates as the best choice for the dependent variable. He also suggests an "eclectic model" treating variable experience in two different parts. That is, X_1 denoting relevant to the present job experience and $X_2=X-X_1$ denoting all the rest. This is of course justified for those people paid on a wage basis and it is in contrast with annual earnings.

In the vast majority of studies though, the dependent variable is the logarithm of monthly or annual earnings rather than, of course, absolute earnings. This is either for easier interpretation of the effect of individual variables (in terms of per cent increment of earnings) or for theoretical reasons following the human capital school (see Mincer, 1974).

Finally, when questioning the specification of the dependent variable, that is $\ln Y$ rather than Y, being widely accepted and seldom being subjected to empirical tests, Heckman & Polachek (1974) and, Dougherty & Jimenez (1987) experimented with the 1960 and 1970 public use samples of the US census and, with the 1980 Brazilian census respectively, offering the conclusion that: the natural logarithm of earnings is indeed the correct specification of the dependent variable in earnings functions.

1.2.5 Extended Earnings Functions

So far we have presented the framework of the model, its Mincerian refinements and the Psacharopoulos' extensions to the HC earnings function, as well as argued on the "correct" specification of the dependent variable of the model. We now discuss other forms of the earnings functions which have appeared

in the literature.

Mincer, in his pioneering work entitled "Schooling, Experience and Earnings" experimented with the inclusion of (the logarithm of) the weeks worked in 1959, as an improvement of his model, and the coefficient of determination almost doubled, while the coefficient of schooling remained still unbiased (Mincer, 1974). His finding was an interesting one, by the means that earnings is an increasing function of the period of work within a particular year.

As stated in Section 1.1 we saw that Human Capital theory has become the "bread and butter" of the economics of education. Economists and educational planners in general, have derived results useful for policy purposes. Likewise, both severe and constructive criticisms of the model (for example Psacharopoulos and Layard, 1979; Blinder, 1976; Griliches, 1977; Psacharopoulos and Tinbergen, 1978; and specifically for the rate of return approach see Merrett, 1966; Soumelis, 1981) in particular, and the theory, in general, have resulted in further refinements and complicated extensions of the basic model known in the literature as "Extended Earnings Functions".

We are now in a possition where a great deal of sensitivity has been added to the human capital analyses. These analyses, apart from the two basic forms of human capital, that is schooling and labour market experience, incorporate:

(i) interaction terms between the two variables (Psacharopoulos and Layard, 1979);

(ii) segmented experience especially at the early years, so as to

take into account the non-strictly parabolic nature of the earnings of these early years (Blaug et al, 1982);

(iii) other factors which account for the so-called in the literature "alpha-coefficient", where "a" stands as a mnemonic for ability (Blaug, 1970; Boissiere et al, 1985; Taubman, 1975, 1976 and 1978; Taubman and Wales, 1973);

(iv) factors such as the type and quality of schooling (Behrman and Birdsall, 1983 and 1985);

(v) whether the employee belongs to minority group;

(vi) trade union variables;

(vii) for testing discrimination hypotheses (Sloane, 1985);

(viii) a vector of family related characteristics (Hill, 1979).

Also, the basic human capital framework, in general, and earnings functions, in particular, have been used in the literature to test labour economics issues. For example, an issue of great importance with relevance to education is whether members in a profession, like teachers, are overpaid relative to those in other professions who have the same human capital and personal characteristics as teachers (see Arrow and Capron, 1959, Rottenberg, 1962, and Psacharopoulos, 1987b). In addition, an extensive presentation of annotated bibliography in the field of the economics of education has been presented by Blaug (1978) and research on the presentation of results of recent studies has been carried out by Psacharopoulos (1981 and 1985).

1.3 SUMMARY

As evidenced so far, earnings functions take into account both the costs and the benefits of education. This, in turn, has a great impact in the practice of educational planning. Also, in conjunction with the frugality of the data the earnings functions demand -- that is information on the earnings, schooling and, experience of employees -- in deriving investment criteria (rates of return) to education makes the approach more popular among others. The rate-of-return approach has been heavily utilised in policy making, as evidenced from the existing literature and, in the context of the human capital earnings functions (basic and extended), will be utilised in this study as well.

In detail, earnings functions for the Greek case will be presented in Section 4.2 and, rates of return estimates will be given in Section 5.1. In the meantime , the Mincerian specification of the experience variable, as presented in Section 1.2.2, will be put on test in Section 4.2.1.5 using recent Greek data. In addition, the status of human capital theory in Greece as challenged by the screening hypothesis will be empirically tested in Section 6.1. Moreover, within the Human Capital framework developed so far, an evaluation of the teachers' pay position in Greece will be attempted in Section 6.2.

Summarising, the reason in this thesis that I have adopted the rate of return model (rather than the competing ones of the social demand and manpower requirements) is that the former has dominated the literature of educational planning -- this is especially since 1967 when Mark Blaug delivered a paper in the

Economic Journal entitled "Approaches to Educational Planning" (Blaug, 1967). Social decisions regarding education entail costs, and such costs must be weighted against a set of benefits in order to rationalise the investment.

CHAPTER 2

THE GREEK CONTEXT

In our study of rates of return to investment in education in Greece, following the presentation of the human capital theoretical framework, we should then look at the country's level of educational development. This can be seen from two complementary points of view. First, from the educational side, that is the flow of students and graduates through the school system; and, second from the demographical side, that is the stock of the educated persons in the population, as well as, the evolution of its size through time.

Educational expansion in Greece has been very rapid during the post-World War II period. Primary education has been universal since 1960. According to UNESCO data (UNESCO, Table 3.2) the coverage of secondary education has increased from about 50 per cent to 90 per cent of the 12 to 18 age group during the 1965 to 1984 period. And higher education coverage has jumped from covering 4 per cent of the population in 1960 to one quarter of the population aged 20 to 24 in the eighties. As will be shown in Chapter 7 of the thesis, below, the 24 per cent higher education enrolment ratio, reported by UNESCO, is an underestimate of the true higher education coverage of the population because it refers to enrolment in domestic institutions and does not take into account Greek students studying abroad. According to our estimates, when study abroad is considered, as much as 40 per cent of the 20-24 age group

could be covered by higher education.

Having commented the above we should then proceed to the presentation of the Greek system of education. Particular attention will be given to post-secondary education, the main topic of this research, and especially on issues associated with the evolution of the flow of students, the planning and admission policies, as well as finance and cost issues pertaining that level of education.

Next, we are going to examine the demographic aspect of educational development by studying official census data. That is, we are going to give the magnitude of the population growth, followed by an examination of its distribution by region. Then, given the developments in the flow of students and graduates in the school system, as these were briefly depicted in terms of enrolments ratios above, we are going to examine any reflections in the changing profile of the level of educational attainment of the population.

Finally, we are going to present the current relevant economics of education literature in Greece, so as to form an overall picture of the Greek context.

2.1 THE GREEK EDUCATIONAL SYSTEM

Before we can look at the implications of different economic models of return to education, we must first have a clear understanding of the stages of education in Greece. Education is provided on three levels:

(i) Primary education -- including nursery and primary schools;

(ii) Secondary education -- including lower (GYMNASIUM) and upper (LYCEUM) cycles; and

(iii) Tertiary education -- which encompasses university-level (AEI) and non-university technological education (TEI).

Compulsory education lasts for 9 years, that is 6 years at the primary school and 3 years at the GYMNASIUM.

The available statistics are, in general, quantitative rather than qualitative which is good for model building. Therefore, the implementation of an input-output model is quite a common practice. In most of the instances though, data are somewhat old - especially for tertiary education - and they are spread-out in many sources. For example, the most recent "Statistics of Education" published by the NSSG refer to the academic year 1980/81. Finally, one great disadvantage of the published data on education is that it does not include any figures on the finance of the educational system.

2.1.1 Primary Education

The nursery schools (NEPIAGOGIA) are either separate institutions or incorporated in child centres. Nursery education lasts for two years. The enrolment of infants is subject to their reaching the age of 3.5 years not later than 1 October of the first year of attendance.

Attendance at primary school is compulsory and lasts for six years. The enrolment of children is subject to their reaching the age of 5.5 years by 1 October of the first year of attendance. Upward progression to the next class is automatic at the end of each school year. Text books are provided free. Transfer to the lower secondary education cycle is also

automatic, depending on satisfactory completion of primary school studies.

The pupil-teacher ratio for this level of education improved considerably for all schools between 1975 and 1984, and current statistics show this trend continues. Nevertheless, the statistic of 23 pupils per teacher for 1984 ranks high among other EEC countries with the exception of Spain and Ireland (see Appendix Table A-1).

Appendix Table A-1 also shows that there is 8 per cent decrease of the number of schools during the same decade accompanied by a 5 per cent decrease in the number of primary pupils enrolled.

2.1.2 Secondary Education

Lower secondary schools fall into two categories: daytime and evening GYMNASIUM. The latter operate for the benefit of persons in employment who are 14 years of age and over. Attendance at the GYMNASIUM lasts for three years and is compulsory. The transition from the one grade to the next is nearly perfectly elastic, that is no examinations are involved throughout for assessment. Graduating pupils are awarded a GYMNASIUM leaving certificate.

Schools for upper secondary education fall into the following types: general, classical, technical/vocational, and the relatively new comprehensive LYCEUM. The upper secondary cycle lasts for three years and each year is divided into 3 trimesters. At general LYCEUM -- which form the vast majority of this category -- pupils in classes 1 and 2 are taught a common

core of subjects, while pupils in the final year (class 3) receive additional tuition in the subjects of one of five option streams "which are designed to prepare them for entry to specific areas of study at university-level or non-university tertiary institutions" (Commission of the European Communities, 1986). For a more detailed presentation on the matter, see later Section 2.2.3.

There are a few classical LYCEUM nation-wide and they are similar to the general ones. Their only difference lies in the additional emphasis they put on the teaching of the ancient Greek language, literature and Latin. Graduates of the classical LYCEUM can enter for university studies only in the classical, pedagogical and social sciences fields.

The technical/vocational LYCEUM combine general education with vocational training. Their pupils have the opportunity to acquire a diploma equipping them to carry out a profession immediately on graduating, or a leaving certificate (APOLYTERION) leading to tertiary-level education.

Finally, the comprehensive (POLYCLADICA) upper secondary schools started operating since 1984/85 school year and are gradually expanding over the main cities of the country. The branches of study they offer prepare the pupils either to continue studies at the tertiary level, or to carry out a profession, or to acquire a specialisation after study at a specialisation department for LYCEUM certificate holders. During the first year of their operation there were 14 such schools in total with 4,458 pupils, while during 1986/87 became 22 having 15,565 pupils.

Table 2.1 shows that the number of the total pupils enrolled has followed a considerable increase of about 21 per cent between 1975 and 1984, elaborating on the three-year extension of compulsory education during the decade.

Table 2.1. Secondary Education in Greece by Type of School, 1975, 1980 and 1984

Type	Year	Teaching Staff (1)	Pupils Enrolled (2)	Pupil/ Teacher Ratio (2):(1)
Total	1975	...	661,796	...
			(43)	
	1980	39,571	740,058	19
		(49)	(46)	
	1984	48,217	802,817	17
		(53)	(48)	
General	1975	18,719	529,205	28
		(53)	(50)	
	1980	31,737	639,633	20
		(55)	(50)	
	1984	39,776	701,274	18
		(56)	(50)	
Vocational	1975	...	132,591	...
			(13)	
	1980	7,834	100,425	13
		(24)	(20)	
	1984	8,441	101,543	12
		(35)	(30)	

Source: UNESCO, 1988, Statistical Yearbook, Table 3.5 (first two columns)
Notes: (...) not available
numbers in parentheses refer to female percentages of the immediately above number

When looking separately between General and Technical-Vocational statistics (Table 2.1), it becomes evident that the vast majority of students prefer the traditional and more "prestigious" general than the less "prestigious" technical-vocational schools. In

addition, while the places are equally shared among males and females at the general stream, females are less likely to join the technical stream where subjects taught are more closely linked to professions traditionally followed by males. The same observation applies to the teaching staff.

Although the pupil-teacher ratio during the eighties has decreased by 2 students per teacher (see Table 2.1), elaborating on the intentions of the government policies towards improvement, the figure still levels high when compared with the respective of other EEC countries with the exception of Spain (see Appendix Table A-2).

In conclusion, the evidence shows that secondary, post-compulsory education, through the higher education entrance examination system, appears to simply serve as an intermediate stage before the tertiary cycle (for a more detailed presentation see later Section 2.2.3). If this is true, then there has to be a major redirection in the philosophy of the system towards the autonomy of this cycle of education. Of course, if the intention of the State is towards the "production" of promising graduates destined to study further at a higher education institution then there is little to be said. Otherwise, much more scepticism should be addressed about the role of secondary education as a whole. Its adequacy in coping and complying with the increased requirements of the world of work, in general, and the Greek labour market, in particular, should be globally re-examined.

2.2 THE DEMAND FOR TERTIARY EDUCATION

This section discusses issues connected with planning, admission-enrolment-supply of graduates, courses and academic staff in the institutions of higher education. Institutions for teacher training and post-secondary, non-university technical-vocational education are included here.

Tertiary or higher education in Greece is divided into two categories. They are, university education (known in Greece as ANOTATI PAEDIA) including universities and independent graduate schools (AEI) and further -- post-secondary, non-university -- education (known in Greece as ANOTERA PAEDIA) including Technical-Vocational education institutions (TEI). Institutions for teacher training have been recently abolished and upgraded into university faculties. The distinction between the two categories of tertiary education thereafter will be as university education (AEI) and non-university, post-secondary education (TEI); (for a description of the existing tertiary education institutions in Greece see Appendix A.1).

2.2.1 Courses Offered

I. University education (AEI) courses last a minimum of 4 years up to the first degree and is provided free of fees. Degree courses in technical and medical subjects take 5 to 6 years. Examinations are held twice a year, in June and October. If students fail in some subjects they may repeat the year. Law studies have maintained their traditional prestige and importance. Organised postgraduate courses are limited in the Faculties of Law, Science, Philosophy and Agriculture-Forestry at

the University of Thessaloniki; in the Faculty of Science at the University of Athens; and at the Graduate School of Economics and Business Sciences in Athens (for a discussion on the Greek case see Lambropoulos, 1990a). These courses are also free of fees and normally last 2 years. Candidates for postgraduate diplomas must have graduated successfully and must submit a thesis in Greek (for an explicit presentation on courses offered by Universities, see Appendix A.1 and for flow figures see later Section 2.2.4).

II. Post-secondary, non-university institutions (TEI) provide vocational education for technicians and middle-level management education for graduates of secondary education. That is, for persons to be in charge of plant, but take their orders from graduates of university-level schools. The applied sciences TEI graduates, would work in the plant itself and direct the work in accordance with the schedules and programming of the engineers. Their teaching programmes cover engineering, food and agricultural technology, business management, graphic arts, health services, social services, and librarian studies.

As a general rule for both university and non-university levels, there is no institutionalised provision for part-time education and short-courses for mature students who with their employers are, nevertheless, more aware about the usefulness of education in production than new school-leavers. This is mainly due to the nature of the higher education system itself where in many cases attending lectures is not compulsory. That leads to too much student absenteeism. Appendix Table A-3, presents results of a questionnaire addressed to some university

level institutions filled by the respective chair (that is, department) in 1977, on what percentage of the registered students actually attended lectures (see Psacharopoulos and Kazamias, 1985, Table 5.1). The results ranged from as much as 89% in Philosophy (Athens University) to a mere 10% attending Piraeus School of Industrial Studies.

2.2.2 Overview of Educational Policies

Universal education among the younger generations has been achieved since the 1920s. To-day the minimum school leaving age is 15 years and the mean educational achievement of those under 29 is 8 years of schooling (based on NSSG 1981 Population Census calculations).

Since 1922, primary and secondary education was provided free of fees in state schools. In 1964 the liberal centrist Prime Minister George Papandreou extended the free provision to all levels (Kazamias, 1967). Though, it was during the Military Dictatorship that some of G. Papandreou's policies were implemented. That is, students pay no fees at the tertiary level, textbooks are provided free since 1968, grants are made towards meals and accommodation, medical attention is free and there is no charges for equipment, as well as, the authorisation of the establishment of KATEE (Centres of Higher Technical Education) in 1973 -- later renamed to TEI -- under legislative decree 652/1970, the latter perceived to be an important innovation in educational policy in the post-war period.

The main reason for this change and the orientation of the higher education towards technical and vocational specialisations

was the attitude that the country lacks such types of education. It was then that Professor Zolotas identified the issue in one of his studies (see Zolotas, 1960). It should be noted that Zolotas' opinion could be the most appropriate with the data available during that period. In addition, it was considerably supported during the mid-sixties by the well-known "Mediterranean Regional Project" of the OECD (for the Greek reality see OECD, 1965a and 1965b, and Williams, 1965). The methodology of the above project was the Manpower Requirements Approach for the development of a country (for a presentation and discussion of the approach see Blaug, 1967, and, also, Armitage, 1971, Harbison and Myers, 1964, Parnes, 1962 and Psacharopoulos and Woodhall, 1985). The case was that Greece accepted both Zolotas' and OECD's views, that is the country should "produce" only those specialties which are needed for the future development and are defined from the future structure of production, and they are still evident until the present days.

Here, we should note that recent studies on the issue of the Manpower Requirements Approach internationally, have contributed substantially in assessing/challenging the credibility of the approach itself, but unfortunately, Greece has not taken seriously into account those studies yet. The vast majority of the researchers agree about the complete failure of the model in question and they argue that, if pursued, it could be catastrophic, as well as a deterrent for the development of a country. An illustrative example is the recent Tanzanian experience, where -- even if it was quite delayed -- they revised that educational planning methodology because of the deadlocks

the country was facing (for a discussion and analysis see Psacharopoulos and Loxley, 1985).

In the post-dictatorship Greece, the New Democracy government headed by C. Karamanlis has given top priority in a series of educational reforms promulgated in Law 309/1976 such as, the reorganisation of secondary education and its distinction into lower (GYMNASIUM) and upper (LYCEUM) 3-year cycles, de-emphasis of the dominant non-colloquial language (KATHAREVOUSA) and the use of DEMOTIKI throughout the school system, the abolition of the entrance examination to the lower secondary cycle, the abolition of lower technical schools and (by implication) the unification of the lower secondary cycle curriculum, the revision of the central and regional administration, and the extension of compulsory education (ROSLA) from 6 to 9 years, that is ages 6 to 15 (Psacharopoulos, 1982b).

Universities in Greece, by the time civilian rule was restored in 1974, are by constitution "self-administered" or have "legal independence", but are under the supervision of the State through the Athens-based Ministry of Education. In other words they are public establishments supported by the State and subject to public law. Their internal governance, the number of various ranks of the teaching staff and the terms of their appointment, the system of examinations (entrance, yearly and final) and grading, the method of distributing textbooks and other teaching materials to students, the student unions, the disciplinary codes as well as other issues, are all regulated by legislative decrees (ie. Law 815/1978 and Law 1268/1982) after proposals submitted by

the Universities.

When the Socialist Party (PASOK) won the 1981 elections headed by Andreas G. Papandreou new changes emerged in the area of Tertiary Education. One year afterwards and after several proposals and discussions between groups of the academic community and the Ministry of Education a Law-Framework (Law 1268/1982) was drafted, aiming "further democratisation and modernisation" of the Universities (for a presentation and discussion of some issues of the Law 1268/1982 see Appendix A.2).

We should also note that the system of higher education in Greece has traditionally been dominated by the centre (Karmas et al., 1988). The reforms, described above, have never challenged this dominance, but, contrary, they have augmented the centre's position (Saitis, 1988). This is not surprising for the Greek case, given that the system of higher education has been heavilly influenced by the nineteenth century Bavarian model (Mouzelis, 1978). Also, as argued before in the literature "most innovations outside the USA, especially in European universities, are stuctural, hard reforms...dominated by hallowed traditions" (Bereday, 1973, p. 104).

So the picture which emerges is that the provision of education has traditionally been void of economic efficiency considerations, irrespective of party politics. Finally, for reasons reflecting the enthusiasm of the restoration of democracy in 1974 and the 1964 reforms, the 1975 Constitution stipulates that private tertiary education would not be allowed (Article 16, paragraph 2 -- see Appendix A.3).

2.2.3 Admission Policies

Since 1959 admission to post-secondary education has been based on highly competitive entrance examinations which are open to all who have successfully completed any course of secondary education (LYCEUM). The Ministry of Education sets a quota system for places each year. This constitutes the main bottleneck of the whole educational system. The entrance examinations take place in the summer, following the secondary education qualifying examinations. This contrasts with the situation before 1959 when there was direct admission for all students who had successfully completed 8 years' of secondary education.

At this point, it is worth noting the existence of numerous "para-educational" institutes (cram schools, else known in Greece as FRONTISTIRIA) which intensively prepare the students for university entry. Those institutes absorb substantial amounts of the family expenditure, but they are considered as an unavoidable expense of any Greek family aspiring higher education for their offspring (for a discussion on the cost issue see later section 2.2.5). All in all, para-educational activities constitute the "Achilles heel" of the educational system because such institutes are not liable to official control and their expansion became immensely high during the recent years, especially after the recent reforms.

Given a possible failure of a student in entering a higher education institution, two possible scenarios exist. The first one is to try again in next year's examinations or to terminate his studies at this point and stay with the secondary education certificate. The second one is to continue his/her post-

secondary studies either abroad (for a detailed presentation see Chapter 7) or within the country at the well-known proprietary schools, depending on the ability of his/her family to bear the cost of such studies.

Given the above, it is quite evident that there has been and still is enough controversy in Greece regarding the post-secondary entrance examination system. Both students and parents and especially academics are not very happy with the existing system and there is always discussion towards change and improvement.

Continuing, there are a number of laws which, although they contradict the letter of the constitution, impose the wishes of the State upon Universities. With respect to entry to Universities, the latter inform annually the Ministry of Education what the size of the intake should be. However, the ultimate decision rests with the Ministry which has, traditionally, revised these suggestions upwards. The social demand for higher education is so much higher than the Universities' intended supply that, if left to the original suggestions, may prove costly to the Government on populist grounds.

Thus, the actual intake is usually 22,000 (1986) and estimated to be almost 45 per cent higher than the Universities' original targets. Rectors of Universities around Greece, admitted to the Greek newspaper AVGI (5/3/87) that "the academic year 1987/88 is considered as the most difficult of the last years both in terms of finance and number of students enrolled".

Table 2.2. Settlement Figures for First Year Entry in two Departments of the University of Thrace, 1986/87

Department of:	Electrical Engineering			Civil Engineering		
		a/	b/		a/	b/
First Proposal	50			90		
After Negotiation	80	60%		120	33%	
Ministry's Decision	150	200%	88%	250	178%	108%

Source: Newspaper AVGI, 5/3/87
Notes: a/ is deviation from First Proposal
b/ deviation from agreed number After Negotiation

Table 2.2 gives information on the settlement figures for first year entry in the departments of Electrical and Civil engineering of the University of Thrace. What is quite evident from this table, is the spectacular deviation percentages on both between (a) the proposed from the University number of intake and (b) the Ministry's actual decision, as well as, the negotiated and the actual figures. Thus, elaborating on the poor decision-making power of the Universities in Greece as opposed to the political leadership. Summarising, we could say that this is not the exact planning procedure one should expect.

In addition, a number of students are selected without sitting the national examinations under the so-called "beneficial provisions" (or "open windows" using the favourite Greek expression). Some examples on the elaboration of these special measures are given in Appendix A.4.

In addition, the problem of internal transfers is strongly associated with the above. In such a case, and for a variety of reasons, students registering to a domestic higher education institution are granted permission to register with another. The vast majority of students though from outside Athens ask for a

place to the capital area. This in turn results in the overcrowding and chaotic functioning of some Universities.

Table 2.3. Admission Figures to the First Year of the National Technical University (POLYTECHNEIO), 1983-86

Academic Year	1983/84	1984/85	1985/86
Admission after:			
(a) Examination	728	723	882
(b_1) Special	595	680	769
Excess (a):(b_2)	82%	94%	87%
(b_2) Internal Transfer	269	421	403
(b_2):(b_1) Ratio	45%	62%	52%

Source: Newspaper AVGI, 5/3/87
Notes: (a) : through passing the national general examinations
(b_1) : through beneficial provisions
(b_2) : through inter-university transfers

This is highlighted in Table 2.3, which presents admission figures to the first year of the National Technical University. Table 2.3 shows that only 50 to 60 per cent of those entered the most prestigious institution of higher education of the country come through internal transfers from other domestic Universities while the rest have been admitted through other channels of special provision of places.

Apart from the above micro-data, Table 2.4 offers data on the higher education entrance examinations nation-wide from a macro point of view, elaborating on the previous discussion. The data in question is quantitative rather than qualitative, that is refer to the number of students rather than their characteristics, but one could identify the major trends and weaknesses of the system.

Table 2.4. Higher Education Entrance Examinations Analysis, 1955-89

Year	Number of Candidates	Number of Success Univ.	Number of Success Total	Secondary Education Graduates	1st Year (Univ.) Total	1st Year (Univ.) First time
	...	...	...	18719	6946	5600
1956	...	...	...	20853	7088	5600
	...	...	...	19996	6866	5600
	...	...	...	20781	8575	7170
	...	...	...	17332	8886	7456
	...	...	...	18879	9688	8200
1961	28140	...	7965	22709	10543	7198
	30000	...	8560	24799	13587	11255
	34000	...	9360	28166	17470	13183
	38000	...	14015	32069	31435	23119
	40000	...	12663	34117	21221	15157
1966	41000	...	12335	35450	21000	14443
	43000	...	16398	36800	21000	18330
	44453	9191	11396	38150	21527	14651
	50865	9024	11324	39500	21282	14152
	53720	10651	13214	40835	21886	17044
1971	48017	10920	13344	44141	25486	19747
	48701	11913	14218	45807	25392	21375
	57331	13392	17588	49264	29985	26511
	68063	14475	18803	52189	37550	35212
	80417	14435	19691	64126	36548	32039
1976	83317	10870	18925	63995	34956	27080
	85220	12100	19162	65167	35211	28251
	87417	12715	21375	65105	38044	32371
	91580	12365	21075	56956	35419	32334
	84911	14200	24122	57830	37390	34304
1981	75206	14560	26754	...	21784	18796
	78708	16375	33235	...	25459	...
	110781	18920	41826	...	24323	...
	129374	22880	51114	...	30143	...
	149269	22930	51308	...	28978	...
1986	156289	22195	45752	...	...	...
1987	151129	24081	44290	...	...	...
1988	132727	23457	42769	...	...	...
1989	...	23432	42846	...	...	...

Source: Ministry of Education, Service of Entrance Examinations
NSSG, "Statistics of Education", (various years)
NSSG, "Statistical Yearbook", (1981-1985)

Note: (...) not available
Success Total, includes both university and non-university institutions

For example, one could easily observe from Table 2.4 that

the number of applicants exceeds by far the number of secondary school graduates. The primary explanation is closely related to the fact that students who were not successful before are retaking examinations. A small percentage of those who applied for a place did not sit the examinations. That supports and builds on the excess demand for post-secondary education.

One could also observe from the same Table 2.4 that success to University institutions follows an upward trend from 1968 until 1975, having an annual rate of growth ranging between 0 and 18 per cent. Then a deterioration of 25 per cent is observed for 1976, but thereafter the number grew steadily and from 10,870 in 1976 has reached 22,195 in 1986. This is an increase of more than 100%, or an 9.5% annual average percentage increase while the same statistic between 1968 and 1975 was only 7.1%.

The question to be asked here is, what was the reason for such an increase and how can it be justified. Was it because of the expansion of universities and the addition of new buildings? A possible answer is that only a small figure is in line with the previous explanation. The rest illustrates the impact of politics on education.

Moving to the figures available in Table 2.4 for those succeeding in both university and and non-university higher education institutions (that is, total success), an increasing pattern appears between 1961 and 1967. Then the number dropped by 30% and reached again its previous size five years later. Thereafter, the growth was constant and the figure doubled by 1982 reflecting the observed extremely high rates of increase of the 1980's. Between 1981 and 1985 the number doubled again,

reflecting the Socialist government's policy "Higher Education for all", which was not finally the case, considering the fact that the then concentration was lying heavily on non-university education, rather than university education as it was until 1980.

The above argument is justified on the grounds of analogies existing among individuals succeeding to university and non-university institutions. Considering the young nature of the technical-vocational post-secondary, non-university institutions (TEI) until 1977 the analogy was 3 to 7 TEI for each 10 students at university schools. Since 1977, there was a rapid expansion of the TEI and that is the reason that the analogy has turned in favour of non-university students, being 10:12.

Consequently, the question is whether it was in the intentions of the government to implement such a policy shift a priori, or whether the channelling of candidates towards TEI was based on such grounds so as to merely satisfy the already increasing demand for post-secondary education, given the overcrowded nature of the universities.

The fact of the decreasing nature of both university and total success figures during 1986 from the previous year by a modest 3.2% and a meaningful 10.8% respectively, despite a 4.7% increase in the number of candidates for the same year (see Table 2.4), supports the argument of overcrowding and its realisation from the decision-makers (Appendix Table A-4 presents the success rates for university and for all higher education institutions).

Let us now look at the figures of Table 2.4 on the stock of secondary school graduates and actual first year university

enrolments (distinguished in total and those who register for the first time). This is in conjunction with the previously discussed number of post-secondary education candidates and those who actually succeeded to university sitting the national examinations.

Solid data which will enable us to examine the above is given in Table 2.4 for the years 1968 to 1980. The following three points can be identified:

1. the number of secondary school graduates depicts an ascending pattern for the majority of the years with the exception of a 12% deterioration between 1978 and the following two years.

2. total first year university enrolments follow a similar pattern with a 7% decline in numbers between 1978 and 1979.

3. there is a sudden increase of first year students and those actually registered in the first year for the first time being 25% and 33% respectively in 1974 (that is, the first year after the restoration of civilian rule). The numbers then for those registered for the first time fluctuate between 35,000 and 27,000.

So far, enough has been said about the figures themselves. The story behind Table 2.4 though, is the identification of various phenomena. First, they show the excess difference between the number of candidates and the actual stock. Second, they give further detail on the remarkably high excess of those attending first year university and/or actually registered for the first time in the first year, as contrasted with those actually sitting and succeeding the national examinations, being almost half or less. Therefore, we can say that the picture emerging is strongly supporting on the one hand the issue of the extremely high social demand for education and on the other hand the mystery of the existence of various informal channels -- apart the formal national examinations -- for university entry.

Certainly, in the light of the above discussion and information provided, we could argue that given the quality of any system of education first depends upon the raw material that enters the system, if nearly one half of the university entrants belong to various groups, student selection defeats its purpose. That means that "if the less able are selected, the value added provided by higher education will be lower" -- equivalent to planting on arid land (Psacharopoulos, 1988, p.123).

2.2.4 Domestic Enrolment

The previous comments make evident that the demand for education exceeds by far its supply at tertiary level, despite the fact that in turn the actual supply by far exceeds the capability of domestic institutions.

Table 2.5 gives aggregate figures of student-teacher ratios by university institution between the mid- and late-seventies.

Table 2.5. University Level Student-Teacher Ratio by Type of Institution, 1976 and 1979

Institution	Students per Teacher	
	1976	1979
University of Athens	116	94
University of Thessaloniki	70	46
University of Ioannina	75	26
University of Thrace	-	28
University of Patras	-	35
Athens Technical University	48	48
Athens Business School	133	105
Athens School of Political Sciences	188	133
Piraeus Industrial Studies	271	164
Thessaloniki Industrial Studies	288	151

Source: 1976: Psacharopoulos and Kazamias, 1985, Table 5.2
1979: NSSG, Education Statistics 1979/80, Athens, 1983
Note: Teaching staff includes full and associate professors and lectures

There has been a spectacular improvement on the analogies of this popular educational quality statistic at the university level between the years 1976 and 1979 for different institutions. Although the changing nature of the analogy is quite evident in Table 2.5 during the 4-year period, it is also worthwhile noting that there are still "overcrowded" schools as far as the ratio of students to higher rank teachers is concerned. If there is no distinction between the ranks of teachers and low level teaching staff is also included in the calculations, then Greece appears to fare rather competitively when compared with other EEC countries, especially France, Italy and Spain at both the total higher and the university level classification (see Appendix Tables A-5 and A-6 respectively).

Table 2.6 shows that enrolment at domestic higher education institutions has been rising steadily during the past 3 decades. In detail, between 1956 and 1966 enrolment at university institutions have been almost quadrupled, bringing the figure from almost 17,000 to about 61,000 students. The following years do not show any spectacular development as such; the figure is growing by almost 50% between the mid-sixties and the mid-seventies, while there is a modest slow-down of about 10% during the 1979 to 1981 period, when the government decided to keep enrolment low. After 1981 there is an increase again -- the figure became about 111,000 in 1985 and 117,000 in 1986 -- reflecting only a small part of the pre-election campaign proclamations of the then newly elected PASOK government "higher education for all".

According to Table 2.6, the flow into the Technical-

Vocational tertiary education institutions presents a picture of rapid growth throughout the years.

Table 2.6. Higher Education Domestic Enrolment, 1956-86

Year	University (1)	Teacher Training (2)	Technical-Vocational (3)	Total Higher (1+2+3)
1956	16,866	2,625	---	19,491
	17,954	2,363	---	20,317
	21,971	2,366	---	24,337
	23,953	2,750	---	26,703
	25,658	2,644	---	28,302
1961	28,042	2,575	---	30,617
	31,995	3,437	---	35,432
	39,824	3,587	---	43,411
	49,532	3,773	---	53,305
	54,261	3,739	5,840	63,840
1966	60,624	3,967	5,615	70,206
	68,236	5,202	6,355	79,793
	71,259	3,637	8,810	83,706
	72,616	3,565	9,324	85,505
	72,269	3,929	9,578	85,776
1971	70,161	4,187	10,653	85,001
	76,035	4,279	10,995	91,309
	80,041	4,562	12,528	97,131
	92,920	4,839	13,682	111,441
	95,385	4,408	17,453	117,246
1976	95,017	3,587	24,229	122,833
	96,650	3,063	23,716	123,429
	95,899	4,426	25,919	126,244
	84,510	5,782	28,140	118,432
	85,718	6,588	28,810	121,116
1981	87,476	7,253	29,965	124,694
	94,876	8,975	33,611	137,462
	100,254	9,698	38,563	148,515
	111,446	9,000*/	45,000*/	165,446*/
	110,959	8,500*/	55,000*/	174,459*/
1986	117,470	7,000*/	64,100	188,570*/

Source: NSSG, Statistics of Education, various years
NSSG, Statistical Yearbook, various years
Note: (---) not applicable
*/ estimates

Their intake has been almost doubled during the sixties while it has tripled during the seventies, reflecting the operation of the

then newly established KATEE. These institutions, which have been renamed to TEI during the eighties, continue to show the same picture of rapid growth, acting in numerous cases as a substitute and trying to satisfy the excess demand for university education. As a result, the 30,000 TEI student population of 1981 became 64,000 in 1986.

In addition, if we want to look at the student population by field of study and by gender, it is worth noting that although in 1985 the total third level student population was almost equally shared between males and females, there is a difference in the fields of study they follow. This is shown clearly by Appendix Table A-7. For example, teacher training, humanities and fine arts appear to attract more females, while natural sciences, mathematics and engineering are clearly male dominated. The same observation is also applicable when looking at tertiary education graduates by field of study and gender (see Appendix Table A-8). We can also say though, if we combine the information provided by both tables A-7 and A-8 that for the mid-eighties the supply of graduates was about 17% as compared to the respective total student population. That means, that on average, it takes almost 6 years for a student to complete his higher education studies, which normally last for about 4 years, while the rest 2 years are taken as wastage.

2.2.5 Finance and Cost Issues

Expenditure on education in comparison to those on the other sectors of the economy indicates the State's intentions and priorities regarding the allocation of available funds. Besides, the disaggregation of a given education budget by level of

schooling embodies the relative priorities the State attaches to the different levels of education.

The criteria for judging the allocation effects of an educational budget are not easy to specify, but viewed ex post, a change over time in the allocation of funds to education versus other sectors of the economy -- comparison is usually made with defence and health -- can reveal a trend in the State's intentions and can be evaluated by external technical criteria. Likewise, education budget data cover only a small part of the true cost of education. On the one hand, there are many hidden costs which do not appear in the budget because the vast majority of schools are state-owned. Also, the private expenditure on education does not appear either. The major part of the time social cost of education -- the forgone earnings of students while at school -- has to be assessed by alternative methods. On the other hand, the current expenditure part of the state budget is a unique source of information on the amount of money required to keep the schools running and subsequently maintain the quality of instruction they provide. And the capital account part of the budget shows the extra effort put by the State to expand the physical capital formation in the school sector of the economy.

The comparison of the relative weight of education in total public expenditure with the overall distribution of public current expenditure among defence and health and welfare expenses in the post-war period suggests, apparently, a low percentage allocated to education (see Appendix Table A-9). A critical comment is that it is generally low and only rarely has been over

15%. It generally ranks higher than health and welfare expenses but fares far lower than the excessive defence expenses. Overall, the State does not appear to have allocated more relative importance to education in its budgeting.

The share of education to the GNP of the country is also extremely low throughout the 1960 to 1984 period. It has been stable around 2.0 to 2.5 per cent (see Appendix Table A-9). The level is low compared with all EEC countries for the mid-eighties (see Appendix Table A-10). Only Spain and Greece have a figure of less than 4.6% which is the EEC minimum.

Appendix Table A-11 shows the share of the public budget that was allocated to education for the years 1961-1984. Before proceeding to the actual interpretation of the figures, it is worth noting that other sectors of the economy apart from education compete for the same funds and also that different countries have different priorities as far as public spending is concerned. However, this statement, besides its validity, by no means relaxes the fact of the observed "low" side of the education share in the Greek budget. The upward trend of the statistic detected for the seventies is followed by a clear downward trend for the recent years. In other words, the share of public expenditure in the budget has remained practically stable at 8 to 9 per cent for the last two decades, having only some exceptions over 10 per cent. Although, as it has already pointed out, international comparison logic have to be treated cautiously, the figure again fares low as compared to the rest of the EEC countries for 1984 (see Appendix Table A-10) and is about of the same order with the one for Portugal, Ireland and Germany, the

rest being well above 11 per cent (with the exception of Italy being 9.6%).

A much better criterion for assessing the educational budget is the internal allocation of funds to the different levels of education, where each one has its own priorities relative to the rest. Table 2.7 presents this internal allocation of funds in Greece between 1961-1985.

Table 2.7. State Budget: Educational Expenditure by Level, 1961-85, (%)

Year	University	Non-Univ.	Secondary	Primary	Total	Total in million Drs.
1961	6.8	...	21.7	71.5	100.0	1,252
	7.0	...	22.9	70.1	100.0	1,370
	7.9	...	23.6	68.5	100.0	1,521
	12.7	...	23.7	63.6	100.0	2,272
1965	13.2	...	25.3	61.5	100.0	2,547
	15.6	...	25.4	59.0	100.0	2,988
	14.2	...	27.3	58.5	100.0	3,611
	13.9	...	28.3	57.8	100.0	3,937
	14.0	...	28.5	57.5	100.0	4,027
1970	14.7	...	27.7	57.6	100.0	3,883
	14.3	1.0	25.7	59.0	100.0	4,428
	12.8	1.6	28.1	57.5	100.0	5,156
	14.8	1.9	27.3	56.0	100.0	5,913
	19.5	1.8	26.7	52.0	100.0	8,581
1975	22.1	2.8	27.7	47.4	100.0	10,591
	22.8	3.7	25.9	47.6	100.0	12,156
	23.4	3.3	28.3	45.0	100.0	15,455
	17.2	2.4	34.4	46.0	100.0	28,131
	12.4	2.3	37.3	48.0	100.0	33,936
1980	14.9	3.1	36.9	45.1	100.0	41,584
	16.7	3.3	38.2	41.8	100.0	53,709
	17.0	3.2	38.6	41.2	100.0	72,173
	16.1	3.0	40.8	40.1	100.0	85,381
	16.8	3.6	40.4	39.2	100.0	107,514
1985	18.3	4.4	42.3	35.0	100.0	...

Source: Pesmazoglou, 1987, Table 4, p. 84
Note: (...) not available

The emerging message is that the pattern over time is quite mixed

and there is a gradual decline in primary education as more funds are devoted to post-compulsory levels. Also, as shown in Table 2.7, the share of secondary education has increased steadily in the post-1974 period and currently levels equally with primary education and amounts to about 40% (for 1984) of the state budget, while for 1985 is estimated to have surpassed primary education allocation share.

As far as higher education is concerned, there has been a substantial slow-down of the growth rate of its share during the late seventies, but it clearly became more important during the eighties by following faster rhythms of growth (see Table 2.7). The relative importance of higher education in Greece, as evidenced by the substantial shift of funds especially from primary education, resulted to a better impression when compared to the rest of the EEC countries (see Appendix Table A-10), where the EEC minimum now, referring solely to higher education, is about 10% (for Italy) and the maximum about 27% (for the Netherlands). All in all, whether this trend in the allocation of funds is in the "right" direction is a matter of a finer breakdown of where the resources are or will be devoted.

To this point we have examined and reported State-related expenditure on education, in general, and higher education, in particular. Though, in the economics of education context, one of the most important aspects of the finance of education is the one related to cost issues. It should be noted that a major distinction of the cost of education is into social and private. Also, we account for direct and indirect cost for both the individual and the society (see for example Vaizey, 1958 and

Blaug, 1970). When referring to the direct social cost we mean the direct public expenditure as it has been already portrayed so far. The direct private cost refers to expenditure borne by the individual for the sole purpose of his/her education (e.g. school fees, tutoring fees, book purchases, transportation, rent, and other miscellaneous expenditure). The indirect social cost is defined as the output of an individual which is forgone by the society while he/she is educated beyond the compulsory point. Following the same rationale the indirect private cost (or opportunity cost) is expressed as the earnings the individual would have received had he been employed while undertaking education or the so-called "forgone earnings". A final remark is that the indirect social cost is based on the forgone earnings of the individual before tax, while the indirect private cost relates to after tax earnings forgone.

Further to the above, the direct social and private cost will be presented and discussed, based on the available data. These costs will be adopted for the social rate of return calculation. The social direct cost is expressed as the average cost per student derived from the realisations of the public current expenditure. Table 2.8 depicts the average social cost per student of higher education -- in total and separately for the post-secondary, non-university education cycle -- in current prices. Undoubtedly, as shown by Table 2.8, the level of the average social cost remains quite high between 1970 and 1987 (even if is adjusted for inflation).

While higher education in Greece is predominantly a State

responsibility, as declared in article 16 of the 1975 constitution (see Section 2.2.3 and Appendix A.3), one should expect that the only cost involved is the one borne by the State. Nonetheless, both the huge flow of Greek students abroad -- and consequently the massive flow of exchange out of the country (see later Chapter 7) -- and the unknown, though considerably high, number of students at proprietary schools, which do not enjoy a university status in Greece, suggest otherwise. This is in addition to the high cost involved in attending domestic institutions apart from the earnings forgone by the students. All the above have considerable cost and equity implications for the Greek system of higher education.

Regarding data on the direct private cost of education at the higher level it is noted that it is extremely scanty and the only available sources are individual studies. One of the recent ones is made in 1987 by Papas and Psacharopoulos. It suggests that education in Greece is by no means free despite the proclamations of the State (op. cit., Table A-3). In detail, the average annual cost per university student (176,348 Drs.) was estimated to be about 20% and 37% less as compared to TEI (219,036 Drs.) and proprietary school (279,333 Drs.) students respectively. Additionally, it is evident that the direct private cost for TEI students, reported by Papas and Psacharopoulos, is 40% higher, for the year 1986, than the respective social cost appearing in Table 2.8. Finally, cram school fees in preparing youngsters to enter university represent one of the most significant direct household expenditures (134,209 Drs. overall).

Data on the average private cost (direct) per student abroad also appear revealing on Table 2.8. These data are derived from the total declared exchange for studies abroad over the corresponding number of students (for an explicit presentation of such data see Section 7.6). The credibility of the above data though is extensively discussed in Chapter 7 (Section 7.2). Papas and Psacharopoulos (op. cit.) reported a figure of the order of 890,417 Drs. for 1986, while the corresponding based on

Table 2.8. Average Cost per Higher Education Student, 1970-87 */

Year	Domestic Average Cost per Student		Average Cost per Student Studying Abroad
	Total Higher	Post-sec., non-univ.	
1970	13,846	---	38,458
1971	12,647	---	45,401
1972	15,553	---	46,655
1973	21,414	---	49,299
1974	26,800	...	61,105
1975	34,234	...	61,643
1976	39,060	60,970	66,714
1977	51,186	65,370	69,002
1978	59,333	56,590	75,591
1979	68,700	60,510	88,293
1980	73,844	62,200	109,908
1981	105,462	89,780	129,874
1982	127,287	95,380	181,779
1983	135,827	92,820	238,913
1984	181,756	133,500	275,902
1985	200,000 a/	150,900 a/	476,890
1986	...	133,620	606,534
1987	305,116 b/	209,189	614,900

Source: Domestic: 1970-1986, Ministry of Education
1987, Greek Newspaper TA NEA 25/11/87
Abroad: 1970-1987, Bank of Greece

Notes: (---) not applicable
(...) not available
*/ data refer to realisations of the Public Current Expenditure and is in current Drs.
a/ Ministry of Education estimates
b/ includes only AEI and TEI

the Bank of Greece summary data is by a third less, that is 606,534 Drs. as shown in Table 2.8. Therefore, it could be argued that the Bank of Greece data do underestimate the magnitude of the "real" expenditure. Although the data may be biased due to their grouped nature one could draw some interesting conclusions. In detail, when contrasted to the analogous social cost appears to be about double and for some years very close to it. That is a fact which reinforces the argument towards the "liberalisation" of higher education in Greece through the reform of the current legal status and the introduction of recognised private universities which in turn will absorb part of that cost.

2.2.6 The Excess Demand Phenomenon

What determines the excess demand for post-secondary education, in general, and university education, in particular, evidenced thus far? There is no single explanation of this phenomenon as it results from numerous economic and sociological factors. The main social and economic explanations will be outlined below.

The widespread belief that the inclination towards learning is a "characteristic of the Greeks from the educationally lower classes" does not offer a satisfactory explanation. The validity of this argument has been challenged in the past and it has been confirmed that such a tendency "cannot, of course, be attributed to any innate characteristic of the population". An interpretation "should be based on the study of the social and economic conditions which determine a large part of the thinking of each Greek" (Nassiakou, 1981, p.69).

In the context of the sociological approach, both social

reproduction (of mainly the public apparatus) and mobility issues are considered. As far as the former is concerned, the central hypothesis elaborated by Tsoucalas (1975 and 1977) is that higher education serves as a mechanism of social reproduction. The majority of higher education graduates are employed in the public sector (see below, Table 4.1), and demand for higher education is motivated by the students' desire to gain admittance into that sector. Therefore, higher education acts as a means of the reproduction of the public sector. The source of the belief that employment in the civil service could be provided for all university graduates goes back to the late nineteenth century. It was estimated that an overgrown public sector was larger in Greece than in much more developed nations. For example, in the 1970s, the number of civil servants per 10,000 population was seven times greater in Greece than in the United Kingdom (Dertilis, 1976, Table 14; cited in Mouzelis, 1986, p. 57).

Social mobility dimensions of the excess demand phenomenon are important, especially when considering the urban and agricultural workers. In this respect, Lambiri-Dimaki (1973) and Frangoudakis (1981) argue that "prestigious" university education is viewed as a valid ticket which, apart from the increased pecuniary benefits, leads to social recognition and the creation of the "elite". In addition, we should note that "social class discrimination", as has been discussed and demonstrated frequently in the literature, is very low in Greek higher education. For example, almost a third of all university students come from rural areas, despite the fact that the

majority of the population lives in urban centres (see below, Section 2.3.2). This representation is high as compared to many European countries (Lambiri-Dimaki, 1983, Mouzelis and Attalides, 1971, Tsoucalas, 1981); for example, Bordieu and Passeron (1977, p. 225) demonstrated that in France, with a population that was 60 per cent peasant and workers in the early 1960s, "only 15 per cent of the student population was of peasant or working class origin". This is particularly surprising for the case of Greece considering that attending tertiary education represents a significant part of the family expenditure as argued in Section 2.2.5 (see also Papas and Psacharopoulos, 1987).

A "good" higher education in Greece has historically been related with classical education, and, any other type -- as for example technical/vocational -- is considered as inferior; similarly, white-collar occupations are considered superior to blue-collar occupations (Kassotakis, 1981, p. 91). This type of thinking is left over from the times of the Bavarian influence in Greek higher education and is still evident today. To put it in Mouzelis' terms, "German idealism and legalism, have for decades been disorientating whole generations of Greek students" (Mouzelis, 1978, p. 73). This is, perhaps, the reason that post-secondary, non-university technical education is not demanded to the extent that university education is; thus it is not the first choice among secondary school graduates, and is viewed as the "poorest solution" (for evidence, see Section 2.2.4, Dragonas and Kostakis, 1986, Kassotakis, 1981, Kazamias, 1978, Papas and Psacharopoulos, 1987). This is also another reason aiding to explain, somehow, the excess demand phenomenon for university

education which could be attributed to the State's decision to systematically and consciously "channel" demand towards the post-secondary, non-university cycle, the Technical Education Institutions (TEI), (see Section 2.2.4). However, a large proportion of TEI graduates are taking advantage of their status and attempt to enter a university school under the various "special provisions" (see Section 2.2.3). In the meantime, a small but significant proportion of those who have failed to enter higher education institutions in Greece, and could afford it, have followed the solution of studying abroad (see below, Chapter 7).

In addition, the nature of the transition process from school to higher education contributes to the excess demand for that level (see Section 2.2.3). In other words, the Greek educational system, through the national general examinations, has created the present situation where the upper secondary diploma means only one thing in the minds of most students, aspiration for higher education. This is also strengthened by the fact that each year the number of higher education applicants exceeds significantly the respective number of secondary level graduates (see Table 2.4) because of the provisions of the system allowing students to rewrite examinations year after year. Also, the fact that the State sets quotas for entry into higher education (numerus clausus) corroborates the observed excess demand simply by limiting the supply, thus creating the impression that higher education is something to be sought after, even beyond the social optimum.

The economic approach, which is the heart of this study, assumes that prospective students act as rational investors. Based on this assumption, the various economic indicators -- and mainly the rate of return to the specific level and kind of education -- would be the determinants of the demand for further education. Therefore, one could say that a profitable return to investment in education, in general, and to higher education, in particular, will justify an incentive for demanding additional education. We are going to elaborate on this issue in Chapter 5, where we estimate the returns to education.

Further to the above, a rational economic explanation is associated with the perception which secondary school graduates have for the labour market. Secondary school seniors have been asked to indicate their expected salaries if they remained with a secondary school degree, and if they had a university degree. The availability of this type of information permits the estimation of an expected or, ex ante, rate of return to investment in university education. Table 5.16, below, shows that the expected rate of return, as perceived by the students, is unrealistically large for both 1974 and 1986. The above, in conjunction with the possibility that secondary school graduates are influenced by past trends, means that there may be some inertia signals acting as a "push factor" for further education, the demand for which is high and inelastic.

It could also be argued, based on the magnitude of employment of graduates in the public sector (see Table 4.1) and the belief that "guaranteed employment" is applicable for that sector (see above), that the demand for higher education is

driven by the "wrong" incentives and counterproductive criteria. The prospective investors (i.e. secondary school graduates) may be overestimating the public sector remuneration package (i.e. tenure, social security, job environment, automatic promotion, reduced responsibilities) in contrast with the more rewarding and productive, but antagonistic and "insecure", private sector of the economy.

The issue also has a graduate unemployment dimension. The negligible opportunity of securing "good" jobs has been well documented (see for example Gedeon and Psacharopoulos, 1979 and 1982, and for an explicit presentation of the graduate unemployment issue see Section 3.1.4 below). The fear of unemployment among Greek youth contributes to the demand for tertiary education because of the perception that a degree implies guaranteed employment in the public sector as argued above. This argument is factually depicted by official public sector employment data (see Table 4.1, and, Section 3.1.4) providing a rational explanation to the phenomenon.

A great part of the strong social demand for higher education in Greece must also be attributed to its low direct cost (that is, students pay no fees, see Section 2.2.5). Of course the individual student has to pay an indirect price in the form of zero or reduced earnings while studying. However, in periods of low employment prospects for secondary school leavers (see above), or when government-set criteria favour the hiring of higher education graduates, university study becomes cheap and investment in it can be carried out beyond the social optimum.

One should also consider job aspirations. A highly-paid position in the competitive sectors of the economy or with multinational corporations brings with it salaries that are far above the respective averages of the public sector. Furthermore, in view of the imminent European Integration of 1992, a large proportion of prospective higher education students may be considering the option of working abroad. It is therefore far more profitable for a student to be educated in Greece (low private cost) and increase his future earnings capacity by "migrating" abroad.

Finally, beyond the above explanations, we should not overlook the consumption aspect associated with a university education. That is, individuals may demand higher education for non-pecuniary reasons, contributing to the excess demand.

2.3 POPULATION CHARACTERISTICS

2.3.1 Population Growth

Population-wise, the combination of such events as the territorial expansion, the disastrous military events of the 1920's in Asia Minor, the rural-urban migration, as well as the significant educational expansion resulted in a drastic change in the size and composition of the Greek population in the present century.

In detail, according to the National Statistical Service of Greece (NSSG) the 753,000 total population of Greece in 1828 grew to 1 million by 1853, 1.5 million in 1890, 2.6 million in 1907, 5.0 million in 1920, 6.2 million in 1928, 7.6 million in 1951, 8.4 million in 1961, 8.8 million in 1971, 9.7 million in 1981 to an estimated size of nearly 10 million in 1988. Moreover, the percentage composition of the population in terms of gender is stable during the last three decades, that is males account for about 48% and females for 52%.

2.3.2 Distribution of Population

Greece has experienced intensive rural-urban migration during the last decades. A major reason for the above, among other, was the lack of adequate educational facilities in the villages and the fact that it is uneconomical to keep schools with very few students in remote areas of the country. The strong urbanisation movement, mainly towards the greater Athens region, and migration abroad have greatly influenced the distribution and structure of the population.

In particular, the population of the greater Athens area

grew rapidly from about 32,000 in 1848, to 180,000 in 1896, 803,000 in 1928, 1.4 million in 1951, 2.5 million in 1971 to a present estimate of over 3 million. This drastic shift of population with concentration in the Athens region is closely related to the increasing pressure for secondary education and the rising demand for higher education, as it will be shown in the next sections.

The picture for the distribution of population by region in 1920 was 62.0, 15.2 and 22.9 per cent, for rural, semi-urban and urban centres respectively. The urbanisation process started in the 1940's and was intensified in the decade 1961-71. As shown in Appendix Table A-13, according to the 1961 census, 42.2 per cent of the population was living in rural areas (less than 3,000 inhabitants), 12.9 per cent in small towns (3,000 inhabitants and over) and 44.8 per cent in large urban centres (10,000 inhabitants and over). By 1971 the situation changed towards the urban centres, where the distribution of population became 34.5, 11.5 and 54.0 per cent for rural, semi-urban and urban areas respectively. The same picture is presented for 1981 where the respective statistics are 30.6, 11.5 and 57.9 per cent, following the same order.

The major shift of the population distribution from rural to urban areas was accompanied (a) by a shift in the distribution of economically active population in the major sectors of the economy, (b) by an increase in the participation of women in the labour force and (c) by a decrease in the proportion of the economically active population in the urban, semi-urban and rural areas.

2.3.3 The Educational Level of the Population

Participation in education also increased dramatically during the last three decades. Greece is the country par excellence where changes in enrolments can be attributed mainly to all other factors except demographic changes. The level of education of the population has been improving steadily in both absolute and relative terms. More specifically:

As shown in Appendix Table A-12, the illiteracy rate for the population aged over 10 years was 17.8 per cent in 1961. Between 1960 and 1970 the absolute figure of illiteracy dropped by more than 20 percentage points. The 14.0 per cent illiteracy rate figure for 1971 jumped to 8.6 per cent in 1981. That was a spectacular change of about 40 per cent, and this percentage was evenly distributed in the male and female population of the country (see also Appendix Table A-12).

This change can be attributed to the increasing participation of youngsters in primary education, the changing role of women in the Greek society and to the natural decrease of the older generation which traditionally has had the lowest literacy rates. For example, 95 per cent of the illiterate population was over 30 years of age, 76 per cent was over 45 and 38 per cent is over 65 in 1971. Furthermore, according to the same Appendix Table A-12, if examined separately by gender, 21.3 per cent of the women and 6.2 per cent of the men were illiterates in 1971 where the respective statistics for 1981 were 13.4 and 3.6 per cent.

In addition, it should be mentioned that illiterates were mostly people in rural areas, the analogy being between rural,

semi-urban and urban areas in 1961, 1971 and 1981 respectively, as follows; 23.9:18.5:11.8, 21.3:15.5:8.9 and 14.4:10.1:5.2 (see Appendix Table A-13).

Finally, we should point out that the overall illiteracy rate is a grossly misleading statistic. As it has already been said, most of the illiterates were old-age persons in rural areas, mostly women. The long life expectancy in Greece (75 years) and low fertility rates (2.1) and the turbulent history of Modern Greece, especially the influx of 1.5 million refugees from Asia Minor in 1922 (accounting for almost 1/3 of the native population during that period) were mostly responsible for this anomaly (Mouzelis, 1978).

The decrease of illiterates indicates one aspect of the upgrading of educational level of the population which has taken place the last three decades. In particular, graduates of higher education have increased at an average annual rate of 5.5 per cent between 1961 and 1971 and by 9.4 per cent between 1971 and 1981. This has occurred mainly in the urban areas with the semi-urban following and has affected women more than men.

Graduates of secondary education have increased at an average annual rate of 4.5 and 4.1 per cent for the 1961-71 and 1971-81 periods respectively. Again, this primarily occurred in the urban areas and affected mostly women.

Overall, as shown in Table 2.9, the average years of schooling have increased by about 40 per cent for all regions and both sexes, between 1961 and 1981. Women were found to be 50 per cent better off, while men by about 30 per cent.

Table 2.9. The Educational Level of the Population, by Gender and Region, 1961-1981

Year		Population (000's)	Education Index per Person	
			Average Years of Schooling	Increase %
1961	Males	3314.2	5.8	---
	Females	3563.3	4.1	---
	Total	6877.5	5.0	---
1971	Males	3514.7	6.5	10.6
	Females	3753.5	5.0	20.5
	Total	7269.2	5.7	14.9
1981	Males	3995.6	7.5	15.8
	Females	4219.4	6.3	25.7
	Total	8215.0	6.9	20.4
1961	Urban	3083.0	6.2	---
	Semi-Urban	889.5	4.5	---
	Rural	2905.0	3.8	---
1971	Urban	3925.7	6.8	10.2
	Semi-Urban	835.8	5.1	12.2
	Rural	2507.7	4.2	10.2
1981	Urban	4754.9	7.9	16.1
	Semi-Urban	945.3	6.1	21.4
	Rural	2514.8	5.2	23.5

Source: NSSG, Population Censuses for 1961, 1971, and 1981 respectively
Note: (---) not applicable

In addition, according to Table 2.9, rural population shows an increase of the average years of schooling between 1961 and 1981 of more than 35 per cent, while the statistic is about the same for semi-urban and levels to about 30 percentage points for urban population.

Summarising Table 2.9, we could say that the higher average years of schooling in 1981 were those of the urban population (7.9) and of men (7.5), while the lower years of schooling were

those of the rural population (5.2) and of women (6.3).

Table 2.10. University Graduates by Field of Study, 1961, 1971 and 1981

Field of Study	Year	Greece Total	% of Total	Capital Area %
Graduates (Total)	1961	85603	100.0	59.9
	1971	150656	100.0	60.6
	1981	329489	100.0	56.4
A. Humanities	1961	9620	11.2	46.5
	1971	18372	12.2	50.4
	1981	44780	13.6	48.5
B. Art	1961	799	0.9	80.4
	1971	716	0.5	90.0
	1981	2454	0.7	73.2
C. Law & Social Sciences	1961	39041	45.6	78.1
	1971	59812	39.7	70.6
	1981	120622	36.6	66.0
D. Science	1961	7939	9.3	54.4
	1971	11364	7.5	54.1
	1981	30270	9.2	46.5
E. Technology	1961	7686	9.0	71.6
	1971	17000	11.3	68.5
	1981	39766	12.1	60.1
F. Medicine & Pharmacy	1961	15477	18.1	53.9
	1971	24024	15.9	55.9
	1981	46240	14.0	50.8
G. Agricultural Studies & Veterinary Sciences	1961	3690	4.3	25.7
	1971	5292	3.5	28.7
	1981	9032	2.7	27.3

Source: NSSG, Population Censuses for 1961, 1971, and 1981 respectively
Note: The excluded categories are Teacher Training, Military Academies, and other 'not specified field' graduates

Finally, if we look at the composition of the University graduates' stock by field of study during the past three decades as presented in Table 2.10, we can identify the following; first, Law & Social Sciences graduates have the lion's share

among all the rest (around 40%); second, Medicine & Pharmacy graduates constitute almost 15% of the total. Humanities graduates follow with a 14% share in 1981 and Technology graduates appear to be 12% for the same year, followed by Science graduates (9% representation); third, at the bottom of the distribution are the Agricultural Studies & Veterinary Sciences and Fine Arts graduates, having 3% and 1% representation respectively; fourth, the stock of all graduates is doubled or more than doubled between 1971 and 1981; last, more than 50% of the graduates in each category functions in the capital area (except those with Agricultural Studies & Veterinary Sciences degrees), highlighting the strong urbanisation effects of the 1950's and the high centralisation.

2.4 ECONOMICS OF EDUCATION IN GREECE

A quick review of the relevant literature on the Greek setting is revealing that little research exists on studies on the economics of education, rates of return to education, and similar topics. They are mainly limited in the works of (i) Professor Harvey Leibenstein (1964), (ii) the OECD, (a) in the context of the Mediterranean Regional Project (OECD, 1965a and 1965b, and Williams, 1965), and (b) the Individual Demand for Education programme (Soumelis, 1979 -- see also Psacharopoulos and Soumelis, 1979), and (iii) George Psacharopoulos and Andreas Kazamias (1985; see also Psacharopoulos, 1982a). Some other studies, on the planning and economic problems of education in Greece, do also exist (see for example Bowles, 1969 and 1971, Caramanis and Ioannides, 1980, Lambropoulos, 1985 and Pesmazoglou, 1987) and they will be presented as well. It should be also recorded that the original data of the above two principal research surveys (Leibenstein, op. cit.; and partly Psacharopoulos and Kazamias, op. cit.) were re-analysed in the context of Ph.D. theses. In detail, by Costas Kanellopoulos (1980) the former and by Alexios Pilavios (1980) part of the latter.

It is needless to say that the establishment of the Mediterranean Regional Project by the OECD was mainly attributed to what Marry Jean Bowman (1966) described as "the human investment revolution in economic thought" of the 1960s (see also Section 1.1.1). The main objective of the above project was to use education as a dynamic factor for the economic development of

a country adopting the Manpower Requirements Approach. The Greek application of the approach consisted mostly of manpower forecasts and educational policy discussions in the context of future needs and reforms (see OECD, 1965a and 1965b). The highlight of the study's findings was the one "urging" the country towards the importance of technical education for future development. The previous finding was in line with what Zolotas (1960) has suggested some years ago, and it was adopted by Greece (see Section 2.2.3). In addition, it is also worth recording that Williams (1965), in the context of the OECD activities, applied the Tinbergen model for Greece. His intention though was the investigation of the application of econometric models in education by utilising Greek data, rather than educational policy issues for the Greek educational system (see also Athanasiou, 1978). The highlight of the concluding points of his exercise was the identification of some kind of "overinvestment" in education in Greece. Summarising, it is worth noting that the philosophy of the internationally questionable credibility of the manpower requirements approach still continues to dominate planning activities in Greece and the need for a re-assessment of the approach itself is very evident for the modernisation of the Greek educational system.

It has been extensively discussed and presented in the literature that education contributes to the economic growth of a country (see for example Denison, 1967). Sources of growth in the Greek economy with particular reference to the role of education in affecting labour quality were first studied by Bowles (1971) for the decade 1951-1961, following the basic

methodological framework first expounded by Denison (op. cit.) and the approach proposed by himself (Bowles, 1969). Bowles, by using the KEPE-Leibenstein Survey, found that increased schooling contributed only to a small percentage of 2% to growth in the Greek setting and he explained his results as follows: first, the educational composition of the labour force did not change markedly over the decade in question (see also Bowles, 1967); second, with the exception of university education, the increase in productivity associated with additional years of schooling appeared to be small.

A similar approach was followed by Caramanis and Ioannides (1980) and in view of the availability of better data (the 1977 NSSG Labour Force Survey) the Bowles's 1951-1961 exercise was repeated for 1961-1971. The study was carried out in the context of the Third Educational Project (see Psacharopoulos and Kazamias, 1985). The main methodological differences between their approach and that of Bowles (1971) were that (a) the human capital characteristic age -- serving as a proxy for variable experience -- was added in the analysis, (b) annual data and growth rates were analysed, in place of Bowles's ten-year averages, and (c) the non-agricultural sector was examined separately, in addition to the entire economy. Their results present a somewhat low contribution of education, they highlight no substantial differences with the 1951-1961 results (ibid.), and the annual fluctuations are not considerable. In detail, "the contribution of education ranges from 3% to 5%, among the examined cases, for the entire economy, and falls to 1% to 2%,

when the agricultural sector is excluded" (Caramanis and Ioannides, op. cit., p. 153). Since the two economic growth studies are separated, datawise, by more than ten years the message is clear: "the returns to education are relatively small and perhaps declining" (op. cit., p.155).

Following the Bowles study and during the 1960s we have the first rate of return to investment in education in Greece study, which was conducted by Professor Harvey Leibenstein (1967) in collaboration with the Athens based Centre of Planning and Economic Research (KEPE) (for a description of the data set see Section 3.3). In brief, the study was based on a survey of large firms in the private sector in the Athens area and was conducted during 1960 and 1964, covering 2,820 observations. The methodology used was the Internal Rate of Return (IRR), involving net present values and the choice of an interest rate for the discounting (rates of 6 and 7% were chosen). A major finding of the study was that "the rates of return to a secondary education as terminal education are frequently close to zero or negative, at a zero growth rate" (Leibenstein, 1967, p.16). Another important result that was unambiguous had to do with technical education at the secondary school level. Leibenstein also notes that "if secondary general education does not pay then technical education of the type and under the conditions given in the past certainly does not pay" (op. cit., p. 24) which was contradictory with the Mediterranean Regional Project outcomes. The main points of his conclusions could be summarised as follows: (a) priority should be given to all educational activities except the secondary and university (excluding doctors, chemists and

engineers) education cycles; and (b) reallocation of the secondary education funds towards primary and non-university, post-secondary education. In addition, the relatively low rates of return lead Leibenstein to assume that the country may be "overeducated".

Further work utilising this data set was done by Kanellopoulos (1980 and 1982), and Psacharopoulos (1982a). In detail, Kanellopoulos identified the existence of "some kind" of sex discrimination in the Greek labour market, that is female employees are in a distinct disadvantage as compared to male employees. The three main reasons for the above observation were, "shorter seniority within the firm, short previous experience and unfavourable occupational distributions" (Kanellopoulos, 1982, p. 239). Additionally, differences in education were not found to account for any important part of the pay differential (ibid.). The analysis of the data set by Psacharopoulos (1982a), within the rate of return to investment in education context, produced a 9.2 and 8.6 per cent average rate of return under the Mincerian specification for the years 1960 and 1964 respectively (op. cit., p. 340). Also, under the step specification of the human capital earnings function the calculation of the private rate of return to higher education was made possible amounting to 15 and 14.4 per cent for 1960 and 1964 respectively (ibid.) and they ranked favourably as compared to those available for other countries during that period.

Psacharopoulos in one of his early papers (1970), by using shadow pricing, estimated shadow wage rates for different skill

levels of Greek labour for the period 1954-1965. Having done that, shadow rates of return to investment in education were calculated and they were compared to the actual rates of return. A major finding of the study highlighted that investment in skill levels requiring only primary education is more socially efficient than the higher skill levels, also suggesting that privately advantageous decisions in the human capital respect may be quite inefficient when assessed in social terms.

During 1977, in the context of the Third Educational Plan, the National Statistical Service of Greece (NSSG) directed under the supervision of George Psacharopoulos and Andreas Kazamias a nationally representative labour force survey, covering 8,756 observations in urban centres (for a detailed description see Section 4.1.1.1 and Psacharopoulos and Kazamias, 1985, also papers published utilising this data set, such as Psacharopoulos, 1982a, 1983a and 1983b). Psacharopoulos (1982a) reports the average rate of return to one extra year of schooling being 5.8 per cent and the rate of return to investment in higher education of the order of about 6.8 per cent (op. cit. p. 340; low rates of return to investment in higher education in Greece were also found by Lambropoulos, 1985, for the mid-1970s and the mid-1980s, calculated by the IRR approach, and utilising public sector payroll scales). The above rates of return permitted the comparison with those of earlier years and it was clear their declining pattern. In addition, he presented rates of return to education in Greece by detailed educational level and university faculty (the highest being Law with 13.8% and the lowest Philosophy with 0.0%). As far as the screening debate was

concerned, Psacharopoulos (1983a) found higher rates of return to schooling in the private rather than the public sector of the Greek economy. His verdict for 1977 was that the Greek data pointed against the screening hypothesis (op. cit., p. 128). Coming to the testing of sex discrimination hypotheses, Psacharopoulos (1983b) found that adjustment for years of schooling and occupational experience explained only 11 per cent of the gross annual earnings differential, the rest to be interpreted as an upper bound of the degree of sex discrimination.

In addition to a data base referring to the National and Commercial Banks of Greece employees, part of the NSSG, 1977 data set (public sector employees) was also analysed by Pilavios (1980), in an effort to assess the rationale for the high demand for post-secondary education given the declining and low rates reported so far. An interesting aspect of his analysis consists on the identification of the peculiarities of the Greek educational system which in turn lead Pilavios to hypothesise that it is theoretically possible for an individual to experience zero forgone earnings while at full employment after the completion of the secondary school cycle and parallel studying at the university (see also Section 2.2.3). The calculation method utilised in his analysis is the internal rate of return (IRR) one in the context of what Psacharopoulos (1981) describes as the "elaborate method". This method allows to take into account the amount of forgone earnings, as well as any other direct cost to education, as contrasted to the Mincerian specification for the

calculation of the rate of return to investment in education which assumes a priori zero forgone earnings (see also Section 1.2). Based on the previous advantage of the method, Pilavios experimented and recalculated the returns to education by assuming zero to four years of forgone earnings. When zero forgone earnings are considered the individual could theoretically experience infinite rates of return. Also, when four years of forgone earnings are accounted the returns are very low, but they rise instantly by the time fewer years of forgone earnings are assumed. Pilavios puts also a number of plausible explanations to justify his assumptions and concludes that the high demand for higher education by the Greeks is not due to income differentials, but state legislation that allows an individual to minimise the costs of that education.

It becomes clear therefore, that although investment in education appears to be non-profitable on economic grounds, the social demand especially for higher education was evident and increasing. Soumelis (1979), attempted to answer the puzzle in the context of the "Individual Demand for Post-Secondary Education" OECD study, where he was responsible for the Greek part. The data were collected through a questionnaire (OECD, 1976) administered to a national random stratified sample of 7,425 Greek pupils (about 7% of the eligible population) who were in the last two years of secondary school in Spring 1974. The series of questions asked raised information on a host of characteristics relating to pupils' plans for further education, family background, scholastic achievement and psychological (perception) factors.

The analysis of the plans of the pupils in deciding to continue or not for higher -- university -- education studies to the particular institution they aspired entry indicated the dominance of school grade as the key variable among others. Additionally, parents' education was found to be -- through an educational production function -- the main variable relating to scholastic achievement which in turn is giving a clue as to the process of transmission of educational aspirations. Namely, the more educated the parents are the more they push their children to obtain high grades, thus making it easier for them to continue into all forms of post-secondary education.

It is noteworthy, that similar conclusions were reached 10 years latter by Papas and Psacharopoulos (1987) when studying a significantly smaller sample of about 500 secondary school seniors in 12 high schools in the Athens area. Another key-factor found to be of significance in that study was the status of the school attended. In detail, the more selective the school, being either private or state, the higher the possibility in entering university. Such an identification creates further questions on the efficiency of the regular schools in Greece and the role of the selective schools in promoting inequality. What is of interest in the present study though, is the first-hand information on the cost of education that it provides. It is well known and extensively stated that education in Greece is free at all levels. The numbers, contrary to the proclamations, speak for a different pattern indiscriminately for all students and they indicate high costs for all levels (for a discussion on

the matter see Section 2.2.5).

Finally, Pesmazoglou (1987) contributed to the little literature existing on education and economy in Greece with a study aiming to examine in depth the traditional structures of the Greek economy and production, as well as the social implications associated with it. The study is dealing extensively with educational finance issues in a descriptive and enquiring rather than institutional Economics of Education framework. Particular attention is given also on the EEC context and the educational process in relation to all three sectors of economic activity. A central argument is the identification of a "crisis" in the system of education which is leading to a negative relationship between education and production, the vicious circle of underdevelopment and dependency. It was not in his intentions though, to offer any form of vital "prescriptions" in facing the problem, but he is rather dealing with the identification of the various phenomena. In addition, he argues that existing "models", as far as the planning of education is concerned, are neither adequate nor appropriate in approaching the core of the various issues associated with education and for that reason he puts a severe critique. However, he suggests an "ecumenical" approach of the educational sector, through considering seriously civilisation, tradition and distinct international developments. Eventually, the dominant feature of his research findings, in general, is the reproduction role of the educational mechanism, as this was studied extensively through the level, distribution and the allocation of the educational expenditure during the post-war period.

2.5 SUMMARY

There is little doubt that at present the supply of education in Greece is near-perfectly elastic for primary and secondary levels. Demand for education at these levels, as evidenced by enrolment ratios, is equally high (106 per cent and 88 per cent for primary and secondary levels, respectively, for 1984, see Sections 2.1.1 and 2.1.2).

However, with respect to post-secondary education, as evidenced in section 2.2.4, it appears that demand exceeds by far the availability of places. The enrolment ratio in the tertiary level is 24 per cent of the relative age group for 1984, although this grossly understates the true enrolment as it excludes Greek students studying abroad (the issue of the demand for study abroad is dealt with in Chapter 7). If Greek students studying abroad are included, then the ratio increases substantially (to more than 30 per cent) and compares favourably to Italy, Spain, France, Germany and the Netherlands (UNESCO, 1987, Tables 2.10 & 2.2).

In addition, as shown in Table 2.6, higher education enrolment grew by sevenfold between the early sixties and the mid-eighties (that is from about 30,000 to nearly 200,000 students -- excluding students abroad). During these years, the competition for entering into the university has been fierce. In the sixties and seventies, entry into the tertiary system as a whole never exceeded one third of the candidates. Entry to a university per se has been restricted to as low as 13 percent of those applying (see Table 2.4). Success rates to the tertiary

system as a whole have increased in the eighties as a result of a Government policy to defuse the demand for higher education by reorienting it towards 3-year Technological Institutes (see Appendix Table A-4).

Excess demand for higher education, and by extension the evolution in enrolments, resulted in the marked increase of the average years of schooling of the population (see Section 2.3.3). According to official census data we found that the educational status of the population has improved considerably, that is by 40 percentage points, between 1961 and 1981 (see Table 2.22). The most telling improvement, though, in the educational attainment of the population, has been the dramatic decrease of the illiterates during the same period, that is from about 18 per cent in 1961 to almost 8.5 per cent in 1981 (see Section 2.3.3). That was a result of the educational policies followed during that period (see Section 2.2.2) and the strong urbanisation movement of the 1950s and 1960s evidenced in Section 2.3.2.

Finally, as shown in Section 2.4, research on the economics of education is sparse in Greece. In Section 2.2.6, on the apparent social demand for higher education, we have given the explanations put forward for that phenomenon. In the context of the economic explanation, which is the heart of our study, one might expect that the returns to a higher education -- and especially a university degree -- in Greece would be extremely high. That is, if someone decides to spend four or five years of his/her life studying at the university, then that person anticipates to realise a significant return on the capital invested in education. Have Greek students and their families

been rational in seeking higher education based on the economic returns associated with this type of investment? To answer this, we should consider the benefits associated with higher education as they will be presented in Chapter 3 and 4 and analysed in detail in Chapter 5.

CHAPTER 3

THE LABOUR MARKET

So far we have concentrated on two issues; first, the explicit development of the Human Capital framework, and second an examination of the Greek setting from the educational point of view. We have also presented background information on the developments in population characteristics and studies which fall within the economics of education in Greece.

We will now look at three issues in the Greek labour market: the structure of employment, pay determination, and the structure of earnings, during the 1960-1987 period. Studying these three areas will enable us to form an overall picture of the economic aspect of employment in Greece during the period under consideration. This, in turn, in conjuction with the topics we have examined so far, will establish the background for the determination of earnings stucture which will be attempted in the following chapter.

The size of the overall labour force in Greece remained virtually stable between 1961 and 1985. Nevertheless, one would expect effects on the labour force, in general, and employment, in particular, stemming from the educational expansion demonstrated in Chapter 2. We would expect the quality of the labour force to improve even though the quantity has shown a relative stability over the period. Which sector of economic activity has been the prime beneficiary of such quality improvements, if any? What were the effects of such rapid

educational -- and particularly higher education -- expansion on graduate unemployment? Did pay policies in the public sector influence demand for post-compulsory education? Finally, how did the market respond -- in terms of earnings differentials among employees with different educational levels -- in such educational and pay policies?

3.1 THE STRUCTURE OF EMPLOYMENT

Table 3.1 gives statistics on the labour market characteristics among the EEC countries for the mid-1980s.

Table 3.1. Labour Market Characteristics, by Employee and Own-Account Workers, EEC Countries, mid-80s

Country	Year	Total Labour Force ('000s)	Employers & Own-Account Workers (%)	Employees (%)	Primary Sector (%)
Greece	1985	3,892.4	33.1	45.5	26.7
Portugal	1986	4,680.5	24.0	62.8	20.1
Italy	1986	23,617.0	21.4	62.9	9.5
Spain	1986	13,781.2	18.0	67.6	14.5
Ireland	1985	1,299.4	18.0	77.0	13.3
France	1985	23,618.6	14.2	75.6	6.7
Belgium	1985	4,202.2	12.1	71.8	2.5
U.K.	1986	27,452.0	9.6	78.7	2.2
Luxemburg	1981	153.8	9.4	85.1	4.9
Denmark	1985	2,753.0	9.3	87.9	6.4
Germany	1985	27,685.0	8.7	87.3	5.0
Netherlands	1985	5,765.0	8.0	79.2	4.7

Source: ILO, 1987, Yearbook of Labour Statistics, Table 2A

One of the immediately obvious characteristics is that the Grrek labour market is equally segmented and there is high proportionate representation of employers, self-employed and unpaid family workers in the total labour force. This is not new

for Greece. The Greek labour market has traditionally been "dominated by a large number of self-employed, a hypertrophy of agriculture and a high concentration of small-sized commercial undertakings, tourism and the building sector" (Skaliotis, 1987, p.11). As a matter of fact Greece has by far the lowest percentage of employees in the labour force among EEC countries. Table 3.1 shows that the corresponding ratio for Italy, Spain and Portugal is almost 50 per cent higher than that for Greece.

So far we have firmly established that the Greek economy, in general, and its labour market, in particular, are among the least typical developed, among European market economies. In addition, as we will see in Table 3.2 the issue of open unemployment has appeared forcefully into the arena during the 1980s. These findings set the tone for the rest of the analysis.

Trends in employment are equally illuminating. Employment in the primary sector, as this is depicted in Table 3.1, accounts for 26.7% (1985) of the total labour force and is still the highest among European market economies. Employment in manufacturing is predominantly in small firms. Many of those engaged in the industrial sector, as well as in services are self-employed (e.g. craftsmen, family workers, engineers, doctors, architects, lawyers, hotelliers and so on).

Table 3.2 presents employment statistics by sector in Greece for selected years, that is 1961 to 1985. These statistics correspond to the periods to which our estimates of rates of return to education relate, presented in Chapter 5.

We can identify the following patterns from Table 3.2 with

respect to the three main sectors of economic activity, namely primary, secondary and tertiary. In the first place, there was a dramatic decline in the importance of the primary (or agricultural) sector which was shared more or less equally by the pre-1970 and post-1970 periods. Secondly, the secondary (or industrial) sector benefited little from the release of labour from agriculture and only during the earlier period. We see that the share of industrial employment has remained stagnant at around 25-30 per cent since 1971. The prime beneficiary has been the tertiary (or services) sector, where employment has almost doubled. As we will see in Section 3.1.4, this is primarily due to Government policies especially with respect to graduate employment.

Table 3.2. Employment in Greece, 1961-1985 (%)

	Economically Active Population by Year			
Economic Sector	1961	1971	1981	1985
1. Primary	55.7	41.4	28.8	28.9
2. Secondary	19.8	27.0	30.9	27.4
3. Tertiary	24.5	31.6	40.3	43.7
A. Private	80.0	74.5	67.8	69.1
B. Public	20.0	25.5	32.2	30.9
All Sectors ('000s)	3,638.6	3,235.0	3,543.8	3,588.5
Unemployed	5.9	3.1	4.2	8.5

Source: NSSG, Population Census, 1961, 1971 & 1981
NSSG, 1986, 1985: Labour Force Survey, Athens
Notes: Private-Public Sector based on crude calculations

A crude disaggregation of the data into private and public sector employment illustrates a dramatic increase of those

employed in the public sector from the 1960s to the 1980s in both absolute and relative terms (Table 3.2). The small 2.5% increase in employment during the 1982-85 period is mainly due to the significant growth in female employment, mostly in the public sector as witnessed by both the labour force surveys and the national accounts demand components (showing a sharp growth in government consumption). A number of socially oriented criteria (age, number of dependent children etc.) applied to candidates for recruitment in the public sector and this explains to some extent the employment growth among females.

Table 3.3 presents statistics on employment by industry and status for 1985.

Table 3.3. Economically Active Population by Industry and Status, 1985 (%) */

Economic Sector	Employers	Self-Employed	Employees	Unpaid Family Workers
1. Primary	2.3	50.9	4.0	38.4
2. Secondary	8.2	16.8	71.3	3.7
3. Tertiary	4.8	23.7	65.5	6.0
A. Private	7.3	43.5	27.6	21.6
B. Public	0.0	0.0	100.0	0.0
All Sectors	5.0	30.9	49.3	14.7

Source: NSSG, 1986, 1985: Labour Force Survey, Athens
Note: */ refers to percentages of the respective row totals
Private-Public Sector based on crude calculations

The highest proportion of self-employed is observed in Agriculture, that is primary sector, (51%) while a massive 38% are classified as unpaid family workers. The share of both employees and employers in the same sector is almost negligible

(less than 5%). In Industry and Services, that is secondary and tertiary sector, respectively, employees form a substantial 71% and 66%, employers 8% and 5%, and self-employed 17% and 24%, respectively. The contribution of unpaid family workers in these sectors of the economy is very low, as compared to Agriculture.

3.1.1 The Educational Level of the Labour Force

We have already seen that the changes in the educational composition of the population (as witnessed in Section 2.3.3), resulting from the educational expansion, were significant. This, has affected the educational level of the economically active population, as well. These changes are depicted in Table 3.4, which gives the educational level of the economically active population, based on census data, for 1961, 1971, and 1981.

Table 3.4. The Educational Level of the Economically Active Population, 1961, 1971, 1981 (%)

Year	1961	1971	1981
Educational Level			
University Graduates	2.9	4.9	10.9
Secondary School Graduates	7.9	11.4	17.9
Primary School Graduates	47.2	53.3	54.8
All the Rest */	42.0	30.4	16.4
Total ('000s) **/	3,663,1	3,283,9	3,543,8

Source: NSSG, Population Censuses of the respective years
Note: */ refers to incomplete primary education or less
**/ The total of the economically active population is based on the 2% sample of 1961, 5% of 1971 and 10% of 1981 censuses

The largest section of the economically active population was primary school graduates, accounting for around half of the total, while secondary education graduates formed only 7.9% in

1961, 11.4% in 1971, and 17.9% in 1981 of the respective total population. The average annual rate of increase of secondary education graduates for the 1961-71 period was 2.7% and has more than doubled, that is to 6.3%, during the last decade. Although university graduates constituted only three, five, and a sizeable 11 per cent of the economically active population in 1961, 1971, and 1981, respectively, they have had the largest increase amongst all levels of education. Their average annual percentage rate was 3.9% between 1961 and 1971 and a spectacular 12.6% between 1971 and 1981.

Further to the above, when we disagreggate the economically active population by occupation and educational level (Appendix Table D-1), we can see that primary school graduates form the larger proportion of farmers, workers, workers in services and those occupied in commercial activities. Secondary school graduates fit largely in the section of clerical and office workers, while finally, graduates of higher education institutions constitute the larger proportion of professional, technical, administrative and managerial occupations.

A more detailed presentation of the educational composition of the labour force appears in Table 3.5. The table shows clearly how the labour force changed in its educational composition during the last quarter century. In detail, average years of schooling show a fast-growing pattern between 1961 and 1971 (35% improvement from 1961) and a spectacular 85% between 1971 and the eighties. That is explained (a) by the dramatic decrease of the proportion of illiterates -- from 42% in 1961 to an impressive record-low 3.9% in 1981 -- and (b) by the

Table 3.5. The Educational Composition of the Labour Force, 1961, 1971, 1981 (%)

Educational Level	1961	1971	1981
Full Higher	2.9	4.9	11.3
Full Secondary	2.8	4.6	15.1
Part Secondary	5.1	6.8	12.8
Full Primary	17.4	24.0	44.5
Part Primary	29.8	29.2	12.5
Illiterates	42.0	30.4	3.9
Total Labour Force in ('000s)	3663.0	3284.0	3570.0
Average Years of Schooling	3.2	4.3	7.9

Source: NSSG, 1976 & 1986, Statistical Yearbook
Note: Members of the labour force with incomplete tertiary education are included in the complete secondary education category

expansion of the share of workers with additional formal schooling. The present structure of the labour force (1981) mainly consists of persons with elementary education (45%), a significant proportion (15%) have completed secondary education and those with university degree or equivalent represent some 11% of the total labour force. The target group for most of the current training schemes is the secondary education youngsters who represent about 38% of the total number of the unemployed.

Table 3.6 gives the educational composition of the labour force by sector of economic activity for 1985. The table shows that the vast majority of those involved in agriculture for 1985 are primary education graduates (68%) followed by those with incomplete primary education (19%) and illiterates (6.6%). That

Table 3.6. The Educational Composition of the Labour Force According to Sector of Economic Activity, 1985 (%)

Economic Sector	Agriculture	Industry	Services	Services (Disaggregated)			
Educational Level				Commerce	Transport & Communic.	Banking & Insurances	Other Services
Full Higher	0.3	3.2	19.8	4.7	4.4	44.1	34.7
Part Higher	0.0	0.4	1.2	1.1	0.8	2.9	1.1
Full Secondary	2.6	16.8	31.1	28.5	32.4	43.4	30.2
Part Secondary	3.4	9.6	7.3	9.5	9.3	3.0	5.3
Full Primary	67.7	62.9	35.3	48.3	48.5	5.7	24.3
Part Primary	19.4	5.9	4.3	6.5	3.9	0.8	3.3
Illiterates	6.6	1.2	1.0	1.4	0.7	0.1	1.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Employed: ('000s)	1036.9	981.8	1568.9	570.9	249.5	132.6	615.9
As % of the Total L.F.	28.9	27.4	43.7	36.4	15.9	8.5	32.2
Average Years of Schooling	5.3	7.4	10.0	8.3	8.6	13.3	11.4

Source: NSSG, 1986, Labour Force Statistics, Table 9, pp.56-57

results to their 5.3 average years of schooling, which is some 1/3 lower than the respective for the total labour force. Again, from Table 3.6, we can see that primary school graduates form about 63% of the industrial sector employment, but then a sizeable proportion (17%) has completed secondary education. As a result, industrial workers have, on average, two more years of schooling compared with their counterparts in agriculture (that is, 7.4 years). The workers with the highest educational qualifications appear, as expected, in the services sector where the vast majority of those with university or equivalent degrees are involved, boosting the average years of schooling to 10. This

figure is almost double than the respective figure in agriculture.

Services activities are disaggregated further, in Table 3.6, by commerce, transport and communications, banking and insurances, and other. These activities form 37%, 16%, 9%, and 32% of the broader Services category, respectively. In detail, we observe a similar pattern for those in commerce and transport, where almost one half have elementary schooling, one third secondary, and less than five per cent tertiary education qualifications. The picture is totally different/reversed for those involved in banking and other services where the proportion of higher education degree holders is substantial and has surpassed all the other categories. That is, the composition of those persons belonging in the other services category presents a somehow equally segmented pattern between the three main educational levels, accounting for 11.4 average years of schooling. As far as those in the banking & insurances sector are concerned, they are equally segmented between higher and secondary education graduates only, explaining the quite high 13.3 average years of schooling observed.

It is clear, therefore, from Table 3.6 that persons with the highest educational credentials in the labour market, seek employment in the services sector, in general, and the banking and public sectors, in particular. This is , especially after the unprecedented expansion of the government sector during the last decade, acting as buffer for graduate employment.

3.1.2 Unemployment

Unemployment is a major characteristic of the functioning of the labour market, with significant socio-economic aspects. In Greece, however, it is argued that the "true" effects of unemployment have been of less importance, when contrasted with other European countries, due to the fact that, to a great extent, the unemployed are supported by other family members and relatives (Skaliotis, 1987). Moreover, the structure of employment itself did prevent a further expansion of unemployment, in the sense that self-employment and family work (dominating in Greece as we saw in the previous Section 3.1) may easily be transformed into underemployment during the recession. This means that, they can simply work fewer hours while paid employees lose their jobs (op.cit.; also, for a presentation of the 'Job Search Model' see Pissarides, 1985).

In numerical terms, however, the problem of unemployment has been particularly acute in urban centres, as well as young people, in general, and women, in particular. The overall youth unemployment rate reached 24% in 1985, while it was almost 32% for young females aged 14-24; the overall share of young persons among the unemployed was about 43%. These rates clearly indicate that barriers exist in the transition from school to working life. One should not forget that the two years of compulsory national service conceal youth unemployment among males; this is a case of "disguised unemployment".

Table 3.7 gives the educational composition of the unemployed for 1985. It shows that the unemployment rate was about 8.5% in 1985, while 53% of those unemployed were women.

Table 3.7. The Educational Composition of the Unemployed, 1985 (%)

Educational Level	A. Unemployed (Total)			B. First-Job Seekers		
	Both	Males	Females	Both	Males	Females
Full Higher	7.6	6.7	8.3	11.3	12.8	10.5
Part Higher	3.7	3.3	4.0	6.8	7.8	6.3
Full Secondary	37.9	30.2	44.7	49.4	47.7	50.3
Part Secondary	11.2	13.0	9.5	11.8	15.5	9.9
Full Primary	34.6	41.6	28.8	19.2	16.2	20.7
Part Primary	3.8	4.1	3.5	1.1	0.0	1.8
Illiterates	1.2	1.1	1.2	0.4	0.0	0.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
Total Unemployed ('000s)	305.0	143.0	162.0	122.0	41.0	81.0
Total Labour Force ('000s)	3590.0	2370.0	1220.0	3590.0	2370.0	1220.0
Average Years of Schooling	9.5	9.0	9.9	10.9	11.2	10.8

Source: NSSG, 1986, Labour Force Statistics, Tables 17 and 20

The unemployment rate for the male labour force was six per cent but double that for females. The share of "first-job seekers" in the unemployment figures was continuously increasing. Table 3.7 suggests also that by 1985 they had reached 40% and the majority of those (66%) were women. The rest (44%) of the unemployed were classified as "job losers/leavers" and the 16% as "re-entrants" to the labour force.

3.1.3 The Educational Level of the Unemployed

When looking at the educational level of the unemployed we can identify the following. Table 3.7 shows that the unemployed are persons with high average years of schooling. That is, 9.5 years on average for 1985, which is 25 per cent more than the

respective average of the labour force for 1981 appearing in Table 3.5. About one half of the unemployed have had full or part secondary education, while more than one third have completed elementary education and a sizeable proportion, of about 11%, enjoyed full or part university education. Table 3.7 also shows that the share of those with no education at all is very low, that is 1.2%, which is also less than half as compared to the respective share in the total labour force. Women appear to have, in total, longer schooling, that is, almost an additional year compared to men.

The educational nature of those classified as "first-job seekers" presents a totally different pattern in contrast to the unemployed population as a whole. As evidenced from Table 3.7, first-job seekers are well-educated persons with almost 11 average years of schooling, where more than 60% have had full or part secondary education and only 20% elementary education. What is striking though is the extremely high proportion of those with some kind or completed university education, which account for about 18% of the total, as well as the incredibly low/negligible proportion of illiterates. In this case, unemployed men appear to have a relative advantage in the form of better qualifications than women (see Table 3.7).

3.1.4 Graduate Unemployment

Graduate unemployment has been rising steadily ever since it began in the early 1980s. This is illustrated through information available from two sources at our disposable. Those two sources are (a) the National Statistical Service of Greece

(NSSG) and (b) the Manpower Employment Agency (OAED). Both organisations collect detailed employment statistics but their methodology differs, in the sense that, the former administers questionnaires and, the latter keeps records of registered unemployed. That information is available from Tables 3.7, 3.8 and 3.9. A first look at these tables shows, although the sources are not absolutely comparable, the share in the unemployed of those with higher education qualifications has been rising in both absolute and relative terms.

Table 3.8. Registered Unemployed by Level of Education, 1978

Educational Level	Both Sexes	Males	Females
Full Higher	1,838 (1.8)	1,146 (1.8)	692 (1.8)
Full Secondary	19,519 (19.3)	10,851 (17.3)	8,668 (22.4)
Full Primary	74,646 (73.6)	48,902 (78.0)	25,744 (66.6)
Illiterates	5,360 (5.3)	1,798 (2.9)	3,562 (9.2)
Total	101,363 (100.0)	62,697 (100.0)	38,666 (100.0)

Source: OAED, 1979, Activity Report
Note: Numbers in parentheses are percentages referring to the respective column total

In detail, Table 3.8 suggests that graduates constituted 1.8% of those unemployed in 1978. However, as shown in Table 3.7 the same statistic became 7.6% for 1985. There are two interrelated reasons for this. First, the de-emphasis of education planners on planning, in general, and in the absence of any serious involvement of private sector employers, while the 1970s and

early 1980s were characterised by a massive expansion of tertiary education. And second, the rigid employment and wage policies in the public sector.

Table 3.9 presents, in detail, graduate unemployment statistics for 1987 by detailed level of higher education.

Table 3.9. Detailed Graduate (Un)employment Statistics, 1987 (2nd quarter)

Level and Type of Higher Education	Total Labour Force	Female Labour Force	Total Unempl. (%)	Female Unempl. (%)
Postgraduate	**15,516**	**2,790**	**2.6**	**2.4**
Foreign	12,931	2,450	2.6	2.8
Domestic	2,585	340	2.6	0.0
Undergraduate	**385,895**	**150,817**	**6.6**	**11.4**
Foreign	38,861	12,658	9.8	15.1
Domestic	278,364	102,770	6.1	10.8
Teacher Training	48,525	31,374	8.4	11.9
Military Academies	14,632	612	0.5	0.0
Higher Tech/Voc	**195,468**	**72,278**	**10.5**	**14.3**
KATEE	25,046	9,187	13.3	15.6
TEI	11,979	6,194	18.7	23.1
Other	158,443	56,897	9.4	13.2
Total Higher	**596,879**	**225,885**	**7.7**	**12.2**
Grand Total	3,883,609	1,394,192	7.4	7.4

Source: NSSG, 1988, Labour Force Survey, Table 5 (Unpublished)

The overall unemployment rate was 7.4%, while the respective rate among graduates was somehow higher, about 7.7%, for 1987. The lowest graduate unemployment rate was for those of Military Academies, that is less than half per cent, where employment is guaranteed immediately after graduation. Very low rates were also observed among Doctorate and Master's degree holders, being 2.6% or one third of the overall unemployment rate.

The figure in the table which refer to first university degree graduates, in general, is about seven per cent, which is almost one per cent below the average rate. In addition, it is evident that almost one out of ten foreign universities' first degree holders is unemployed (that is, unemployment rate 9.8%). The respective analogy for domestic graduates is significantly less (that is, 6.1%). The explanation may be the existing difficulties in recognising foreign degrees set by the Inter-university Centre for the Recognition of Foreign Degrees (DIKATSA). This is more relevant for employment in the public sector where a foreign university credentials have to be recognised by DIKATSA. The substantial supply of graduates from domestic tertiary institutions, as well as the potentially low quality of the foreign qualifications (e.g. from small "obscure" colleges, Romania and so on) of those unemployed could be some alternative explanations. Graduates of Teacher Training Academies appear to have a high percentage of unemployment, that is 8.4%, as compared to domestic university graduates. This rate could be misleading, though, because the vast majority of these unemployed graduates are women (92%) who have probably decided not to join the profession for various reasons, and who are in a waiting state for their appointment -- which takes a few years for state schools, where in the meanwhile men serve their national service -- or they may be in search for a job in a different field.

We could also use Table 3.9 to examine the post-secondary, non-university education graduates of the Technical Education Institutions (TEI and KATEE). Their unemployment problem seems

to be serious. Their unemployment rate is 10.5%, in total, which is almost the same for foreign degree holders. The rate escalates to 13.3% for the "old" KATEE graduates, but it is the "new" TEI graduates who suffer more, by reaching almost 19%, highlighting the "failure" of these institutions in the labour market, meaning that they do not "produce" the type of qualified manpower employers need.

In the case of women, figures from the same Table 3.9 suggest that they seem to find easier employment when holding a domestic postgraduate title. The rate is very low, about three per cent, for foreign postgraduate degree holders, who actually form the vast majority among the overall number of postgraduate degree holders in Greece. When moving to University level women graduates, it seems that there is a high unemployment problem, which becomes more critical in the case of foreign U/G degrees. The problem of graduate unemployment is more illustrative as far as post-secondary, non-university Technical and Vocational women graduates are concerned. In such a case we observe unemployment rates of about 15%, and a dramatic 23%, for those women graduated from the recently established TEI.

To conclude, the problem of graduate unemployment (a) is quite vivid nowadays in Greece; (b) varies substantially among different types of graduates, especially among post-secondary, non-university graduates; and (c) is more severe among women.

The rising unemployment among graduates could be attributed to (i) the slowdown of job generation due to recession; (ii) the increase in the local and overseas supply of graduates; (iii)

"mismatches" between training and requirements; and, (iv) lack of a proper mechanism to provide adequate labour market information to graduates. This is a more or less comprehensive list of reasons why graduate unemployment may take root and thrive in any economy. One has to bear in mind here that the first of the above reasons relates to ex post demand and supply which contribute in an "accounting" sense to the problem of graduate unemployment, if wages are not allowed to respond to the emerging conditions. This is the case in Greece today because of the duality in the labour market which has been created by some of the public sector policies. The third reason, "mismatches", is a crude and misleading way of summarising the lack of co-ordination between the education sector and employers and reflects the failure to invoke the private sector, directly or indirectly, in educational planning (through inflexible wage structures). The fourth reason (information) is a genuine reason which contributes to the creation of frictional unemployment and can be rectified relatively easily.

If the supply of qualified manpower is high and demand is low, then the natural way to reduce graduate unemployment is by reducing wage differentials. The gross overpayment of graduates does not help in this respect because it leads to the "diploma disease" and the "qualification escalation" syndromes common to most developing countries where salary structures are based on certification (see also Dore, 1976). This is a legitimate way, indeed, of tackling the problem. However, it is quite puzzling in the case of Greece where the salary structure has been totally changed during the socialist administration favouring those with

the least qualifications as we shall see in the discussion in the next Section (3.2). Nevertheless, the demand for higher education in Greece remains high and is increasing.

The relevance of these developments to education is that recruitment criteria may have changed significantly over time as the objectives of the public sector need not necessarily be the same as those of the private sector. The private sector relies more on actual performance and less on credentialism and pays more attention to individual effort and remuneration. Contrary to the above, the public sector is perhaps more sensitive to issues of aggregate employment and rigid pay scales. The changing emphasis from private to public employment should have affected the structure of wages in the Greek economy and we turn to the examination of the wage setting in the next Section (3.2).

3.2 PAY POLICIES

Employers and employees in Greece are extensively engaged in collective bargaining which is highly centralised (see Catephores and Tzannatos, 1986). The annual general national agreement for the private sector of industry is thought to cover about 25% of all paid employees.

The agreement is negotiated on the employers' side by the Confederation of Greek Industries (SEV), the Central Confederation of Artisans (GSEVE) and the three big cities' Commercial Employers' Associations (ESAPS). These three associations cover effectively all Greek employers. On the employee side, the far more important agent is the General Confederation of Greek Workers (GSEE) which represents around 400,000 employees of the 450,000 workers (around 30% of Greece's 1.5 million employees is unionised). Another reason for the importance of the GSEE is that it has significant power as a pressure group itself, compared with the rest of the unions (around 3,500 unions, of which many have as few as 20 or 30 members) (Tzannatos, 1987). It is noteworthy, that during the socialist administration GSEE was led by pro-governmental trade-unionists who, in line with the established practices by the conservatives, were also appointees. Union bargaining rights have de facto been given to GSEE for central level bargaining which almost exclusively determines national minimum pay and hours of work for manual and non-manual workers in the industrial sector. However, in so doing, the agreement also establishes a nation-wide minimum wage rate for employees in other areas of the

private sector.

The incomes policies undertaken by both the conservative and the socialist governments since 1975 fall into two categories. The first contains the norm-based policy of the 1975-81 period. The second contains the policy based on systems of indexation which were in operation throughout the period 1982-88. We could say that the incomes policies of both categories resulted in an increase of the labour share in the net domestic income, as well as the increase of real wages and salaries with faster pace than those of productivity (while profits and investment in the private sector were diminished). Their main objective was to restore the buying power of wage and salary earners which has deteriorated during the years of the military dictatorship (see Pavlopoulos, 1986 and, Ioannou, 1988).

3.2.1 Historic Review of Incomes Policies

There is no long tradition of wage setting through collective bargaining in Greece, as in most western industrial economies. Throughout the post-war period wage determination processes have been clearly dominated by: (a) the extensively used mechanism of compulsory arbitration, along with (b) the legal right of the Ministry of Labour to reject and modify any collective agreement or compulsory arbitration award if considered as not being in line with the governmental economic policy (direct State intervention).

Wage determination processes were abandoned after the restoration of an elected civilian government in 1974 and the right to collective bargaining was re-established. It has,

however, remained "bounded" by the continuously used mechanism of compulsory arbitration courts and this mechanism has in fact been under the control of the Ministry of Labour.

The informal processes of wage determination through extensive recourse to plant level strike activity were undertaken as a workers' response to high and rising rates of inflation, and as an effort to overcome the pay settlements of the official annual collective agreements, thus creating rather erratic wage rounds in the Greek scene. Later, in the 80s, under the influence of deteriorating conditions in the labour market, this informal system of collective bargaining became, to a certain extent, under restraint.

The period 1967-74

During the 1967-74 period, "all trade union activities had been suppressed by the military dictatorship, whereas at the same time capital owners received considerable government help" (Sarantis, 1982, p.292). No formal incomes policy was practised. Wages were set unilaterally by the military government, and the right to strike was suspended along with collective bargaining. Finally, the massive migration abroad during that period, while the level of unemployment was at its lowest level ever recorded in the post-war Greece, suggests that an "exit-voice" mechanism was in work.

The period 1975-81

As a result of these developments, "immediately after the fall of the military dictatorship in 1974, trade unions started demanding major pay rises in order to recapture part of the income losses they suffered in previous years. In order to improve partly this

imbalance in incomes, the civilian government agreed to a massive increase of minimum wages and salaries of approximately 70%. This was in addition of course to substantial pay rises at all levels in 1975, and to a complete equalisation of minimum wages with the corresponding salaries between men and women by 1978. This increase of minimum wages was spread over the period 1975-1978, taking place twice a year and shown in the figures of the second and third quarter of each year" (Sarantis, 1982, p. 293). In 1979, instead of the usual increase in two semestrial instalments, an increase of 15 per cent was granted from the beginning and for the whole year. Under conditions of accelerating inflation an identical incomes policy was adopted in 1980. The norm was set for a 15 per cent increase from the 15th February. As shown in Table 3.10 both years 1979 and 1980, lead to a further sharp reduction in real earnings.

Table 3.10. Relative Change of Wages, Lower Bounds, 1975-87

Year	Current Monthly	Constant Monthly
1975	...	...
1976	17.0	3.2
1977	15.0	2.6
1978	22.5	8.9
1979	15.0	-3.4
1980	18.7	-4.9
1981	32.6	6.5
1982	49.7	23.8
1983	19.9	-0.2
1984	21.0	2.2
1985	17.8	-1.3
1986	10.9	-9.8
1987	9.8	...

Source: National Collective Agreements, GSEE: Athens
Note: (...) not available

In 1981, year of elections, a threshold clause was included in this year's policy as the authorities announced that to maintain real incomes, there would be an additional increase towards the end of the year in case inflation were to exceed the 20 per cent forecast.

The period 1982-88

During this period, the socialist administration introduced the system of indexation. This was in order to offset the erosion of real earnings of employees suffered in the 1979-81 period, and to fulfil electoral pledges. This took place in 1982, for both the public and the private sector, through the so-called "Automatic Inflation Adjustment" (ATA). It is acting as a correction towards inflation trends and is reflecting the philosophy of the newly introduced incomes policy where the dependant variable is inflation leaving out productivity considerations.

This adjustment is a part of the earnings of the employee and it is given on top of the main salary of the employee, three times per year. The calculation of the ATA percentage to be allowed, from 1986 onwards, is based on predictions of the inflation (consumer prices rises) in the preceding four months. The distribution of this allowance is based on egalitarian criteria, thus decreasing proportionally favouring those with salaries belonging to the lower segmental bounds, totally ignoring the top earners.

In detail, this system of formal and partial indexation took effect in January 1982 with the first four-monthly adjustment due on 1st May. Full indexation was provided for average monthly earnings up to Dr.35.000. The band of earnings between Dr.35.000

and Dr.55.000 was indexed only to half of the consumer prices increase. The next band, between Dr.55.000 and Dr.80.000 was entitled a 25 per cent indexation, while no indexation was provided for the band of monthly earnings above Dr.80.000. Important amendments of the plateau and of the index used (ATA) for compensating inflation took place during 1984 and 1987. For an illustration of the adjustment through time and its distributional policy, see Tables 3.11 and 3.12.

Table 3.11. Egalitarian Effect of the Allowance of ATA

Section of ATA Allowed(%)	Earnings Plateau on which ATA allowance is based */		
	1/5/82-31/12/83	1/1/84-31/12/86	1/1/87-
100	-35,000	- 50,000	- 60,000
50	35,001-55,000	50,001- 75,000	60,001- 75,000
25	55,001-80,000	75,001-100,000	75,001-100,000
0	above 80,001	above 100,001	above 100,001

Source: Kioulafas, 1987, Table 2
Note: */ in Greek Drachmas

To summarise, "during this period of formal indexation policies clearly oriented in favour of the low paid labour force, negative productivity and unit labour costs developments obliged the authorities to impose two short term wage freezes (see Table 3.10) and then to modify the indexation scheme and impose it through statutory regulation. While claiming of being protecting real wages mainly of the low paid, the indexation incomes policies had to recourse to direct intervention in wage determination. Nevertheless collective bargaining was taking place through the formal system, at least when there was no incomes policy made compulsory by law, and through the informal

as well, while the latter was under restraint by unfavourable developments in the labour market" (Ioannou, 1989).

Table 3.12. Development of the Inflation Adjustment (ATA)

Period for which allowed	Percentage Increment
1/5/82 to 31/08/82	7.3
1/9/82 to 31/12/82	2.0
1/1/83 to 31/08/83	8.8
1/9/83 to 31/12/83	10.2
1/1/84 to 30/04/84	8.9
1/5/84 to 31/08/84	6.9
1/9/84 to 31/12/84	2.2
1/1/85 to 30/04/85	8.2
1/5/85 to 31/08/85	6.6
1/9/85 to 31/12/85	2.1
1/1/86 to 30/04/86	4.5
1/5/86 to 31/08/86	1.3
1/9/86 to 31/12/86	4.7
1/1/87 to 30/04/87	4.1

Source: Kioulafas, 1987, Table 1

3.2.2 Pay Determination in the Public Sector

Public sector pay prior to 1984 was based on grades and also on sector of employment. Thus, employees with different educational qualifications were assigned to a particular grade and their pay increased as a resultant of length of service and progress reports by their superiors. In addition there were different scales for administrative and local authorities staff, as well as employees in the army, clergy, medicine, banking, judicial and so on. However, in 1984 the socialist government introduced a law (Law 1505/1984) with the view to unify the piecemeal practices of wage settlement in the public sector.

The main objective and philosophy of the new payroll (called "ENIAIO" meaning single and comprehensive) was to provide a more

equitable and egalitarian distribution of personal earnings in the public sector. It purported to achieve these objectives through:

(a) the independence of an employee's salary from his grade, thus the automatic salary promotion of the employee every two years to the final scale with no obstacles in-the-way, according to level of education and years of experience, and

(b) the dramatic reduction of the gap between the starting and final earnings.

The payroll was introduced through a number of measures, taking into account the existing salary of employees, their educational qualifications and years of experience, so as to result in a "fair" ranking of the in-service employees (Ministry of Finance, 1985).

The innovation of the new payroll lies in its simplicity, achieved through the abolition of the numerous existing allowances and the adoption of only some basic allowances which are more commonly found among employees (such as, Time, Family, Smoothing, Postgraduate Studies, Christmas, Easter, Vacation and Unhealthy and Dangerous Working Conditions Allowances as the standard).

It is fairly obvious from this description of the payroll structure, still in force, that beyond its populistic objectives and philosophy it contradicts the basic ideology of productivity. It is doing so by allowing no such criteria but rather taking them as granted, by favouring especially the relatively younger employees. In addition, we could argue, that due to the impressive reduction of the gap of earnings differentials (the current analogy between the starting salary of a primary

education graduate and the ending salary of a higher education graduate with six years of university is 1:2.7, previously being 1:3.1) even between different educational levels it mainly favours secondary school graduates, thus discouraging graduates with higher degrees to join the service. If so we would expect that it would have a negative effect on productivity. But as we have already seen in Section 3.1.1 and, particularly Table 3.6, a significant proportion of the employees in the Services sector have had a higher education degree.

At this point it is worth noting that the new payroll is reflected through the 1981-87 incomes policy and has finally resulted in:

(a) an increase in the starting salary; Table 3.13 (left column) shows that the increase was higher for those with less years of education; and

(b) to a decrease of the ending salary; that decrease was even higher for employees with higher levels of education as this appears in Table 3.13 (right column).

Summarising the above, Drettakis quotes in his article in the Greek newspaper "NEA" (14/9/88) that the incomes policy in question "has turned against both education and experience".

Table 3.13. Relative Change in the Civil Servants' Starting and Ending Salary, by Level of Education, between 1981 and 1987 */

Educational Level	Starting Salary	Ending Salary
Primary	+28.2	- 0.3
Secondary	+22.0	- 9.7
KATEE (TEI)	+15.9	-26.7
University	+10.3	-26.3

Source: Drettakis, M., 14/9/88, Greek newspaper "NEA"
Note: Salaries are in constant prices, 2nd half 1981
*/ ending salary corresponds to 30 years of experience

Finally, in the light of the above information we could say that the introduction of the new payroll in the public sector and the inflation correction adjustment, both forming and reflecting the priorities of the late egalitarian incomes policy in the name of "social justice", have had a dramatic equalising effect resulting in a marked squeeze of the earnings differentials between the top and the low salary earners and, neglects any form of productivity and meritocracy criteria.

3.3 STRUCTURE OF EARNINGS

Our final step before proceeding to the estimation of human capital earnings functions is to look at the structure of earnings from salaried employment, in both the private and the public sector, in Greece. The question to be asked is, to what degree has the labour market responded to the above dramatic changes in the composition of the population, in general, and the labour force, in particular? To the extent that the labour market is competitive, one would expect a fall in the earnings differential associated with higher education, provided of course there have not been offsetting shifts in the demand for labour with higher education qualifications.

Several data sets are available from which one can trace the evolution of earnings differentials by level of education in Greece since 1960 (a detailed description of each of the data sets will follow in Section 4.1.1). Information can be obtained from (i) the KEPE-Leibenstein survey for the years 1960 and 1964, (ii) the 1977 National Statistical Service of Greece (NSSG) Employee Survey, and (iii) the public sector data set for 1986 and 1987. In addition, data from the Institute of Economic and Industrial Research (IEIR) data set will be utilised in the summary, referring to the years 1975, 1981 and 1985. Although these data sets are not strictly comparable (e.g. representation, coverage and so on), they allow the establishment of some gross trends in the evolution of relative wages.

Athens Firms, 1960-1964

Professor Harvey Leibenstein in a pioneering effort to obtain

information useful in the planning of the Greek educational system directed and designed in 1965, in collaboration with the Centre of Planning and Economic Research (KEPE) statisticians, a sample survey. The survey was carried out in the Greater Athens area between May and October 1965. The earnings information raised refers to October 1960 and 1964 pay. It was collected from the personnel departments of 31 private firms -- 28 for October 1960, having three dropouts due to the inability of these companies to recover earnings five years backwards -- for their employees. Statistics on the sample size are presented below.

Figure 3.1. Sample Sizes of two Surveys, Oct.1960 & Oct.1964

KEPE-Leibenstein Data Set	Sample Size Oct.1960	Oct.1964	Total
Total Number of Observations	1,187	1,633	2,820
Males	776	1,076	1,852
Females	411	557	968
Number of Firms Examined	28	31	31

Table 3.14. Mean Annual Earnings and Educational Attainment in the Private Sector: KEPE Data Set, 1960 and 1964

Educational Level	1960 Educ. Attain. (%)	1960 Male Earnings (Drs)*/	1960 Earnings Index	1964 Educ. Attain. (%)	1964 Male Earnings (Drs)	1964 Earnings Index
Primary	48.1	21,472	100	47.7	25,668	100
Secondary	40.3	26,541	124	39.5	33,504	131
Higher	11.6	54,209	252	13.1	61,199	238
Overall	100.0	27,462	128	100.0	33,815	132

Source: Re-analysis of the KEPE sample, see Section 3.3
Notes: */ 1960 earnings are in 1964 constant prices

The earnings and schooling information obtained from the survey was used by Leibenstein (1967), Bowles (1969 & 1971), Psacharopoulos (1970 & 1981), and Kanellopoulos (1980) -- see Section 2.4.

In Table 3.14, one can observe the within-year structure, in index form, of the annual earnings by level of education. Between 1960 and 1964 the earnings differential among primary and secondary education graduates remained practically unaffected, while for tertiary decreased by almost six per cent.

National Data, 1977

Statistics for 1977 come from the nationally representative labour force survey of the NSSG, covering all sectors of economic activity. These data have been utilised by Psacharopoulos and Kazamias (1985) in the context of the 1977 Third Educational Plan. Table 3.15 gives mean monthly earnings from salaried employment by level of education of the NSSG sample for 1977.

Table 3.15. Mean Monthly Earnings and Educational Attainment in the Private and Public Sectors: NSSG Data Set, 1977

1977	Entire Sample			Private Sector			Public Sector		
Detailed Educational Level	Educ. Attain. (%)	Earnings (Drs)	Earnings Index	Educ. Attain. (%)	Earnings (Drs)	Earnings Index	Educ. Attain. (%)	Earnings (Drs)	Earnings Index
None	0.3	6,545	57	0.2	9,000	86	0.3	7,300	60
Primary Incomplete	1.7	8,793	76	2.9	8,957	85	0.3	7,740	64
Primary Complete	10.0	11,556	100	21.8	10,523	100	5.1	12,077	100
Secondary Incomplete	3.8	13,406	116	7.4	11,840	113	3.4	12,475	103
Secondary Complete	16.0	13,764	119	23.1	12,489	119	16.2	12,668	105
Higher Incomplete	1.6	12,413	107	2.8	11,587	110	1.2	12,022	100
Higher Complete	66.5	16,873	146	41.8	20,596	196	73.4	19,384	161
Overall	100.0	15,441	134	100.0	15,272	145	100.0	17,521	145

Source: Based on the NSSG data set, described in Section 3.3; for a detailed description see Section 4.1.2.1
Note: Refers to salaried employment and, both sexes

We can see the dramatic squeeze of the earnings advantage of the higher education graduates during the late seventies as compared to the early sixties. In detail, the structure of earnings among the salary earners -- where the current study refers to -- proves to be of some interest, especially where they are further disaggregated by type of employment, that is Private and Public Sector. It becomes clear therefore that there has been a considerable compression of the monthly earnings for those with higher education as compared to their counterparts with secondary education during the past decade. Specifically, as suggested by Table 3.15, there is no significant difference in the remuneration of the salary earners with incomplete secondary education as compared to their counterparts who have completed that level. This observation is also applicable to both economic sectors, that is private and public, under consideration. In addition, the finding of the pay inferiority of higher education drop-outs, that is index=107, in contrast to the secondary graduates, that is index=119, is extraordinary. This is in conjunction to the fact that to be classified as having incomplete higher education automatically means to have completed the secondary education cycle. Moving to higher education graduates, their pay superiority is clear, indicative of an index of 146, as compared to all the rest educational categories. They are the only educational group ranking above the 134 overall earnings index, while the rest lie well below.

Disaggregating for the two economic sectors in question, one could observe that internal pay structure in the public services appears to be closer to the overall figures in both absolute and

index terms, without of course suggesting an identical pattern. On the contrary, there is an even higher pay advantage of the post-secondary over the secondary education graduates (161:105) than the one presented above. A remarkable observation is that persons who drop-out of university enjoy exactly the same earnings with those with primary schooling. Finally, the story of the incomplete higher education category, as discussed above, is re-appearing.

The private sector figures, though, support to an extent the 1960 pattern. They elaborate a huger gap between the primary and both secondary and higher education graduates pay. The degree of the analogy is 86:100:119:196, for those who have no education, and have completed primary, secondary, and higher education, respectively.

If we compare the two economic sectors we can see that primary education graduates receive higher pay in the public than the private sector. This means that competitive employers, that is in the private sector, value less their productivity than the institutionalised public sector (the same applies for all those belonging to incomplete education categories). As far as those with completed higher education in the private sector are concerned, they seem to earn slightly more when compared with their counterparts in the public services.

In conclusion, we saw that there is an ascending pattern in the earnings of employees for 1977. This is so, with the exception of the incomplete higher education category, where employees are earning less would be secondary education

graduates. Also, employees with primary education in the public sector are treated more generously than their colleagues in the private sector, highlighting the existence of institutional factors dominating the public sector pay, as argued through its incomes policy (Section 3.2.2). Finally, comparing the 1964 and 1977 earnings structure, we can identify a moderate decrease, of about 16%, in the earnings differentials among those with secondary schooling, while tertiary education graduates have suffered a substantial loss of almost 70%.

Public Sector Employees, 1986 and 1987

Table 3.16 provides information on the public sector data set for 1986 and 1987, reporting here for the first time.

Table 3.16. Mean Monthly Earnings and Educational Attainment: Public Sector Sample, 1986 and 1987

Educational Level	1987 HIDB Bank			1987 Ministry of Education			1986 Ministry of Finance		
	Educ. Attain. (%)	Earnings (Drs)	Earnings Index	Educ. Attain. (%)	Earnings (Drs)	Earnings Index	Educ. Attain. (%)	Earnings (Drs)	Earnings Index
Primary	13.7	66,381	100	5.7	59,924	100	6.5	53,639	100
Secondary	40.8	80,184	121	48.4	65,754	110	49.8	57,797	108
Non-Univ. Post-Sec.	...	...	...	3.0	67,336	112	0.1	55,712	104
Higher	45.5	100,280	151	40.5	75,129	125	42.9	68,791	128
Postgraduate	...	...	...	2.4	79,213	132	0.7	71,300	133
Overall	100.0	87,415	132	100.0	69,587	116	100.0	62,333	116

Source: Based on the Public Sector data set described in Section 3.3; for a detailed description see Section 4.1.2.3

Note: (...) not applicable
Refers to both sexes

This is pictured through employment in two Ministries (that is Ministry of Education, and Finance) and a State-controlled Bank (that is the Hellenic Industrial Development Bank -- HIDB). These data were collected from the payroll departments of these organisations for the purposes of this research. An identical relative pay structure appears in Table 3.16 for both Ministries, that is Finance (1986) and Education (1987). Their only difference is in the post-secondary, non-university (TEI) pattern mainly due to the insignificant number of observations in that category in the 1986 payroll. Earnings differentials in the Public sector show an even more compressed structure as compared to 1977, while as suggested by the figures, those with postgraduate qualifications earn a mere five per cent on top of those with a higher education degree. For the three completed levels of education, in ascending order, the index ratio becomes 100:110:125, respectively.

It is also evident apart from the table (3.16) that the pattern is slightly different for the Banking sector. The analogy is shaped as 100:121:151 for the three completed educational levels.

Lastly, apart the variation of the earnings differentials, differences are also highlighted in absolute earnings terms between the state-controlled Bank employees and the civil servants. They suggest the overall pay superiority of the Bank employees, varying between 33, 23 and 11 per cent for higher, secondary and primary education graduates, respectively. Another point worthwhile noting is the overall cohesion in the education attainment in the internal pay structure among all three public sector data sets.

Summary

Table 3.17 attempts a grand summary of earnings and education in Greece from 1960 until 1987 based on original analyses presented so far of the available data sets, including the Institute of Economic and Industrial Research (IEIR) one as well (for a description of this data set see Section 4.1.2.2). As shown in Table 3.17, the earnings advantage of higher education graduates has declined considerably between 1960 and 1987. It has been reduced to nearly half its size in the 27 year period.

Table 3.17. Earnings Differentials by Level of Education in Greece, 1960-1987

Educational Level	1960 KEPE a/	1964 KEPE a/	1975 IEIR b/	1977 NSSG b/	1981 IEIR b/	1985 IEIR b/	1987 Public c/
Primary	81	77	106	84	101	95	83
Secondary	100	100	100	100	100	100	100
Higher	204	183	201	123	162	138	125

Source: 1960 & 1964: based on Table 3.14
1975, 1981 & 1985: based on the IEIR data set; for a detailed description see Section 4.1.2.2
1977: based on Table 3.15
1987: based on Table 3.16

Note: Index base: Secondary education = 100
a/refers to male employees in the private sector
b/refers to employees of both sexes in the private and public sectors
c/refers to employees of both sexes of the Hellenic Industrial Development Bank (HIDB)

One obvious question in considering the evolution of earnings differentials by level of education over time, is to what extent the decline of the earnings premium of the more educated has been the result of a public sector incomes

equalisation policy (as this was presented in Section 3.2.2), rather than market forces. This issue is particularly important in the Greek case for three reasons. First, the public sector is dominant in the market for university graduates -- the Government and parastatal enterprises employ one third of the labour force in general as shown in Table 3.3, and about one half of the stock of university graduates, as we will see in Table 4.1. Second, collective agreements may influence pay differentials even in the private competitive sector as argued in Section 3.2.1. Third, the period under investigation corresponds to a major shift of the political orientation of the Government in power: from a conservative government ruling until 1981, to a socialist government thereafter.

Also, our data sets allow us to make a distinction between the private and public sector of the economy in 1977 and 1985.

Table 3.18. Earnings Differentials by Level of Education in the Private and Public Sectors, 1977 and 1985

Educational Level	1977		1985	
	Private	Public	Private	Public
Primary	86	97	99	93
Secondary	100	100	100	100
Higher	162	153	143	134

Source: 1977: based on Table 3.15
1985: based on the IEIR data set; for a detailed description see Section 4.1.2.2
Note: Index base: Secondary education = 100
Refers to both sexes

According to the figures shown in Table 3.18 the higher education

earnings advantage of university graduates has been squeezed much more in the public rather in the private sector between the two years under comparison. The fact that the private earnings differential has been more resilient to the increased supply of graduates, evidenced so far, means that competitive employers continue to value the productivity differential associated with employing a higher education rather than a secondary school graduate.

There are private/social and efficiency/equity effects of the salary compression reported above. One undoubted private/equity effect is a more equal income distribution. It is well known that Human Capital theory provides a behavioural basis for an analysis of the personal distribution of income. According to Becker and Chiswick (1966) the relative inequality of income is a function of the rate of return to the investment, the intensity of investment in a year, and the inequality in years of investment. In other words, the variance in the natural logarithm of income is a rising function of the rates of return from schooling and post-school training (see Chiswick, 1974). Therefore, as far as the Greek data is concerned we observe in Table 3.19 that the variance of the logarithm of earnings was reduced significantly between the mid-sixties and the early eighties, while there is a dramatic fall of the statistic for the mid-eighties. The latest extraordinary reduction of the income inequality measure though, by about 40% between 1981 and 1985, is mainly attributed to the incomes equalisation policy followed by the government during that period, particularly for the public and by extension the private

sector of the economy, as this was discussed in Section 3.2.

Table 3.19. Income Inequality in Greece, 1964-1987

Year	Sample	Var(lnY)
1964	KEPE*/	0.282
1975	IEIR	0.353
1977	NSSG	0.232
1981	IEIR	0.229
1985	IEIR	0.141

Source: Original analyses of the respective samples; for a detailed description see Section 4.1.2
Notes: Based on entire data sets except if otherwise stated
*/refers to male employees in the private sector

A social/efficiency aspect refers to the nature of the signal given to prospective students and their families for investment in the various levels and types of education. Consequently, the main issue should be the role of public sector in setting the signals and incentives in demanding higher education (for an alternative view see Tsoucalas, 1975). This is justified on grounds that have been extensively discussed so far, that is, the hypertrophy of the public sector in the Greek economy, as well as the fact that the public sector is the most dominant employer in the university graduates market as this was shown in Table 3.3, and will be shown in Table 4.1 as well. It could be said, therefore, that the "signal" in question -- which by definition does necessarily relates to productivity -- may be misleading in the sense that it forces people to invest in a type or level of education which is not the optimum from the societal

angle. The ultimate efficiency question, of course, is whether the country is investing the "right" amount of resources on higher education or, perhaps, the country is "overeducated" as argued by Tsoucalas (1981) and, public resources should be allocated to uses other than education. In fact, the common perception in Greece is that the country has more higher education students than the country needs for economic growth, and this has been reflected in the numerus clausus set in public universities. (It is reminded that, according to the Greek constitution, higher education in Greece is provided only publicly and that private universities are prohibited).

To answer such questions it is necessary to estimate earnings functions, using our data sets, and rates of return to investment in education.

CHAPTER 4

DETERMINANTS OF EARNINGS

The present Chapter refers to the empirical application of what we have discussed so far within the Human Capital framework. At first, in Section 4.1, a description of the basic and other demographic human capital variables to be used in this study will be given. The variable description will be followed by a detailed description of the available data sets. They cover about 29,000 employees in both the private and the public sectors of economic activity during the 1975 to 1987 period. These data sets are: (a) the 1977 National Statistical Service of Greece (NSSG) Employee Survey, (b) the Institute of Industrial and Economic Research (IEIR) data set referring to the years 1975, 1981 and, 1985, and (c) the Public Sector data set for 1986 and 1987. Lastly, a summary of the data sets to be analysed appears in Figure 4.3.

In Section 4.2, earnings functions will be fitted in the traditional human capital fashion to the available data sets, separately for both males and females in the private and the public sectors. In addition, we are going to utilise three alternative specifications presented in Chapter 1. That is (i) the basic human capital or Mincerian (see equation 1.5), (ii) the non-linear in years of schooling (see equation 1.6), and (iii) the step (see equation 1.8) specification. The above three variations to the basic model will enable us to estimate the effect of both the length and level of schooling on earnings and

derive the respective rates of return (which will be presented in Chapter 5). Extended earnings functions will be fitted in Section 4.2.1.4 to examine the overall effect of gender, marital status, number of children and, training on earnings. Lastly, the Mincerian specification of variable experience against real labour market experience will be put on test in Section 4.2.1.5.

There are a number of questions we will attempt to answer in this section. Does Human Capital theory offer a plausible explanation, in the context of earnings decomposition, in the Greek case? How much of the variance of earnings is explained by education? Are there any significant differences when accounting for the sector of employment and gender of employees? What is the effect of other demographic characteristics of employees on earnings apart from education? How does the human capital model behave when accounting for such characteristics? Is there any statistically significant difference in the derived schooling coefficient when considering potential (Mincerian) rather than real labour market experience in the earnings functions?

4.1 DATA DESCRIPTION AND SOURCES

Our analysis of earnings functions will be given in the next Section 4.2. Here we will present the human capital earnings functions variables and the data sets at our disposal to be analysed.

4.1.1 Variables used in Earnings Functions

Before proceeding to the description of the data sets and the human capital earnings functions, we need to define the variables used. These fall in the following categories: (i) Personal, including the human capital category and (ii) Environmental. An additional distinction is between variables that are subject to the individual's choice and those beyond his or her control. According to the above classification, Psacharopoulos (1987a) summarises these variables in the following Figure 4.1.

In our study of rates of return to education we need to fit earnings functions as these were presented in Sections 1.2.2 and 1.2.3 earlier in the thesis. Both the Mincerian specification, that is the basic human capital model of equation 1.5, as well as its extensions suggested by Psacharopoulos, that is equations 1.6 and 1.8, require data on the earnings from salaried employment, levels and length of schooling, and work experience of employees. The extended earnings functions (as described in Section 1.2.4) require additional variables. The variables which we have available are the gender and, the marital status of the employee, as well as the number of children in the family. These variables are presented and discussed below. For a full exposition of the variables and the availability of each in the data sets we

utilise for this study, see Figure 4.3 later in the thesis and, for their averages, see Appendix Tables B-1 through B-5.

Figure 4.1. The Determinants of Earnings

Personal Characteristics	
Mostly Not Subject to Choice	Sex
	Age
	Race
	Genetic Ability
	Family Background
	(social class)
	Motivation
Mostly Subject to Choice	Occupation
	Marital Status
	Number of Children
	Weeks Worked
	Human Capital:
	Years of Schooling
	Quality of Schooling
	Achievement
	Experience & On-the-job Training
	Rate of Return to Schooling
	Migration
	(Health)
Environmental and Institutional	
Geographic Locality	
Economic Sector	
Unionisation	
Monopoly, Monopsony	
Discrimination	

Source: Psacharopoulos, 1987a, Figure 1, p. 220

4.1.1.1 Monthly Earnings

The dependent variable in our human capital earnings functions will be the natural logarithm of monthly pay of employees. Monthly earnings from salaried employment is available in all data sets -- surveys and payrolls -- to be analysed (for a discussion on the choice of the dependent variable see Section

1.2.4).

In addition, we should consider the case of hourly, weekly and annual earnings. Hourly or weekly earnings are advantageous because they do not bear any high unemployment biased risk but are more appropriate for those employees where applicable. Also, annual earnings, if reported in such a form, although they bear a high measurement risk by the means of months worked, they automatically adjust for the unemployment factor. They also seem to be more sensitive in catching some peculiarities in the internal pay structure. For example, when comparing earnings between the banking and the public services on an annual basis we will have to include an extra half month pay for the former, that is 14.5 salaries per annum as opposed to the 14 salaries earned by the latter. The additional two months pay for both categories in question is attributed to bonuses for the Christmas, Easter (1/2 salary for each holiday) and summer vacations (1 salary), while the extra 1/2 month pay for the banking is considered to be a "productivity bonus".

However, the data sets we have available report earnings on a monthly basis. Thus, the choice of monthly salary, rather than hourly or weekly or even annual pay, as the dependent variable appears to have in our case more advantages than disadvantages. Since the purpose of this study is to examine, through the determination of pay, rates-of-return to schooling "moonlighting" opportunities are assumed to be minimal. Monthly earnings are for all data sets post-tax, also net of social security and various funds contributions. Distinction is made also, where

available, among males and females up to 65 years of age.

A final comment should be made on the exclusion of fringe benefits from the monthly pay to be analysed, as well as factors such as job security, work environment and conditions, opportunities for training and advancement and so on. Fringe benefits, in particular, are of high importance in the public sector as a whole and especially in the banking sector, where employees have from as little as one month's interest free loans to as much as home buying loans with preferential rate and a lump sum for their daughters when they will get married. Other such benefits, are better social security funds, Christmas presents and subsidised or even free summer vacation camps for their children and so on. Various privileges are enjoyed by the employees of many parastatal enterprises as well. Last but not least, in the case of lifetime earnings, one should also emphasise the existence of the so-called "EFAPAX", being a lump sum amounting approximately to 35 salaries given at the time of retirement given to all employees.

4.1.1.2 Level and Length of Schooling

Section 5.1 will focus on the main purpose of the thesis, that is, to present the rates of return to both levels and length of schooling, derived from the earnings functions analyses which will be presented in Section 4.2. Our data sets contain information on both the level and length of schooling. In detail, information on the length of schooling is brought by reporting the highest educational level completed by each employee (with the exception of the NSSG labour force survey where it could be also found in a more detailed form) and is

measured by corresponding each educational level to the appropriate years of schooling it reflects. The available information on schooling is limiting us to treat it as in most empirical studies. This is years spent in conventional education, thus neglecting quality factors, school and degree types and so on. The following Figure 4.2 summarises the conversions used in corresponding levels of education to years of schooling in our analyses of earnings functions in the next Section 4.2.

Figure 4.2. Level of Formal Education and Corresponding Years of Schooling

Educational Level	Corresponding Years of Schooling
Primary Incomplete	3
Primary Complete	6
Secondary Incomplete	9
Secondary Complete	12
Higher Incomplete	14
Higher Technical (TEI)	15
Higher Complete	16
Postgraduate Studies	18

Finally, any form of specialised training could be regarded as "informal" schooling. In one of our data sets, namely the Institute of Economic and Industrial Research (IEIR) one, which will be described in Section 4.1.2.2, we can distinguish for such a variable. Training is usually defined as the acquisition of specific systematic knowledge and information by the individual which, in turn, will result in the improvement of his/her productivity (for an elaboration of worker trait requirements for

4,000 jobs, see U.S. Bureau of Employment Security, 1965). The inclusion of this variable in the extended earnings functions of Section 4.2.1.4 is based on the assumption that employees have acquired specialised training in order to perform better, that is increase their productivity, in their specialty. That implies an investment from both the employee and the firm. In our analysis, we are going to approach the issue form the employee's side. We expect, therefore, increased earnings for those employees with such training on top of their "formal" education. For the use of variable training in the particular data set see later Section 4.1.2.2.

4.1.1.3 Labour Market Experience

The labour market experience variable here is in years of experience on the job, being either real or potential.

In detail, in the case of the 1977 National Statistical Service of Greece (NSSG) employee sample survey, labour market experience is treated as a proxy. It is calculated in the conventional Mincerian way, that is, EX=AGE-S-6, according to the explanation given in Section 1.2.2, where S stands for years of schooling corresponding to the level of education reported by the employee (see Figure 4.2 above) and 6 is the school starting age.

In the case of the Institute of Economic and Industrial Research (IEIR) data set the variable experience refers to the real experience of employees on the job and it is available in a grouped form. There are four experience groups, referring to those with 3, 8-9, 15-16 and 24-25 years of labour market experience. In that respect, in the analysis, the variable is treated in a continuous form and for that reason the respective

averages were obtained for each experience group.

Coming to the Public sector data set, and particularly the Ministry of Education and Hellenic Industrial Development Bank (HIDB) payroll data bases, it is treated as a continuous variable and refers to real experience within the service and it is also including any recognised experience from previous employment. In the case of the third Public sector data set, that is the Ministry of Finance payroll data, where experience was not readily available as a continuous variable, it was computed from a relative concept variable based on its definition. That variable was called "Time Allowance in per cent" and was varying from 0 to 60 per cent. In detail, after the completion of the first year the employee receives 4% time allowance on the basic salary and an additional 4% thereafter -- up to a total of 60% -- every two years. Having available both the age, as well as real experience of the employees in both the 1987 payroll data sets, we are going to examine empirically in Section 4.2.1.5 its differences with the proxy measure (also called Mincerian or Potential Experience).

At this point, one should note the main advantage of the use of variable experience instead of age in earnings functions analyses. The former is more in accordance with the human capital theory allowing to measure returns to education holding other kinds of human capital constant as this has been explicitly presented in Section 1.2. In mathematical notation the argument is as follows:

$\log(Y) = a_0 + a_1 S + a_2 EX$,
$EX = AGE-S-6$, and
$a_1 = r$.

Therefore, by substituting we get

$\log(Y) = a_0 + rS + a_2(AGE-S-6)$

which gives us

$\log(Y) = (a_0-6.a_2) + (r-a_2)S + a_2 AGE$

highlighting that the schooling coefficient (r) will be underestimated if age (AGE)is used rather than experience (EX). Blinder (1976, p.19) though, argues that the whole matter is "trivial enough to be ignored". There is evidence to indicate that the inherent age factor affects earnings to only a minor degree during the usual working life. In data where age and work experience are statistically separable, the earnings curve is found to be mainly a function of experience rather than age (see Mincer, 1976, p.140).

4.1.1.4 Gender, Marital Status and Number of Children

Information on the gender of employees is available in all data sets with the exception of the Ministry of Finance payroll (Public sector data set). The nature of this variable is of a dummy form having the value 1 if observation is male and 0 if female. This variable will enable us to test differences and possible sex discrimination hypotheses in the Greek labour market and form an over-time picture of its levels, if any.

Marital status as a variable is common to all data sets. It has a dummy form as well, of 1 if employee is married and 0 if otherwise. Availability on the number of children in the family is only in the public sector data set. Information on marital status and number of children, usually referred to as "family

responsibility" variables in the literature, will enable us initially to calculate the impact of those variables on earnings and test whether the Greek setting is in accordance with the theory, that is a positive effect on earnings. As presented by Sloane (1985, p. 134), the positive wage effects of marriage could be interpreted, first, that "married men are more work-motivated than single men because of their additional family responsibilities" and, second, because employers decisions "are based upon paternalistic attitudes which lead them to reward those with greater financial responsibilities with higher wages" (see also Hill, 1979 and Osterman, 1979).

4.1.1.5 Age of First Employment

Finally, this is not a human capital variable useful for earnings functions. It was constructed simply to show the approximate two year labour market advantage at an early stage for females, as opposed to their male counterparts who have to spend two years in National Service.

4.1.2 The Data Sets

The data utilised for this study came from:

(1) the "1977 Employee Survey", conducted by the National Statistical Service of Greece (NSSG);

(2) the Institute of Economic and Industrial Research (IEIR), referring to 1975, 1981 and, 1985; and

(3) the Public Sector, referring to 1986 and 1987.

Figure 4.3 provides summary information of the data sets to be analysed by date, source, coverage, human capital variables, sample size, and section of thesis where discussed.

Figure 4.3. Summary of Data Sets Analysed in the Thesis, by Date, Source, Coverage, Human Capital Variables, Sample Size, and Sections where discussed

Sample			Public Sector		
Characteristics	NSSG a/	IEIR b/	Finance Ministry	Education Ministry	HIDB Bank c/
Date of Sample:	1977	1975 1981 1985	1986	1987	1987
Coverage:	All Sectors	Public-Private	Public	Public	Public
Human Capital Variables:					
Earnings	+	+	+	+	+
Schooling	+	+	+	+	+
Age	+	-	-	+	+
Real Experience	-	+	-	+	+
Gender	+	+	-	+	+
Marital Status	+	+	+	+	+
Number of Children	-	-	+	+	+
Training	-	+	-	-	-
Sections where Discussed:	4.1.2.1	4.1.2.2	4.1.2.3	4.1.2.3	4.1.2.3
Number of Observations	7,058	1,917	18,337	632	786

Note: (+) indicates availability
(-) indicates non-availability
a/National Statistical Service of Greece
b/Institute of Economic and Industrial Research
c/Hellenic Industrial Development Bank

4.1.2.1 The NSSG Employee Survey, 1977

A specially designed questionnaire was administered in 1977 by the National Statistical Service of Greece (NSSG) to a national random stratified sample of 8,756 manual and non-manual workers involved in non-agricultural activities in major urban areas of the country. The whole project was under the supervision of Dr. George Psacharopoulos and Dr. Andreas Kazamias in the context of the elaboration of the third Greek educational plan. The

stratification was made in such a way as to give 50 per cent greater representation to higher education graduates, for a study of post-secondary education in Greece (see Psacharopoulos and Kazamias, 1985).

Although the original sample contained 8,756 workers, the data set provided for the current study included the 7,058 salary earners (non-manual employees), that is it excluded 1,698 wage earners. This, as we will see, is in accordance with the rest of the data sets actually restricted to earnings information from salaried employment. In detail, out of the 7,058 salary earners, 30 per cent were female employees. A further distinction of the salary earners data set was also possible so as to isolate specific subgroups of employees. That is, employees in the Private sector (employees in all branches of Manufacturing) and the Public sector (employees in Public Administration and the Social Services) of economic activity, accounting for 19 and 21 per cent, respectively, of the data set provided. Out of the 1,319 private and the 1,462 public sector employees 22 and 20 per cent were females, respectively.

The human capital related variables available were net monthly salary, age and, schooling of employees, as well as gender and marital status. Because of the lack of real labour market experience in the data set, it was calculated in the Mincerian way, as has been already presented in Section 4.1.1.3.

In addition, it should be noted that the original NSSG sample was analysed by Psacharopoulos and Kazamias (1985). Papers published utilising the principal data base are

Psacharopoulos (1982a, 1983a and, 1983b). The public sector sub-sample of the original data base was re-analysed by Pilavios (1980) in the context of a Ph.D thesis that has never been published. Therefore, the salary earners data set will be analysed here for the first time. Finally, mean sample characteristics by gender and type of employment are presented in Appendix Table B-1.

4.1.2.2 The IEIR Data Set, 1975, 1981 and 1985

The Institute of Economic and Industrial Research (IEIR) data set consists of three distinct samples covering a ten-year span. The data were collected retrospectively in 1985, under the supervision of Dr. Kyriakos Kioulafas of the University of Athens and the IEIR, through a questionnaire from the payroll departments of the various public and private firms covered in the samples. The samples contain 587, 637 and 693 observations (1,917 in total), of which 45 per cent were females, for the years 1975, 1981 and 1985, respectively. In detail, these data refer to six firms in the Public sector and four branches of manufacturing in the Private sector. In detail, the Public sector refers to a Ministry, a State-controlled Bank, the Hellenic Telecommunications Organisation (OTE), the Public Power Corporation (DEH), the Electrical Buses Company (HLPAP) and, Olympic Airways (OA), accounting for 74 to 80 per cent of the entire sample, the rest belonging to the private sector. In the context of the Private sector, the manufacturing branches covered were Drinks, Chemicals, Metallic and Non-metallic products.

The human capital related variables available were net monthly salary, years of real experience on the job, and

educational level, as well as gender and marital status of employees. The original experience variable in this sample has been in a grouped form (see Section 4.1.1.3), hence the high R-squares in the earnings functions using this sample. In addition, a variable named "specialised training" is included in this sample, permitting us to test the effect of "informal" education on earnings (as discussed in Section 4.1.1.2). Employees with primary education were considered as specialised if they were drivers, electricians, pressmen and roasters. Likewise, employees with secondary education in clerical jobs were considered as non-specialised and those holding an engineering or economics university degree were classified as specialised. In addition, these data were utilised by Kioulafas (1987) to study the effects of incomes policies on the earnings of employees through time, and published only in Greek. Finally, mean sample characteristics by gender and type of employment appear in the Appendix Tables B-2, B-3 and, B-4 for the respective years, while the human capital related results are reported here for the first time.

4.1.2.3 The Public Sector Data Set, 1986 and 1987

This is in fact a set of three distinct data bases, one for 1986 [Ministry of Finance] and two for 1987 [(i) Hellenic Industrial Development Bank and, (ii) Ministry of Education and Religious Affairs]. The data were collected personally from the payroll departments of the respective institutions. In detail:

(a) The Ministry of Finance payroll data refer to September 1986 pay and covers, effectively, all of the 18,337 employees of this

Ministry throughout Greece, involved in all areas of relative activity; that is, Administration, Inland Revenue and Customs Services. The available information was limited to earnings, schooling and family related characteristics. Although experience was not readily available in terms of years in the data base, it was estimated indirectly through a related variable, namely the "Time Allowance in per cent" (see Section 4.1.1.3). This refers to an allowance automatically given to employees after completing years in-service and includes any previous recognised experience. A certain disadvantage of this data base is that it does not provide information on the gender of the employees.

(b) A more qualitative data set in terms of variables available, as compared to the Ministry of Finance data set, was provided by the Ministry of Education and Religious Affairs. The data base refers to September 1987 pay and consists of 632 employees involved in the central administration and the National Scholarships Foundation (IKY), 60 per cent being female. Detailed information on earnings, schooling and, real experience of the employees were readily available, as well as a number of other variables such as age, gender, marital status, and number of children in the family.

(c) A very similar data base was provided by the Hellenic Industrial Development Bank (HIDB) for September 1987. This data base covers the total of the Bank's employees throughout the country, amounting to 786, 38 per cent being female.

This data set has been compiled and reported here for the first time. Finally, mean sample characteristics by gender for

the three payrolls, described above, are presented in Appendix Table B-5.

4.1.3 Why Public Sector Data?

Having described the data sets available, we need then to justify why we will utilise public sector payroll data for our earnings functions analyses. The rationale of including such data in the analyses is twofold. First, detailed earnings data in Greece, especially through Labour Force Surveys, continues to be extremely scanty. Second, the implementation of an extensive survey would be quite expensive, as well as time consuming.

Continuing, one should note that supportive evidence for the utilisation of payroll data, in general, and public sector data, in particular, for the Greek case has been given by Gedeon and Psacharopoulos (1982), who elaborated on the fact of the excess demand for employment in the Public sector and the Banking services in Greece. More recently, Pesmazoglou (1987, p. 395) argued that the "dream" of a Greek graduate is to join the civil service. In the sociological context, Tsoucalas (1975) argued that the role of higher education institutions in Greece is towards the reproduction of the state apparatus. Therefore, we can claim that the public sector is the most attractive employer in Greece, because it offers tenure and considerable social benefits package. This is justified on the grounds of solid evidence. For example, in 1977, nearly 18,000 people applied for the 480 places -- that is 36 candidates per vacancy -- in the National Bank of Greece (Gedeon and Psacharopoulos, 1982, p. 82). Another sound recent example is that in 1989,

140,000 applicants competed for 7,980 job openings in the Civil Service -- an analogy of 17.5 applicants per vacancy (Greek newspaper "ELEFTHEROTYPIA", 8/5/89). Besides the above examples, when considering the employment of the university graduates for 1982, it becomes evident from Table 4.1 that 88 per cent of their total stock is employed in the services sector. According to the same table, a significant proportion (that is 69%) out of those employed in the services sector, in general, falls within public sector employment.

Table 4.1. University Graduates Employed in the Services Sector, 1982

Branch of Economic Activity	Percentage of University graduates
Trade - Restaurants - Hotels	8.6
Transport - Storage - Communications	3.7
Banks - Insurances	19.0
Public and other services	68.7
Total	100.0
Number of graduates in the Services sector	268,400
Number of graduates (All sectors)	306,200

Source: NSSG, 1984, Labour Force Survey of 1982

Additionally, it will be of interest to examine payroll data mainly from the public sector and derive results, so as to justify the utilisation of such data for human capital earnings functions in future analyses. Existing results from similar studies report no major objections in the consideration of public sector as contrasted to private sector earnings in human capital analyses (for the Iranian case, see Psacharopoulos and Williams,

1973). Further to the above, one could also claim that because public sector pay-scales are more accessible -- thus better known to the public -- prospective investors adjust their future expectations in conjunction with these scales than with the less-known private sector pay scales. Therefore, the Greek case will contribute additional evidence to this issue.

4.2 NEW ESTIMATES

A series of new estimates related to the private rate of return analysis within the human capital framework discussed extensively so far, are presented below. The methodology followed has been already discussed in detail in Section 1.2 of the thesis. The new estimates are based on the analysis of: (a) the salary-earners sub-sample of the 1977 NSSG employee survey; (b) the IEIR data set for 1975, 1981 and 1985, reporting rates of return to education for the first time; and (c) the public sector data set -- referring to two ministries and a state-controlled bank -- for 1986 and 1987 (for a description of these data sets see previous Section 4.1.3). The earnings regressions fitted to these data sets will be reported here for the first time.

4.2.1 Earnings Function Analysis

The basic Mincer model presented so far, in addition to some of its extensions, permits us to analyse earnings and, within the human capital methodology, derive rates of return to education (see Section 1.2). This model relates variations in earnings to variations in schooling and work experience. The regression derived rates of return to education could be either in general form, that is referring to the average rate of return to an extra year of schooling, or in education level specific form. The former is derived from the basic Mincerian model, where the rate of return is the regression coefficient of the years of schooling variable, and the latter is derived from variations of the basic model.

In this analysis, three different regression model

specifications will be fitted to each group and sub-group of workers and will be presented in the next sections. That is, according to: (i) the basic Mincerian specification as described in Section 1.2.2 (equation 1.5), (ii) the non-linear in years of schooling specification as presented in Section 1.2.3 (equation 1.6) and, (iii) the step specification of the same Section 1.2.3 (equation 1.8). The first specification will give us average rates of return, while the other two give us education level specific yields.

These models have been extensively used in the literature and a general observation concerning the classic simple Mincerian specification is that the explanatory power of schooling and experience variable appears to be about a third in both the USA (Mincer, 1974) and England and Wales (Psacharopoulos and Layard, 1979) estimates for 1959 and 1972, respectively. A higher result has been achieved by including weeks worked, giving 53 per cent, while the schooling coefficient remained unbiased in the USA data, but one could argue that this was not appropriate since weeks worked is endogenous. Siebert (1985, p. 43) argues that "if 30 per cent seems 'low' for the human capital model, thereby implying a large amount of play for factors such as luck, nepotism and discrimination, it should be remembered that we are dealing with the very simplest model which, in particular, omits ability and non-pecuniary differences in individuals' jobs". And he concludes that it should be more sensible to judge the contribution of human capital factors to earnings by looking at the size, sign and significance of coefficients than by looking at the R-squared value which, it is reminded, is very sensitive

to the number of right-hand-side variables included.

In the following Sections we are going to discuss in detail the three specifications of the fitted earnings functions for each sample separately, complying with the previous comments. At first, we are going to present those referring to entire samples, and then for each sector (that is private and public) by the gender of employees. Given the possible combinations of sub-groups of employees to be examined, that is by sector of employment and by gender, as well as the three specifications considered, we will end up with a significant number of earnings functions tables. However, in the text we are going to present only those referring to entire samples and both sexes, while the rest will be referred to as Appendix tables.

4.2.1.1 The NSSG Employee Survey, 1977

According to Table 4.2, the two basic human capital (HC) variables, namely years of schooling and years of experience, explain some 37% (that is adjusted R-squared=0.365) -- which is good for cross-section estimates as it has been argued above -- of the earnings of workers in salaried employment involved in all sectors of economic activity. The schooling coefficient is highly significant and is indicating an average rate of return of about 5.2% (that is S=0.052). It should also be noted that the schooling and experience variables are negatively related in the sense that the higher the level of schooling, the less the individual has had time to work. The negative significant coefficient of experience-squared indicates that graduate earnings rise but level off as experience increases.

Table 4.2. Earnings Functions by Economic Sector, Both Sexes: NSSG Sample, 1977

	All Sectors		Private Sector		Public Sector	
Independent Variable	Mincerian	Step	Mincerian	Step	Mincerian	Step
Years of Schooling, S	0.052 *		0.075 *		0.075 *	
	(38.51)		(26.37)		(27.74)	
Years of Experience, EX	0.060 *	0.061 *	0.063 *	0.062 *	0.048 *	0.050 *
	(41.01)	(41.66)	(18.63)	(18.45)	(18.17)	(18.85)
Experience-squared	-0.00098 *	-0.00102 *	-0.00109 *	-0.00109 *	-0.00058 *	-0.00064 *
	(28.72)	(29.92)	(14.20)	(14.47)	(9.37)	(10.46)
Educational Level						
- Secondary Incomplete		0.264 *		0.166 *		0.219 *
		(9.65)		(3.56)		(4.22)
- Secondary		0.329 *		0.273 *		0.282 *
		(17.94)		(8.22)		(7.45)
- University Incomplete		0.340 *		0.303 *		0.369 *
		(8.77)		(4.30)		(4.88)
- University		0.545 *		0.767 *		0.690 *
		(35.17)		(25.96)		(20.19)
Constant Term	8.172	8.456	7.964	8.480	7.943	8.469
R-squared (adjusted)	0.365	0.359	0.433	0.458	0.541	0.546
N	7,058	7,058	1,319	1,319	1,462	1,462

Source: Based on the NSSG data set, see Section 4.1.2.1
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

Moving to the male employees of the entire data set (Appendix Table B-6), we observe that all the variables have the expected signs. Here, the two HC variables explain almost one third of the male earnings, while the rate of return is by one-half per cent less than the one referring to the total (4.8%). Moving to

the female earnings structure (Table B-7), we note that the explanatory power of the two variables is now significantly higher. Schooling and work experience alone explain more than half of the personal earnings of female employees. It is also of interest that the rate of return is now higher, levelling at 6.8 per cent. What should be noted though, is that males ceteris paribus earn on average more than females, reflected in constant terms of 8.406 for males versus 7.810 for females.

An identical pattern is observed when examining separately employees in the private and the public sectors of the economy by gender. Table 4.2 presents results for both sexes, and Table B-6 and B-7 for males and females, respectively. What is noteworthy, however, is the equality of the magnitude of the rate of return for the two sectors, referring to both genders, and the relative advantage of the returns referring to the public sector, when examined separately for each gender. In addition, another general comment can be made about the levels of the explanatory coefficients, where it is obvious that institutionalised pay in the public sector accounts for the higher R-squared terms as compared to the private sector, where productivity related characteristics are valued more. Also of interest is the fact that the private sector pays, on average, higher wages than the public sector of the economy.

If a non-linear term, when referring to years of schooling, is entered into the regression (that is, a schooling-squared term) it is possible to estimate educational level specific returns to education. The theory suggests (see Section 1.2.3) that the return to education at a specific educational level is

estimated on the basis of the following formula:

$$r = b + 2es,$$

where **r** is the rate of return to education,
b is the schooling coefficient,
e is the schooling-squared coefficient, and
s refers to the years of schooling of the particular educational level.

Table 4.3. Mincerian Earnings Functions, Non-linear in 'S', by Economic Sector, Both Sexes: NSSG Sample, 1977

Independent Variable	All Sectors	Private Sector	Public Sector
Years of Schooling, S	0.075 *	-0.049 *	0.009
	(8.82)	(2.68)	(0.53)
Years of Experience, EX	0.059 *	0.063 *	0.049 *
	(40.63)	(18.87)	(18.55)
Experience-squared	-0.00096 *	-0.00112 *	-0.00062 *
	(27.95)	(14.74)	(9.91)
Schooling-squared	-0.001 *	0.006 *	0.003 *
	(2.77)	(6.87)	(3.94)
Constant Term	8.063	8.544	8.279
R-squared (adjusted)	0.365	0.453	0.545
N	7,058	1,319	1,462

Source: Based on the NSSG data set, see Section 4.1.2.1
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table 4.3, and Appendix Tables B-8 and B-9, report the results of regressions fitted according to this specification, by economic sector and gender. As shown in Table 4.3 above, the coefficients of the regressions are highly significant when referring to all sectors of the economy, irrespective of gender, and are of the expected signs. That is, the schooling-squared coefficient is of a negative value (i.e. -0.001), acting as a downward bias for the

incremental levels of education. Contrarily, when disaggregating for the two economic sectors in question, the pattern appears to be of an ascending order, irrespective of gender, and in most instances statistically insignificant (see Tables 4.3, B-8 and, B-9).

The step specification of the Mincerian earnings function permits the calculation of education level specific rates of return, as well, in relation to a comparison group (for more details see Section 1.2.3). This method is more accurate than the non-linear in 'S' method, because the years of schooling variable is now defined in the respective educational levels with the use of dummy variables having the value of 1 if the observation has the prescribed educational level, or 0 if otherwise. In this specification, the omitted education dummy -- acting as the control group -- is primary education or less. The results for both sexes appear in Table 4.2 (already presented for the basic model), and for male and female employees in Appendix Tables B-6 and B-7, respectively. A general remark is that the comments are fairly the same as those for the basic model. A couple of additional general comments, though, are that, first, the adjusted R-squared term, denoting the explanatory power of the model, is slightly higher as compared to the basic model, and, second, possession of a university degree is associated with a sizeable and statistically significant earnings premium over the other levels of education.

Finally, the estimated returns to on-the-job training (experience) reveal an increasing pattern of the estimated

coefficients, being 6.0, 5.3 and, 5.1 per cent for an additional year of experience, referring to both genders, males and, females respectively employed at all economic sectors (see Tables 4.2, B-6 and, B-7). Concerning employment in the competitive sector of the economy, the respective figures are 6.3, 5.7 and, 4.3 per cent, while employment in the non-competitive sector yield a rate of return to an extra year of experience of the order of 4.8, 4.3 and, 4.2 per cent (see also Tables 4.2, B-6 and, B-7).

4.2.1.2 The IEIR Data Set, 1975, 1981 and 1985

The analysis of the IEIR data, although significantly smaller in terms of size as compared to the NSSG sample, gave highly significant regression results for all three years covered, as shown in Table 4.4 below for the basic model, referring to both sexes.

Table 4.4. Mincerian Earnings Functions, All Sectors, Both Sexes: IEIR Sample, 1975, 1981 and 1985

Independent Variable	1975	1981	1985
Years of Schooling, S	0.058 *	0.041 *	0.034 *
	(14.05)	(12.95)	(14.64)
Years of Experience, EX	0.064 *	0.048 *	0.042 *
	(6.50)	(6.45)	(7.60)
Experience-squared	-0.00102 *	-0.00054 **	-0.00058 *
	(2.96)	(2.07)	(3.01)
Constant Term	8.305	9.548	10.507
R-squared (adjusted)	0.437	0.460	0.482
N	587	637	693

Source: Based on the IEIR data set, see Section 4.1.2.2
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Again, the coefficients are of the expected signs and the two HC variables explain more than 40% of the variations in earnings of individual employees, mainly because of the grouped nature of experience variable (see Section 4.1.3.3). As also suggested by the same table (4.4), the schooling coefficients indicate rates of return to a typical year of schooling of 5.8%, 4.1% and, 3.4%, referring to all employees in all economic sectors, for the years 1975, 1981 and, 1985. When examining separately male and female earnings, it is noted that the experience-squared coefficient is becoming less important in the earnings determination in terms of statistical significance. The above is denoting the trend towards non-strictly parabolic experience-earnings profiles (see Appendix Tables B-10 and, B-11). We also note that while males appear to earn on average more than females (constant term comparison) for 1975 and 1981, the effect of the equalisation policies of the Socialist administration of the 1980s is clear for the year 1985.

As suggested by Table 4.5, if we disaggregate further into the private and the public sector of the economy for the years 1975, 1981 and, 1985, we observe that HC theory explains somehow little of the earnings variation, that is 22% to 25%, despite the grouped nature of the experience variable. Given the previously mentioned feature of the sample, concerning the experience variable, it is clear from the same table (4.5) that human capital modelling explains more than 50% for the public sector. The most telling statistic though, is the one for 1985, where education and years of experience appear to explain 63% of the earnings of civil servants. This is so, because of the

introduction of the highly institutionalised "Integrated Payroll", valuing exceedingly such characteristics irrespective of productivity considerations (see also Section 3.2.2).

Table 4.5. Mincerian Earnings Functions by Economic Sector, Both Sexes: IEIR Sample, 1975, 1981 and 1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Schooling, S	0.031 *	0.063 *	0.034 *	0.044 *	0.030 *	0.035 *
	(3.88)	(14.00)	(4.73)	(13.47)	(5.74)	(16.53)
Years of Experience, EX	0.041 **	0.070 *	0.037 **	0.055 *	0.037 *	0.046 *
	(2.27)	(6.39)	(2.20)	(7.03)	(3.12)	(8.89)
Experience-squared	-0.00082	-0.00116 *	-0.00060	-0.00067 **	-0.00081	-0.00062 *
	(1.26)	(3.07)	(0.99)	(2.50)	(1.90)	(3.52)
Constant Term	8.591	8.261	9.631	9.508	10.460	10.525
R-squared (adjusted)	0.218	0.478	0.223	0.559	0.263	0.631
N	116	471	165	472	181	512

Source: Based on the IEIR data set, see Section 4.1.2.2
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

The same observation, as above, is applicable for each gender separately (see Appendix Tables B-11 and, B-13). Furthermore, the years of schooling coefficient, referring to both sexes, appears to be higher in the public than the private sector of the economy (see Table 4.5). This is an interesting observation with screening implications, but it is mainly due to sampling biases in favour of the public sector, as well as including a significant number of employees in some highly paid parastatal enterprises (see Section 4.1.2.2). An anti-screening pattern

though, emerges from Appendix Table B-11 when only male employees' earnings are analysed. The analysis for female employees in the private sector gave completely insignificant coefficients, while more educated women in the public sector appear to enjoy partly higher yields to their educational investment, although earning comparatively less than their male counterparts (see Appendix Table B-13).

The analysis of the IEIR sample data according to the schooling-squared specification by gender and by economic sector -- appearing in Tables 4.6 and 4.7, as well as Appendix Tables B-14, B-15, B-16 and, B-17 -- yielded statistically significant results (except for females in the private sector, appearing in Appendix Table B-17).

Table 4.6. Mincerian Earnings Functions, Non-linear in 'S', All Sectors, Both Sexes: IEIR Sample, 1975, 1981, 1985

Independent Variable	1975	1981	1985
Years of Schooling, S	-0.280 *	-0.198 *	-0.123 *
	(7.30)	(6.64)	(5.34)
Years of Experience, EX	0.064 *	0.047 *	0.042 *
	(6.90)	(6.63)	(7.83)
Experience-squared	-0.00101 *	-0.00051 **	-0.00058 *
	(3.14)	(2.07)	(3.11)
Schooling-squared	0.016 *	0.011 *	0.007 *
	(8.87)	(8.04)	(6.83)
Constant Term	9.831	10.629	11.210
R-squared (adjusted)	0.504	0.509	0.514
N	587	637	693

Source: Based on the IEIR data set, see Section 4.1.2.2
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table 4.7. Mincerian Earnings Functions, Non-linear in 'S', by Economic Sector, Both Sexes: IEIR Sample, 1975-1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Schooling, S	-0.227 *	-0.268 *	-0.242 *	-0.180 *	-0.130 *	-0.106 *
	(3.49)	(6.17)	(3.70)	(5.75)	(2.67)	(4.94)
Years of Experience, EX	0.041 *	0.070 *	0.033 **	0.055 *	0.037 *	0.046 *
	(2.44)	(6.77)	(2.08)	(7.39)	(3.13)	(9.29)
Experience-squared	-0.00083	-0.00116 *	-0.00050	-0.00067 *	-0.00080 **	-0.00063 *
	(1.35)	(3.25)	(0.88)	(2.63)	(1.92)	(3.69)
Schooling-squared	0.012 *	0.015 *	0.013 *	0.010 *	0.007 *	0.007 *
	(4.00)	(7.66)	(4.24)	(7.18)	(3.30)	(6.59)
Constant Term	9.754	9.753	10.903	10.508	11.186	11.156
R-squared (adjusted)	0.310	0.535	0.297	0.602	0.302	0.659
N	116	471	165	472	181	512

Source: Based on the IEIR data set, see Section 4.1.2.2
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

However, the sign of the schooling-squared coefficient in all regressions is of the opposite sign than expected. That is, positive, denoting an ascending rate of return pattern to the increased order educational levels.

Tables 4.8 and 4.9, as well as Appendix Tables B-18, B-19, B-20, and B-21, present results according to the step specification by gender and by economic sector for all the three time periods available, that is 1975, 1981 and, 1985. Based on these estimates it will be possible to calculate comparison rates of return to specific levels of education, as opposed to the average rate of return concept implicit in the basic Mincerian model. In this case, primary education is the omitted category,

because this particular sample does not contain any employees with less than primary education. The results of the fitted step earnings functions appearing in Tables 4.8 and 4.9 indicate that secondary education has lost its importance in determining earnings, obviously due near universalisation. University education, however, is consistently, as well as significantly, associated with a considerable earnings premium over the other levels of education.

Table 4.8. Step Earnings Functions, All Sectors, Both Sexes: IEIR Sample, 1975, 1981 and 1985

Independent Variable	1975	1981	1985
Years of Experience, EX	0.064 *	0.047 *	0.042 *
	(6.90)	(6.63)	(7.83)
Experience-squared	-0.00101 *	-0.00051 *	-0.00058 *
	(3.14)	(2.07)	(3.11)
Educational Level			
- Secondary	0.007	0.004	0.043
	(0.16)	(0.10)	(1.61)
- University	0.636 *	0.448 *	0.361 *
	(16.13)	(14.75)	(16.03)
Constant Term	8.715	9.836	10.732
R-squared (adjusted)	0.504	0.509	0.514
N	587	637	693

Source: Based on the IEIR data set, see Section 4.1.2.2
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table 4.9. Step Earnings Functions by Economic Sector, Both Sexes: IEIR Sample, 1975, 1981 and 1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Experience, EX	0.041 **	0.070 *	0.033 **	0.055 *	0.037 *	0.046 *
	(2.44)	(6.77)	(2.08)	(7.39)	(3.13)	(9.29)
Experience-squared	-0.00083	-0.00116 *	-0.00050	-0.00067 *	-0.00079	-0.00063 *
	(1.35)	(3.25)	(0.88)	(2.63)	(1.91)	(3.69)
Educational Level						
- Secondary	-0.061	0.040	-0.071	0.036	0.020	0.065 *
	(0.79)	(0.79)	(0.92)	(1.00)	(0.36)	(2.59)
- University	0.381 *	0.678 *	0.393 *	0.473 *	0.331 *	0.368 *
	(4.93)	(15.75)	(5.62)	(15.19)	(6.43)	(18.01)
Constant Term	8.825	8.694	9.910	9.802	10.671	10.751
R-squared (adjusted)	0.310	0.535	0.297	0.602	0.302	0.659
N	116	471	165	472	181	512

Source: Based on the IEIR data set, see Section 4.1.2.2
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

A few remarks should also be made concerning the coefficient on the years of labour market experience in the simple Mincerian earnings functions. First, it should be noted that these coefficients follow a declining pattern, complying with the trend in the observed schooling coefficient and, second, they are highly significant, irrespective of sector of employment and gender. Indicative is, as shown in Table 4.4, the rate of return to an additional year of labour market experience, applying to both genders, ranging from 6.4% in 1975, to 4.8% in 1981 and, to 4.2% in 1985. Also, the respective figures for private sector

employment, as suggested by Table 4.5, range between 4.1% (for 1975) and 3.7% (for 1981 and 1985). In addition, Table 4.5 shows that public sector yields higher pay increases for an extra year of experience, i.e. 7.0%, 5.5% and, 4.6% for the respective time periods. This is opposite to what was found for 1977 in the previous Section and it could be attributed to the data deficiencies described earlier.

4.2.1.3 The Public Sector Data Set, 1986 and 1987

Basic Mincerian HC earnings functions fitted in the three public sector payrolls for the years 1986 and 1987 appear in Table 4.10. They gave highly significant coefficients of the expected signs -- referring to both genders -- with the exception of the Ministry of Education Employees. The first observation in order here, according to Table 4.10, concerns the high explanatory power of the model, i.e. R-squared of about 65%. Institutionalised pay is the most plausible explanation for such a case. The second observation is about the declining nature of the schooling coefficients, as compared to those of the previous years, being 2.3% (Ministry of Finance) in 1986 and, 3.1% (Ministry of Education) and 4.0% (Hellenic Industrial Development Bank) in 1987. The negative but relatively small coefficient of experience-squared variable, referring to the Ministry of Finance employees, accounts to a degree for the concave nature of the experience-earnings profile but also indicates that the majority of graduates are still experiencing rising earnings. Moving to the Ministry of Education payroll data analysis, even if the coefficient of the experience-squared variable is not statistically significant, it is not of the expected sign.

Table 4.10. Earnings Functions, Both Sexes: Public Sector Sample, 1986 and 1987

	1986 a/		1987 b/		1987 c/	
Independent Variable	Mincerian	Step	Mincerian	Step	Mincerian	Step
Years of Schooling, S	0.023 *		0.031 *		0.040 *	
	(67.64)		(21.78)		(22.82)	
Years of Experience, EX	0.023 *	0.023 *	0.010 *	0.008 *	0.036 *	0.037 *
	(59.51)	(59.42)	(4.03)	(3.55)	(17.19)	(18.59)
Experience-squared	-0.00023 *	-0.00023 *	0.00011	0.00015 **	-0.00053 *	-0.00056 *
	(17.17)	(17.06)	(1.56)	(2.14)	(11.59)	(12.23)
Educational Level						
- Secondary		0.063 *		0.099 *		0.175 *
		(16.90)		(5.93)		(9.73)
- Non-Univ., Post-Sec.		0.117 *		0.187 *		---
		(3.05)		(8.80)		
- University		0.186 *		0.256 *		0.375 *
		(49.06)		(15.22)		(21.11)
- Post-Graduate		0.207 *		0.293 *		---
		(18.35)		(10.45)		
Constant Term	10.489	10.837	10.572	10.832	10.408	10.672
R-squared (adjusted)	0.633	0.644	0.661	0.682	0.629	0.637
N	18,337	18,337	548	548	735	735

Source: Based on the Public Sector data set, see Section 4.1.2.3
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively
(---) not applicable
a/Ministry of Finance
b/Ministry of Education
c/State-controlled Bank (HIDB)

It is positive and quite small, disclosing rapidly rising earnings as experience increases for the majority of graduates at an almost linear way, denoting the irrationality in pay of the public sector according to non-productivity criteria. According

to Table 4.10, the same coefficient for the HIDB payroll data shows the opposite effect on the experience-earnings profiles of the Bank employees. The pattern suggested is a typical HC one, familiar to private sector data analyses, suggesting a quite parabolic earnings profile levelling off as experience increases. Another noteworthy comment relative to the productivity unrelated rationale in the public sector pay stems from the comparison of the constant terms between the Ministry of Education and the HIDB basic Mincerian earnings functions, both referring to the same month's pay in 1987. It is clear that a person with no schooling and zero experience will be getting more pay in the civil service than the state-controlled banking sector (reflected in constant terms of 10.572 versus 10.408). Similar remarks apply to both males and females when examined separately (see Appendix Tables B-22 and, B-23).

The non-linear in 'S' specification gave the opposite than expected sign in the schooling-squared coefficient in all payrolls and for both and each gender separately, while most of the analyses reported statistically insignificant coefficients. For an elaboration of the above comments see Table 4.11 referring to both sexes, and for each gender separately see Appendix Tables B-24 and B-25 referring to males and females respectively).

Lastly, the step specification of the fitted earnings functions for both sexes appears in Table 4.10 already presented for the basic model (see Appendix Table B-22 for males, and B-23 for females). This specification produced statistically significant coefficients, in general, on the included variables

and the commentary associated with these analyses is quite similar to the one on the basic model, discussed earlier. A further point, though, is that two of the data sets -- Ministry of Finance and Ministry of Education -- allow the distinction between non-university, post-secondary graduates (TEI) and those holding postgraduate degrees (M.A. and Ph.D.). Hence, these categories have been included as additional dummy variables in the step earnings function. Possession of a university degree is, of course, again associated with a sizeable and statistically significant earnings premium as contrasted to the rest of the educational levels.

Table 4.11. Mincerian Earnings Functions, Non-linear in 'S', Both Sexes: Public Sector Sample, 1986 and 1987

Independent Variable	1986 a/	1987 b/	1987 c/
Years of Schooling, S	-0.024 *	-0.018 **	0.009
	(11.50)	(2.03)	(0.76)
Years of Experience, EX	0.023 *	0.009 *	0.037 *
	(59.52)	(3.82)	(18.56)
Experience-squared	-0.00023 *	0.00013	-0.00056 *
	(17.17)	(1.87)	(12.23)
Schooling-squared	0.002 *	0.002 *	0.002 *
	(22.78)	(5.60)	(4.25)
Constant Term	10.755	10.861	10.649
R-squared (adjusted)	0.643	0.678	0.637
N	18,337	548	735

Source: Based on the Public Sector data set, see Section 4.1.2.3
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively
a/Ministry of Finance
b/Ministry of Education
c/State-controlled Bank (HIDB)

A final remark concerns the returns to an additional year of on-the-job experience. There are quite mixed patterns when examining employment in the two Ministries, regarding both genders. In detail, according to the basic human capital model specification of Table 4.10, experience appears to yield an average rate of return of about 2.3 per cent in the Ministry of Finance, being equal to the average rate of return to schooling. The same rate for the Ministry of education is only 1.0 per cent, being slightly less than one third of the typical year of schooling yield. Finally, the average rate of increase of the earnings of the HIDB employees after completing an extra year of experience is 3.6 per cent and is about the same with the one attributed to schooling alone.

4.2.1.4 Extended Earnings Functions

As shown in Figure 4.3 (in Section 4.1.2) our data sets allow for additional variables on the personal characteristics of employees. The inclusion of such variables in the right-hand side of the basic human capital earnings functions, as argued in Section 1.2.5, will enable us to examine their effect on the model itself, as well as on the earnings of employees. The additional independent variables are gender, marital status, number of children, as well as whether the employee has had specific training for the current position held. These variables have been entered in a dummy variable specification, that is having the value of 1 if the employee belonged to the specified group and 0 otherwise, except for the one referring to the number of children in the family which was entered in absolute figures.

Table 4.12 presents extended earnings functions on six out

of the seven available data sets (the seventh being the Ministry of Finance payroll).

Table 4.12. Extended Earnings Functions: Greece, 1975-1987

Independent Variable	IEIR 1975	NSSG 1977	IEIR 1981	IEIR 1985	Public Sector 1987 d/	Public Sector 1987 e/
Years of Schooling, S	0.046 *	0.054 *	0.030 *	0.026 *	0.029 *	0.039 *
	(11.79)	(41.92)	(10.04)	(11.79)	(23.39)	(22.74)
Years of Experience, EX	0.063 *	0.049 *	0.047 *	0.041 *	0.012 *	0.032 *
	(7.08)	(34.80)	(6.99)	(8.15)	(5.56)	(15.44)
Experience-squared	-0.00099 *	-0.00082 *	-0.00052 **	-0.00055 *	+0.00002	-0.00048 *
	(3.19)	(25.52)	(2.21)	(3.17)	(0.35)	(10.57)
Male a/	0.056 ***	0.316 *	0.064 *	0.038 **	0.036 *	0.043 *
	(1.67)	(33.53)	(2.53)	(2.02)	(4.92)	(3.32)
Married b/	0.055 ***	0.088 *	0.080 *	0.103 *	0.047 *	0.055 *
	(1.65)	(8.06)	(3.18)	(5.46)	(5.09)	(3.43)
Number of Children	---	---	---	---	0.017 *	0.025 *
					(3.48)	(3.88)
Trained c/	0.392 *	---	0.308 *	0.205 *	---	---
	(11.14)		(11.50)	(10.15)		
Constant Term	8.161	7.969	9.421	10.396	10.537	10.382
R-squared (adjusted)	0.540	0.470	0.562	0.566	0.743	0.663
N	587	7,058	637	693	548	735

Source: Based on the respective data sets, see Section 4.1.2
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
*, ** and, *** indicate statistical significance at the 1%, 5% and, 10% level, respectively
(---) not applicable
a/ 1=male, 0=female
b/ 1=married, 0=single
c/ 1=trained for current position, 0=not trained
d/ Ministry of Education
e/ State-controlled Bank (HIDB)

The results indicate that the explanatory power of the human capital model has increased substantially as a result of the

inclusion of these variables in the earnings functions. The increase has been more than 10 per cent for the majority of the data sets, while it levelled at about eight and three per cent for the Ministry of Education and the HIDB payroll data respectively (the comparison was made with the adjusted R-squared coefficients of the basic human capital model of the respective data sets, referring to both sexes). Therefore, we could summarise that the relative strength of these variables in explaining the variance of earnings has been in most cases significant, but not impressive.

Another important finding is associated with the effect the additional variables have on the model itself. By including these variables we expect that the bias in the schooling coefficient is removed, if these variables are correlated with schooling. As we have already argued in Section 4.1.1.2, variable training is by definition correlated with schooling. This variable is available in the IEIR data set only (see Figure 4.3). In such case, the inclusion of training in explaining earnings has resulted in a downward correction of the schooling coefficient. That is, if we compare the coefficients of schooling of the IEIR data set (for 1975, 1981, and 1985) appearing on Table 4.12 with the respective ones of the basic Mincerian earnings functions appearing on Table 4.4, we observe that they are now levelling at about 0.010 (or 1%), lower than in the basic model, for all three years. Contrarily, the rest of the data sets analysed, that is the NSSG sample referring to 1977 and the Ministry of Education and HIDB payrolls referring to 1987, gave

biased-free schooling coefficients, when compared to results of the basic model appearing in Tables 4.2 and 4.10, respectively. This is also implying that the inclusion of gender, marital status, and number of children has no effect whatsoever on schooling since these variables are exogenous.

It has also been confirmed here that being male ceteris paribus is associated with higher earnings on average than females. In detail, Table 4.12 suggests that males appeared to earn on average a massive 32 per cent more than females in 1977. The effect of the equalisation policies of the Socialist administration of the 1980s is evident for the post-1981 period. The pay superiority of the males has decreased substantially and the analyses for 1987 suggest that males get on average 4 per cent more than females.

The case of higher pay among employees with increased family responsibilities, as this was argued in Section 4.1.1.4, is also demonstrated in the extended earnings functions of Table 4.12. Being married is associated with a premium of about 10 per cent on average until the mid-1980s. For 1987, this premium has been found to be almost half than before but still significant, at about five per cent. In addition, each child in the family was found to be related with a premium of about 2 per cent on the personal earnings for 1987.

The effect of the training variable on the earnings of employees was found to be quite significant and sizeable, when available. In detail, as we have already stated earlier, the availability of this variable was only in the IEIR data set, referring to 1975, 1981, and 1985. Table 4.12 indicates that,

being specifically trained for the current position held, is associated with an impressive 40 per cent earnings premium as compared to those without specific training for 1975, other things being equal. A deterioration on the size of the coefficient is also observed over time, suggesting 31% and 21% higher earnings for 1981 and 1985 respectively.

A final comment is about the labour market experience of employees. This concerns the extreme points of labour market experience where employees realise the peak of their earnings in the experience-earnings profiles. We are able to estimate such points from the fitted earnings function. This point is given where the first derivative of the experience variable in the quadratic human capital equation is zero. In earnings functions this extreme point corresponds to a maximum (not minimum). In detail, Table 4.12 implies that maximum earnings are reached when experience becomes 31.9 years in 1975 (IEIR), 29.9 years in 1977 (NSSG), 43.5 years in 1981 (IEIR), 35.3 years in 1985 (IEIR), and 33.3 years in 1987 (State-controlled Bank -- HIDB). In the case of the Ministry of Education data, referring to 1987, it was found that such a point never exists (linear increase), because the EX-squared coefficient is statistically insignificant. Our findings are in line with other studies, such as Mincer's (1974) estimate of 34 years using U.S.A. data, and Psacharopoulos' and Layard's (1979, p. 492) estimate of 30 years when experimenting with British data.

4.2.1.5 Potential Versus Real Experience

The potential versus real experience debate has not been given

much attention in the human capital analyses literature. This is because, in most cases, researchers found the Mincerian classification of experience (see Section 4.1.1.3) the most convenient and, of course, accepted way to define it, in the absence of real labour market experience. Occupational mobility, as well as job search issues lead to the deterioration of the importance of the experience variable in determining earnings, and tenure was included on top in the earnings functions. This is of significant importance for the firm because the most telling seniority variable should be years of experience within the firm (i.e. tenure) rather than, generally speaking, years of labour market experience. Furthermore, when actual years of labour market experience are available, there is no issue of calculating potential experience for all those reasons associated with the above explanation. Unquestionably, it is the availability or not of the variable in determining whether potential (or Mincerian type) or actual experience would be included in the HC analyses. It should also be added here, that the basic criterion of some of the authors when selecting between alternative potential experience definitions has been the comparison of the adjusted R-squared terms of the earnings functions using alternative specifications of the variable in question (see for example Arabsheibani, 1983, p. 51).

Having said that, it is also of importance to comment on the Greek evidence in our possession before proceeding to the comparison. As suggested by Figure 4.3, cited earlier in the Chapter, there are two data sets permitting such analysis. The Ministry of Education and the HIDB payroll data sets, both

belonging to the Public Sector sample, referring to 1987. The availability of the variable "Age of Employee" in both data sets allows for estimating potential experience (P_EXP) according to the Mincerian way, that is: P_EXP = AGE-Schooling-6, where 6 years is the legal schooling starting age in Greece. However, because both samples refer to public sector, it should be reminded that job security is the main feature of these jobs, thus one should not expect sound variations in the comparison. Also, the nature of these jobs and the main reason in driving people demanding them (see for example Gedeon and Psacharopoulos, 1982), is leading us to assume that there is minimal occupational and job search mobility. The previous statement is also leading us to assume in advance that, the use of the real experience variable in the human capital earnings functions analyses -- even if this could be treated as tenure as well -- should be the most appropriate.

The methodology in testing for the above contentions will be the comparison of classic Mincerian specifications (basic Mincerian earnings functions) using (i) real and (ii) potential experience for both data sets.

Tables 4.13 and 4.14 present the results of the basic Mincerian earnings functions fitted in the Ministry of Education and the HIDB data sets respectively. It is of particular interest to note that the two analyses suggest somewhat controversial results as far as the explanatory power of the model is concerned. In detail, the Ministry data, appearing in Table 4.13, suggest that the use of the variable potential

instead of real experience weakens the explanatory power of the Mincerian model by about four per cent, while the Bank data of Table 4.14 gave a slightly better fit of one per cent.

Table 4.13. Mincerian Earnings Functions, with Alternative Experience Variables, Both Sexes: Ministry of Education Data Set, 1987

Independent Variable	Real Experience Specification	Potential Experience Specification
Years of Schooling, S	0.031 *	0.042 *
	(21.78)	(26.39)
Years of Experience, EX	0.010 *	0.013 *
	(4.03)	(4.96)
Experience-squared	0.00011	-0.00002
	(1.56)	(0.30)
Constant Term	10.572	10.321
R-squared (adjusted)	0.661	0.624
N	548	548

Source: Real experience specification: from Table 4.10
Potential experience specification: based on Ministry of Education payroll (see Section 4.1.2.3) estimates
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
*/ indicates statistical significance at the 1% level

An interesting finding, though, arising from Table 4.13 is that the inclusion of potential experience in explaining earnings variations among the Ministry employees complies better with the HC "laws". That is, although statistically insignificant, the experience-squared coefficient has now a negative sign, meaning that graduate earnings rise but tend to level off as experience increases. However, in the case of the State-controlled Bank data of Table 4.14, we note that the respective coefficient is still highly significant, but slightly smaller.

Table 4.14. Mincerian Earnings Functions, with Alternative Experience Variables, Both Sexes: HIDB Data Set, 1987

Independent Variable	Real Experience Specification	Potential Experience Specification
Years of Schooling, S	0.040 *	0.051 *
	(22.82)	(26.96)
Years of Experience, EX	0.036 *	0.038 *
	(17.19)	(22.15)
Experience-squared	-0.00053 *	-0.00047 *
	(11.59)	(15.21)
Constant Term	10.408	10.091
R-squared (adjusted)	0.629	0.639
N	735	783

Source: Real experience specification: from Table 4.10
Potential experience specification: based on HIDB payroll (see Section 4.1.2.3) estimates
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
*/ indicates statistical significance at the 1% level

Moving to the examination of the linear experience coefficient, it is clear from both Tables (4.13 and 4.14) that is still highly significant, as well as somewhat higher in the potential experience specification. Such finding means that earnings increase at a slightly higher rate after each year on-the-job had the potential experience being considered than the real one.

Lastly, the schooling coefficient is levelling higher in the potential experience than the actual experience specification, suggesting a very interesting finding, common to both data sets. The schooling coefficient was found to be overestimated by 1.1 units (see schooling coefficients of Tables 4.13 and 4.14). Although the figure seems to be very small, in absolute terms,

it is of particular importance in rate of return to education estimates of the order of the Greek setting. That is, an upward aggregation bias of about 30 per cent (36% in the case of the Ministry of Education and 28% in the HIDB case) in the statistic is suggested, in relative terms. A possible explanation could be the gradual diminishing importance of the potential experience variable -- given its implicit unemployment risks -- in earnings determination, and the rapid overweight put on education related characteristics.

In conclusion, based on the public sector Greek data for 1987, we could argue that the magnitude of the fit of the classic Mincerian model does not point to the "correct" direction in selecting between the two experience specifications. There are other factors to be taken seriously into account. However, one could summarise that in the absence of real labour market experience, the potential specification could be used instead and is pointing to the "correct" direction, although it is intuitively assuming no periods of unemployment. But in view of the fact that both experience specifications are available, one should be very cautious in treating potential rather than actual experience because of the aggregation bias highlighted for the former above.

4.3 SUMMARY

In this Chapter we have examined the earnings of employees in Greece through a variety of data sets covering a time span of thirteen years, that is from 1975 to 1987 (for an illustration and summary information of the data sets see Figure 4.3). Although the data sets were not strictly comparable, they enabled us to form an aggregate picture on the decomposition of earnings from salaried employment in Greece by fitting human capital earnings functions in Section 4.2. These functions have been fitted separately for males and females in the private and the public sectors of the economy.

The overall conclusion from these earnings functions analyses is that there is a strong and positive relationship between the earnings of employees and their educational level. Our figures show that the two basic human capital characteristics of employees, that is, schooling and labour market experience, accounted for more than one third of personal earnings variation (ranging from 37% in the case of 1977 NSSG data to 66% in the case of the 1987 Ministry of Education data, referring to entire data sets, irrespective of gender). This is high for cross-section estimates, and compares well with the respective from the international literature. When we disaggregated for the two economic sectors, that is private and public, the superiority of the explanatory power of the basic human capital model in the public sector became clear . That was expected and was mainly due to the fact of the highly institutionalised pay of that sector, as opposed to the private sector where productivity

related characteristics are valued more.

In addition to the above, it has been also found that the basic human capital model has behaved quite well. That is, the schooling and experience variables were found, in the majority of the analyses, to be highly significant and negatively related, as expected, in the sense the more the schooling the less the individual has had time to work. The negative significant coefficient of the experience-squared variable indicated that earnings rise but level off as experience increased (except in the Ministry of Education data set where it was found to be positive denoting non-strictly parabolic experience-earnings profiles -- see Table 4.10). The step specification of the fitted earnings functions produced results indicating that secondary education has lost its importance in determining earnings over time, mainly because to its near universalisation. University education though, was found to be significantly and consistently associated with a considerable earnings premium over the other levels of education. However, the non-linear in years of schooling specification did not give a clear consensus concerning the signs of the coefficients.

Another finding, stemming from the earnings functions analyses, is that males ceteris paribus earn on average more than females, while the effect of the equalisation policies of the Socialist administration of the 1980s is evident for the mid-1980s.

When other personal characteristics of employees were entered in the analyses the explanatory power of the model was increased substantially (that is by more than 10%, except for the

case of the public sector payrolls where the increase varied from 3-8%). The inclusion of those characteristics in the human capital earnings functions of Section 4.2.1.4 pointed towards bias-free results, by leaving the schooling coefficient virtually unaffected. The extended earnings functions have also confirmed that: (a) being male is automatically associated with higher pay, (b) married employees earn on average more than their counterparts with no family responsibilities, (c) an additional child in the family implies higher earnings, and (d) specialised training is associated with a substantial earnings premium, levelling significantly higher than the respective for an additional year of schooling.

Finally, the issue on the use of potential, in the absence of real, labour market experience variable in earnings functions were tested in Section 4.2.1.5. The analysis indicated that the potential specification of the experience variable could be used and it is pointing to the "correct" direction, although it is intuitively assuming no periods of unemployment.

CHAPTER 5

THE RETURNS TO EDUCATION

In this Chapter we are going to present the returns to education estimated on the basis of the earnings functions which were fitted and discussed in Section 4.2 of the previous Chapter. These returns will be presented and discussed separately from the poit of view both of the individual and society.

This thesis has shown that there is apparently a strong excess social demand for higher education in Greece. The rate-of-return approach has been considered as being able to offer a plausible explanation of the phenomenon. In detail, the study of the ratios of rates of return to investment in education over time, rather than their levels, will provide valuable indications as to where are we heading to, or say, evaluate the economic efficiency of education. The comparison of their levels, however, among different periods of time may provide significant insight to the changing importance of education as an economic productivity augmenting factor in the Greek economy. The study of the comparative position of these rates with the respective ones for other countries, for which data are readily available, would mask Greece's international standing. The levelling of rates of return over time in conjunction with distinct changes in the quality of the population and the labour force, would adhere further evidence on the functioning of the labour market in the small open economy of Greece. In addition, by contrasting the calculated (ex post) to the expected (ex ante) rates of return,

we could rationalise the issue of the increased social demand for education from a different perspective. Finally, by calculating the social rates of return we will be able to estimate the level of the public subsidisation of higher education and form an overall picture with educational finance implications.

5.1 PRIVATE RATES OF RETURN

The private rates of return which are going to be presented here have been estimated on the basis of human capital earnings functions fitted in Section 4.2. As we have already argued in Section 4.2.1, three earnings functions types have been fitted, resulting to an equal number of calculated returns to education. First, the rate of return stemming from a classic Mincerian specification is defined as being simply the coefficient of the years of schooling variable, referring to as the average rate of return, meaning the percentage increase in the earnings of an individual having completed an extra year of schooling (see Section 1.2.2). Second, as summarised in Section 1.2.3, the need to add a specific education dimension in the average rate of return concept, has been possible in two distinct ways. The one being through the "crude way", that is by including a years-of-schooling-squared term in the previous function. Having done so, the rate of return is defined as the outcome of a summation, involving on the one hand the coefficient of the years of schooling variable, and on the other hand the schooling-squared coefficient times twice the years of schooling corresponding at the educational level under consideration. The other practice is

through the "refined way", being the step specification of the Mincerian earnings function. This specification involves a higher degree of sensitivity in the estimation of education level specific rates of return as opposed to the previous one. The rate of return according to this specification is defined as the difference between the coefficients of two successive education dummy variables divided by the difference in the number of years of schooling between the two educational levels under comparison.

A first comment, with reference to these rates of return to investment in education, is that they are void of adjustments for ability, non-pecuniary benefits and disbenefits of jobs, quality of schooling, and so on. This was not permitted by the data available which, amongst some other problems discussed throughout the analysis, were mostly quantitative rather than qualitative variable-wise. Therefore, in that sense, the calculation of biased-free rates of return has not been possible. Even though, given that the purpose was not to calculate the effect of these adjustments on the statistic but rather the statistic itself, the fact of the fairly low returns -- especially for the most recent years -- should be considered. Thus, a downward adjustment, so as to incorporate for these factors, would have resulted to even lower rates of return of perhaps unobservable size.

5.1.1 Overall Returns to Education

Here we are going to present the overall or Mincerian rates of return to an additional year of schooling, stemming from the simple Mincerian model. These returns will be examined separately according to the sector of competitiveness and the

gender of employees.

Table 5.1 gives Mincerian rates of return to schooling for both sexes and entire samples. It shows that the average rate of return to investment in education in 1975, was of the order of 5.8 per cent. By 1985 it was 3.4 per cent. The same declining pattern is observed for both genders (see Appendix Tables C-1 and, C-2), while one could say that the returns to males have been higher, in general, than those of females.

Table 5.1. Mincerian Rates of Return to Schooling, Both Sexes, Entire Samples, 1975-85

Sample	Year	Rate of Return (%)	Number of Observations (N)	Adjusted R-squared
IEIR	1975	5.8	587	0.44
NSSG	1977	5.2	7,058	0.37
IEIR	1981	4.1	637	0.46
IEIR	1985	3.4	693	0.48

Source: IEIR: from Table 4.4
NSSG: from Table 4.2

An identical declining pattern is observed in Table 5.2, when examining the private sector alone. The rate is ranging between 7.5 (1977) and 3.0 per cent (1985) -- note the discrepancy between the 1975 and the 1977 figure, mainly due to the quality of the available data. The table also indicates a further erosion of the earnings advantage of those employed in the public sector for 1986 and 1987. As far as the levels of the rates of returns between the two sectors are concerned, it is shown that the public sector yields constantly higher rates of return -- with the exception of the 1977 estimates showing an

equal yield -- building up in favour of the certification argument. Though, one should remain cautious in deriving conclusions, given again the heterogeneity of the data utilised for such analyses. Male earnings could be more appropriate in determining such a proposition (see below).

Table 5.2. Mincerian Rates of Return to Schooling by Economic Sector, Both Sexes, 1975-87 (percent)

Sample	Year	Economic Sector	
		Private	Public
IEIR	1975	3.1	6.3
NSSG	1977	7.5	7.5
IEIR	1981	3.4	4.4
IEIR	1985	3.0	3.5
Public Sector a/	1986	...	2.3
Public Sector b/	1987	...	3.1
Public Sector c/	1987	...	4.0

Source: IEIR: from Table 4.5
NSSG: from Table 4.2
Public Sector: from Table 4.10
Notes: a/ Ministry of Finance
b/ Ministry of Education
c/ State-controlled Bank (HIDB)

The respective analysis for the male population appearing in Appendix Table C-3 shows a clear-cut pattern towards a gradual deterioration of the years of schooling coefficient during the 25-year period. That is, the rate of return has fallen to less than half of its size, i.e. from 9.2% to 3.9%, between the early 1960s and the mid-1980s. It is also obvious from this table (C-3) that the returns have shifted quicker towards very low levels

(i.e. from 6.4% and 7.3% in the mid-1970s, became 2.6% -- or 4.3% -- in 1987), with respect to the non-competitive sector of the Greek economy. This is principally attributed to the post-1981 egalitarian pay policies in the public sector and the increased government intervention in determining wages. With respect to the screening or certification argument, pre-1980 figures support its existence, while post-1980 evidence suggests otherwise (see also Section 6.1 on the topic).

Lastly, the female earnings function analyses for the competitive sector of the economy produced, in their majority, statistically insignificant results (see Appendix Table C-4). It is clear, however, that although public sector employment may offer job-security, tenure and other non-pecuniary benefits, it yields very low rates of return, lessening during the years (i.e. from 6.2% and 8.6% in the mid-1970s to around 3.0% in 1987).

5.1.2 Education Level Specific Returns

In this Section we will present education level specific rates of return to investment in education. As we have already argued in the beginning of the Chapter, there are two distinct ways in doing so. The first is through what we have defined as the non-linear in years of schooling earnings function specification and the second is through the step specification.

The 'Non-linear in Years of Schooling' Specification

Table 5.3 depicts rates of return to the various educational levels according to the 'non-linear in S' specification for both sexes, based on entire sample estimates.

Table 5.3. Mincerian Rates of Return to Schooling by Level of Education, Both Sexes, Entire Samples, 1975-85 (%)

Sample	Year	Level of Education		
		Primary	Secondary	Higher
IEIR	1975	-8.8	10.4	23.2
NSSG	1977	6.3	5.1	4.3
IEIR	1981	-6.6	6.6	15.4
IEIR	1985	-3.9	4.5	10.1

Source: IEIR: from Table 4.6
NSSG: from Table 4.3

A first examination of this table points to a direction of mixed views. The quality and comparability differences of the data sets in our disposal is again to be blamed for the observed inconsistencies in the pattern of the calculated rates of return. In detail, contrary to the Human Capital "rules", the Greek experience suggests that rates of return increase -- rather than decrease -- as one completes more years of education. This is, of course, not applicable in the case of the examination of the 1977 rates, referring to the NSSG nationally representative survey, which comply with the (not-necessarily-not-to-be-broken) Human Capital "law". The same commentary applies when studying the returns by gender (see Appendix Tables C-5, and C-6).

A second look at the same table (5.3) reveals that primary education, irrespective of gender (see Appendix Tables C-5, and C-6), yields negative returns on investment, ranging from a meaningful -9.0 per cent in 1975 to about -7.0 per cent six years later and becoming -4.0 per cent in 1985. The exception to the rule of the negatively signed rates is again the 1977 figure, suggesting a moderate positive rate of 6.3%. Nevertheless, if we

overlook this inconsistency, it is clear that the pattern is ascending during the 1975-1985 decade, and constantly points through at the non-profitability of this level. If the previous statement is accepted, one could put as an explanation of the phenomenon the near universalisation of this level of education, as well as that of the secondary level, therefore, the observed negative returns.

Coming to the secondary education profitability rates, depicted in Table 5.3, the ascending pattern of the rates during the years, evident in the primary education estimates, is reversed to the familiar from the average rate of return trend, implying a diminishing path. That is, the rate is less than halved during the ten-year period, applying to both genders (see Appendix Tables C-5, and C-6).

Additionally, when investigating the rates of return of the successive educational level, it is obvious that they follow an analogous -- to the secondary level -- declining trend, but they level significantly higher (applicable for both and each of the genders separately), pointing at the comparatively high position the Greeks put on University education.

If we distinguish by economic sector, ascending patterns on the magnitude of the rates of return as one completes more years of education are presented for both sectors under consideration by gender. This, somehow, contradicts the human capital experience, while, in this case, the 1977 figures abide with the pattern and there are many insignificant observations.

In detail, as far as the public sector of the Greek economy is concerned, it is apparent the ascending, but negative, pattern

of the returns to primary education until the year 1985, where it reverts to positive by 1986 having a zero value and just over half per cent in 1987 (see Appendix Tables C-7, C-8, and C-9, referring to both sexes, males, and females respectively). Secondary education yields rates below ten per cent, and here we have again the law of the diminishing rates of return through time. Post-secondary, non-university education presents poor returns of about 4.0 per cent (1986 and 1987), which are slightly larger than the respective for secondary education. In the case of university education, the diminishing rates of return "law" is again evident, suggesting that the importance of this level of education in public employment has lessen over time. In detail, the sizeable 21.0% of 1975, has stabilised to a modest 5.0% in 1986-87. Finally, post-graduate studies in the mid-1980s, yield just less than one per cent above university education, emphasising the relative non-profitability of this level.

In the competitive sector, things are very much the same, in both trends and levels of the observed rates of return, with the non-competitive sector of the economy. A comparison among the returns for males in the two sectors, withholds the screening argument and directs towards the proper functioning of the market (see Appendix Tables C-10, C-11, and C-12, referring to both genders, males, and females, respectively).

The Step Specification

Next, we are going to discuss comparison rates of return to secondary and higher education -- primary education is not available because is acting as the control group -- according to

the step specification. In is evident from Table 5.4, that a variability of patterns exists in this case as well, for both the levels and the trends of the rates of return over time.

Table 5.4. Rates of Return to Schooling by Level of Education, Both Sexes, Entire Samples, 1975-85 (percent)

Sample	Year	Secondary (vs. Primary)	Higher (vs. Secondary)
IEIR	1975	0.1	15.7
NSSG	1977	5.5	5.4
IEIR	1981	0.1	11.1
IEIR	1985	1.0	8.0

Source: IEIR: from Table 4.8
NSSG: from Table 4.2

Specifically, the returns to secondary, as compared to primary, education do not appear to be significantly higher than zero throughout the decade into consideration. This is so, but with the exception of the 1977 figures which fare to about 5.0 per cent when looking at both genders and males, while the rate is double than that (10.0%) for females (see Appendix Tables C-13 and C-14, referring to males, and females, respectively).

Significant changes evolve in the higher versus secondary education category of Table 5.4, with respect to the size of the statistic, being about 16.0% for 1975, 11.0% for 1981, and finally around 8.0% for 1985. In this case, the 1977 figure differs significantly to the one reported for 1975, suggesting a rate of return of about one third of the size of the latter, that is, levelling around 5.0%. It is of interest, that for the 1977 case, there is no significant difference between the rates of the two successive educational levels, with the exception of women

who seem to yield higher returns being educated at the secondary rather than the higher level of education (i.e. 9.7% vs. 4.9%, see Appendix Table C-14). A conclusive note to the above, should be the trend on the diminishing importance of higher education through time, pointing at the comparative deterioration of this level of education at the labour market during the time span into consideration.

A further disaggregation of the presentation of these comparison rates of return into the competitive and non-competitive sectors of the economy, which is presented in Table 5.5, will add more information and sensitivity in their study.

Table 5.5. Rates of Return to Schooling by Level of Education, Both Sexes, Public Sector, 1975-87 (percent)

Sample	Year	Secondary vs. Primary	TEI d/ vs. Secondary	University vs. Secondary	Postgraduate vs. University
IEIR	1975	*/	...	16.0	...
NSSG	1977	4.7	...	10.2	...
IEIR	1981	*/	...	10.9	...
IEIR	1985	*/	...	7.6	...
Public Sector a/	1986	1.1	1.8	3.1	1.1
Public Sector b/	1987	1.7	2.9	3.9	1.9
Public Sector c/	1987	2.9	...	5.0	...

Source: IEIR: from Table 4.9
NSSG: from Table 4.2
Public Sector: from Table 4.10

Notes: (...) not available
*/ not statistically significant
a/ Ministry of Finance
b/ Ministry of Education
c/ State-controlled Bank (HIDB)
d/ Non-university, Post-secondary

Exploring firstly the public sector results of Table 5.5, it is of interest to note the changing pattern of the vertical relationship of the returns to investment in education at the secondary level. There is a declining pattern over time, shifting the rate of return from about 5.0 per cent (5.% also in the case of males, and 14.0% in the case of females -- see Appendix Tables C-15 and C-16 respectively) in 1977, to between 1.0 and 2.0 per cent in the late 1980s (note that the statistic is about 4.0% referring to the male employees of HIDB, appearing in Appendix Table C-15).

As also shown in Table 5.5, the TEI (post-secondary, non-university) rates of return estimates have, once again, delivered poor estimates of about 2.0 per cent. The data referring to both genders suggest that a TEI graduate enjoys almost twice the size of a rate of return compared with the respective for his/her colleague with secondary education, but the male and female estimates, separately, suggest that one should remain indifferent for TEI studies (see Appendix Tables C-15 and C-16).

The story behind the university (versus secondary) rates of return estimates, depicts a vertical relationship of rapidly diminishing rates, suggesting, once again, overinvestment in this level of education. In particular, Table 5.5 demonstrates that its size ranges from about 16.0 per cent for 1975, to between 4.0 and 5.0 per cent for the post-1985 period. Compared to the respective secondary education rates, it is evident that university studies provide twice the yield, with the exception of the 1977 female rate (see Table C-16). In addition, when contrasted to the post-secondary, non-university rates, they also

appear to be almost double, despite the negligible/short difference in the length of study (that is, TEI=3 years, University=4+ years).

Rates of return to post-graduate qualifications (Masters and Ph.D.) are available for only 1986 and 1987. These rates, which also appear in Table 5.5, suggest that post-graduate diplomas holders enjoy significantly low yields on their investment, of the order of 1.0 to 2.0 per cent or half the size of the respective university rates. This is puzzling, given the complete lack of such organised programmes in the Greek setting.

Finally, the rate of return analyses for the competitive sector, propose that employment in this sector yields higher returns on educational investment than the public sector. This is so when comparing rates referring to both genders of Tables 5.6 below and Table 5.5 presented earlier.

Table 5.6. Rates of Return to Schooling by Level of Education, Both Sexes, Private Sector, 1975-85 (percent)

Sample	Year	Secondary (vs. Primary)	Higher (vs. Secondary)
IEIR	1975	*/	11.1
NSSG	1977	4.6	12.4
IEIR	1981	*/	11.6
IEIR	1985	*/	7.8

Source: IEIR: from Table 4.9
NSSG: from Table 4.2
Note: */ not statistically significant

That is, the rate of return is constantly and significantly higher than the respective for secondary -- where applicable -- and higher education in the private than the public sector

(horizontal relationship). This is more evident especially when the comparison is made between males (see Tables C-15 and C-17). Finally, the vertical relationship conforms with the declining pattern (diminishing rates of return "law") observed elsewhere.

5.2 SOCIAL RATES OF RETURN

There are various objections -- focusing on a possible aggregation bias -- associated with the utilisation of the "Short-Cut Method" in deriving social rates of return to education, in comparison to the so-called "Elaborate Method" (see Section 1.2.3 and Psacharopoulos, 1981). However, it is also argued (op. cit.) that this approach is ideally ingenious in calculating social rates of return to investment in education, initially because it is stemming from the human capital earnings function methodology, and secondly due to its simplistic nature in that it is requiring only mean earnings by level of education, as well as the resource cost of schooling.

Specifically, the formula in deriving the social rate of return to a particular educational level -- compared with the directly preceding one -- is a ratio, involving the gross earnings difference between the two adjacent educational levels in the numerator, whereas the gross earnings of the comparison education level prolonged by the resource cost of schooling of the desired educational level times their difference in years of schooling conforms the denominator (for a detailed description on the derivation of this formula see Section 1.2.3). This formula can be also interpreted as the yield of a permanent constant stream of benefits over a lump sum cost of projected earnings plus direct outlays. Mean post-tax earnings have been utilised -- due to the unavailability of pre-tax earnings -- for its calculation, based on the respective samples (see Appendix Table C-19) and cost figures have been taken from Table 2.8.

Despite the methodological drawbacks and objections, the short-cut method was considered as the most appropriate approach in calculating social rates of return for the Greek setting. The previous decision is justified on technical grounds rather than methodological considerations, while one should remain more sceptical in its utilisation for private rates of return estimates (see for example Table 5.7). In detail, it is considered that the possibility of an aggregation bias is minimal, because the resource cost of schooling will be added in the denominator (and this cost is sizeable). In other words, neither the implicit permanent benefits assumption, nor the lumping together costs are critical for the calculation, since the latter occur within a limited number of years and the former extend over several decades. Also, given the purposes of the study, it has not been possible for the resource cost of education to be compiled and refined according to what the theory would expect, but it was taken from official Ministry of Education estimates. Finally, the purpose is to detect trends over time rather than absolute levels of the statistic, although within year comparisons among the various educational levels would point on economic efficiency considerations of the educational system and determine, to a degree, investment priorities.

Having commented the above, it is now time to present the estimates of social rates of return to higher education for the Greek setting. Table 5.7 demonstrates the familiar, from the private rates of return estimates, diminishing pattern of the statistic during the 27-year period under consideration.

Table 5.7. Approximate Social and Private Rates of Return to Investment in Higher Education, 1960-1987 */

Year	Social Rate of Return (%)	Private Rate of Return (%)
1960/64	13.7	20.7
1975	20.3	25.2
1977	4.5	5.9
1981	12.2	15.5
1985	7.9	9.6
1987 University	2.6	3.6
Non-univ./post-sec.	0.6	0.8
Post-graduate	3.2 a/ 4.1 b/	5.4

Source: Unless otherwise stated based on mean earnings from Appendix Table C-19; cost figures from Table 2.8
1960/64 (Social): Psacharopoulos, 1982a, Table 8, p.341
Note: 1987 estimates refer to the Ministry of Education data
1960/64 rates refer to the private sector
*/ based on the "short-cut" estimation method
a/ estimate assuming one year direct private cost abroad
b/ based on the social domestic cost for higher education

Inconsistencies on the level of the statistic during the years are mainly due to sample differences (that is why, for example, the statistic appears to be 20% for 1975 and just 5% for 1977). Given that three of the data sets are homogeneous, referring to the years 1975, 1981 and 1985, the previously mentioned declining pattern becomes clear. Thus, whilst investing in university education has been a highly profitable investment to the society during the 1960s, yielding around 14.0 per cent, a sudden drop by more than three times is observed for the mid-1970s. Likewise, a sharp decline of the social profitability level is also apparent during the decade 1975-1985. The statistic escalated from 20.3%

to about 12.2% in 1981, and has finally dropped to almost 7.9% in 1985. Moreover, the most recent data suggest an altogether poor social rate of return to higher education. University education yields some 2.6 per cent, while post-graduate studies appear to be relatively more profitable to the society, yielding 3.2 per cent. It is of interest to add here, that post-graduate studies are contrasted to first university degrees, as well as that the resource cost taken in the estimation has been the significantly high cost of studying abroad borne by the individual and not by the society (see Table 2.8). This is so, because there are no organised studies at this level in Greece yet and those willing to further their education have to study at foreign universities (for a comprehensive presentation on the issue of foreign study see Chapter 7). In addition, the social rate of return to post-graduate studies has also been calculated based on the hypothesis that such programmes were offered by the Greek universities. Therefore, the social cost underlying in such a hypothesis, has been taken to be the domestic one for higher education as a whole. The result pointed to a significantly higher -- by almost 60% -- social rate of return, that is, 4.1 per cent, compared with the one referring to first degree university studies.

It is also noteworthy the negligible size of the social yield on investment at the 3-year duration TEI institutes (post-secondary, but non-university status), being almost zero. This statistic, that is, 0.6 per cent, is conveying considerable policy implication messages and adds further to the recent debate on the status of these institutions.

If one wants to compare these approximate social rates of

return to the respective private ones it would be possible to assess whether educational investments differ in profitability when considered from those two distinct angles, that is the individual and the societal. In order to do that, private rates of return have been recalculated based on the "short-cut" method as well. The reason for calculating additional private rates of return has been to overcome the previously mentioned possible aggregation biases among the various estimation methods. The results, appearing in Table 5.7, show that both rates of return series portray an analogous declining pattern. Private rates of return to university education are consistently and considerably higher than the social rates throughout the time span under consideration. This is clearly demonstrated in Table 5.8, where the comparative advantage of the private over the social rates of return, or the so-called public subsidisation of education, varies between 20% and 50%. The reason for the above observed excess is that education is publicly subsidised. The Greek pattern of the level of public subsidisation of higher education compares favourably with the respective referring to the average of a set of advanced countries, amounting to 44%, while it is surpassing considerably the 7% figure referring to intermediate countries (Psacharopoulos, 1985, Table 2). In addition, the 69 per cent degree of subsidisation for post-graduate degrees in 1987 is, somehow, misleading because the cost of these studies refers to the individual and not the society. Had there been such studies in Greece, the index would have dropped to 32 per cent, leaving 37 per cent direct private contribution.

Table 5.8. The Index of Public Subsidisation of Higher Education, 1960-1987

Year	Private over Social Rate of Return Advantage (%)
1960/64	50.9
1975	24.1
1977	31.1
1981	27.0
1985	21.5
1987 University	38.5
Non-univ./post-sec.	33.3
Post-graduate	68.8 a/
	31.7 b/

Source: Based on Table 5.7
Note: 1987 estimates refer to the Ministry of Education data
a/ estimate assuming one year direct private cost abroad
b/ based on the social domestic cost for higher education

Finally, and further to the above, it seems that the 1987 figure for post-graduate degrees, not only in absolute but also in relative terms, that is, in both within and across series comparisons, is consistently higher than the respective ones for university and non-university, post-secondary studies. That is, in both instances -- when either privately or socially considered -- the comparative investment advantage lies with the post-graduate degree holders. Thus, in order of importance the pattern seems to be Post-graduate>University>TEI or 3.2>2.6>0.6. This is also applicable in the case where the figure under consideration is the one based on the domestic rather than the foreign cost for higher post-graduate education studies.

5.3 DISCUSSION

A major question posed after the assessment of the profitability of the educational investment is whether the observed rates of return to schooling are similar and comparable to that on equally risky physical capital and the market interest rate. This is a point which enables to assess whether the returns are on the low or the high side. Whether the returns to education are much above or much below the reference rates, is a matter of testing the "validity", in a sense, of the human capital model in explaining various aspects of schooling. Though, one should remain sceptical, given the above, and pay extra attention to the fact that the rate of return to education is a relative concept. A rough comparison between the returns to human and physical capital appears in Table 5.9, suggesting two distinct paths, if differently considered.

Table 5.9. Returns to Human and Physical Capital, 1960-1985 (%)

Year	Human-1		Physical		Human-2
	Overall (Mincerian)				Higher Education
1960	9.2	>	5.0	<	15.0
1964	8.6	>	5.0	<	14.4
1975	4.8	<	9.0	<	15.1
1977	6.8	<	7.5	<	10.5
1981	4.9	<	14.0	>=	13.7
1985	3.9	<	15.5	>	10.2

Source: Physical: Bank of Greece, 1986, Table 29
Human-1: Appendix Table C-3
Human-2: Appendix Table C-17
1960 and 1964: from Psacharopoulos, 1982a, p.340

Notes: Returns to physical capital refer to the upper bound of interest rates on bank deposits (savings) with commercial banks (in drachmas)
Returns to human capital refer to males in the private sector

Specifically, according to Table 5.9, if the overall rate of return to a typical year of schooling is considered, then the advantage during the 1960s lies with human capital, while since the mid-1970s the pattern is reversed. Though, if the returns to higher education are considered instead, it becomes obvious that human capital maintains an advantageous position throughout the two decades 1960-1981 -- following a diminishing manner -- and it is only after 1981 that started losing some ground.

Summarising, it could be argued that human capital as a whole suggests a very poor investment, whereas if the educational level is specified in the form of higher education conforms a competent investment and worthwhile activity and the returns are mostly on the "high" side. Furthermore, the post-1981 experience could be indicative of some form of development, given that international experience suggests that human capital is more profitable in developing countries, i.e. 15% versus 13%, while in advanced countries the gap is narrower, i.e. 9% versus 11%, for the 1970s respectively (see Table 8, Psacharopoulos, 1985).

So far, various aspects of the Greek context have been expounded and it is after the calculation of the yield on educational investment that will allow to be considered in a coherent manner. At first, we will attempt to summarise the rates of return results, we have presented in Sections 5.1 and 5.2, over time.

Tables 5.10 and 5.11 endeavour to summarise the rate of return results over time by gender and sector of employment, referring to the rate of return to an extra year of schooling, and higher education, respectively.

Table 5.10. Mincer-Type Returns to Education by Gender and Sector of Employment, 1975-1987 (percent)

Year	Men			Women		
	All Sectors	Private Sector	Public Sector	All Sectors	Private Sector	Public Sector
1975 a/	6.2	4.8	6.4	5.4	*/	6.2
1977 b/	4.8	6.8	7.3	6.8	7.4	8.6
1981 a/	4.3	4.9	4.0	3.8	*/	4.7
1985 a/	3.7	3.9	3.3	3.0	*/	3.6
1987 c/	...	...	2.6	...	...	2.9
1987 d/	...	...	4.3	...	...	2.8

Source: All Sectors: Appendix Tables C-1 and, C-2
Private - Public Sector: Appendix Tables C-3 and, C-4
Note: */ statistically insignificant
a/ IEIR Sample
b/ NSSG Sample
c/ Public Sector Sample: Ministry of Education
d/ Public Sector Sample: State-controlled Bank (HIDB)

The underlying reason for such a refinement is twofold. Initially, it is well known that, for a variety of reasons, women in all countries earn on average less -- and in most cases substantially less -- than men. This does not automatically imply lower rates than those of men as it will be shown below, given that the rate of return is a relative concept and not a measure of underpayment. Secondly, rate-of-return estimates in recent years are increasingly based on the earnings of those employed in the competitive sector of the economy where the benefits of education better reflect the worker's productivity.

To elaborate on the former remark, both Tables 5.10 and 5.11 are utilised. They indicate that regardless of economic sector considered it should not be surprising that the profitability of

Table 5.11. The Returns to Higher Education by Gender and Sector of Employment, 1975-1987 (percent)

Year	Men			Women		
	All Sectors	Private Sector	Public Sector	All Sectors	Private Sector	Public Sector
1975 a/	16.2	15.1	15.9	14.9	*/	15.9
1977 b/	4.9	10.5	9.8	4.9	10.1	7.7
1981 a/	11.6	13.7	10.7	10.4	*/	11.1
1985 a/	8.3	10.2	7.4	7.5	*/	7.7
1987 c/	...	...	3.4	...	...	3.5
1987 d/	...	...	4.8	...	...	4.0

Source: All Sectors: Appendix Tables C-13 and, C-14
Private Sector: Appendix Tables C-17 and, C-18
Public Sector: Appendix Tables C-15 and, C-16

Note: */ statistically insignificant
a/ IEIR Sample
b/ NSSG Sample
c/ Public Sector Sample: Ministry of Education
d/ Public Sector Sample: State-controlled Bank (HIDB)

investment in women's education is occasionally greater than that of men. On the contrary, this rate-of-return differential in favour of women may be an underestimate, because the rate of return to investment in women's education, as commonly calculated, does not take into account the increased probability of more educated women participating in the labour force. For example, according to the most recent data (NSSG, 1985) the labour force participation of working-age women aged over 14 ranged from 22 per cent for those who had no schooling and attended at least one grade at the primary school, to 36 per cent for those who had primary education, and, to an impressive 78 per cent for those with a university education. For contrasting

purposes, the participation rates for men were, 42%, 77% and 88% respectively. This is a valid point on which the decision to rely mostly on males' rates-of-return estimates in deriving conclusions and policy implications is justified.

According to Table 5.11, the private rate of return to higher education in 1975 was of the order of 15 per cent, and there was not much difference between the public and the private sectors of the economy. One could interpret such finding that, under a conservative Government, the labour market was more or less in equilibrium in the sense that the two sectors offered competing premiums to university graduates. Yet, by 1985, the earnings premium of those employed in the public sector had eroded, an obvious reflection of the pay equalisation policy of the socialist Government. Those employed in the private sector continued to enjoy a 3 percentage points premium relative to those in the public sector. It becomes obvious therefore, that if relied on the returns to education based on data referring in all sectors, the outcome might have been an underestimate (for an international perspective see Appendix Table C-20). This is mostly because the inclusion of public sector earnings and the equalisation policy of pay scales are, mainly, responsible in flattening mean earnings differentials, which, by extension, depress the returns to education. In addition, such a finding lends no support to the so-called screening or certification hypothesis (see also Section 6.1).

Beyond such private-public sector comparisons, the rate of return to investment in higher education has fallen in the 1975 to 1985 period. As evidenced by both Tables 5.10 and 5.11, the

fall has been spectacular during the period under consideration, mostly for the overall statistic and that which refers to higher education. The decline, though, has been more impressive and faster in the non-competitive sector than the competitive sector of the economy.

One should also consider two alternative rationalisations in relation to the rate of return concept. The first being the relationship between the rate of return and the level of economic development and the second the association of the statistic with the evolution in educational expansion. Table 5.12 depicts an inverse relationship between the overall rate-of-return to investment in education against the level of economic development of the country, as this is expressed in terms of GNP per capita.

Table 5.12. Overall Rates of Return and Per Capita Income, 1960-1985

Year	GNP per capita (current US $)	Overall (Mincerian) Rate of Return (%)
1960	471	9.2 */
1964	619	8.6 */
1975	2,318	6.2
1977	2,810	4.8
1981	3,774	4.3
1985	3,294	3.7

Source: OECD, National Accounts of Greece, respective years
Mincerian: Appendix Tables C-1 and C-3
1960 & 1964 from Psacharopoulos, 1982a, p. 340
Notes: Returns refer to males, entire samples
*/ refer to the private sector

This negative relationship seems to be very strong from 1960 till 1981, while it is immediately apparent that there is a discontinuity in the post-1981 period. In particular, although the per capita income appears to follow a reversible pattern in 1985 the overall yield on the educational investment continued to drop further rather than increase or remain stagnant. The observed pattern, appearing in Table 5.12, of the declining returns to education by increasing level of economic development is consistent with what the theory expects, namely diminishing marginal returns to investment in human capital.

Secondly, one should seriously consider the case of the rapid educational expansion, which took place in the last decades in Greece and, the evolution of the rates-of-return to investment in education. This could be explored in two ways. Initially, by considering relative enrolments and, secondly through the development of the educational level of the population and the labour force. Table 5.13 suggests that there is indeed a polar relationship between the evolution of relative enrolments and the rate-of-return to investment in higher education, being either privately or socially taken. Relative enrolments in Table 5.13 are expressed as the ratio of the total higher education over secondary education enrolment and, are taken as such because the rate-of-return itself is a relative concept as well. The comparative stability of the relative enrolments during the 1975-1981 period is also reflecting the returns for the same period, which fluctuated between 15 and 14 per cent, conforming also with the 1960s trends where enrolments were substantially less. The sound increase in relative enrolments for the mid-1980s, as well

as, the accumulated fluctuations of the 1970s resulted to the decline of the higher education profitability yield. The same applies to the social rate of return, as this is studied relative to the index of public subsidisation, where it becomes obvious that the higher the rhythm of the evolution in enrolments, the less the degree of subsidy. Had the returns considered been the overall ones, rather than for higher education, the pattern would have been a clearly diminishing one.

Table 5.13. Rates of Return, the Index of Public Subsidisation of Higher Education and Relative Enrolments, 1960-1985

Year	Private Rate of Return to Higher Education (%)	Index of Public Subsidisation of Higher Education	Enrolment in Higher relative to Secondary Level
1960	15.0	50.9	0.10
1964	14.4	50.9	0.15
1975	15.1	24.1	0.17
1977	10.5	31.1	0.18
1981	13.7	27.0	0.17
1985	10.2	21.5	0.22

Source: Private Rate of Return: Appendix Table C-17
Public Subsidisation Index: Table 5.8
1960 & 1964: from Psacharopoulos, 1982a, p. 340
Relative Enrolment: NSSG, "Education Statistics"
Notes: Returns to higher education refer to males in the private sector

At this point, the case of the ex ante versus the ex post rates of return should be also considered. The significance of this comparison lies in the study as to where these two distinct angle rates have evolved following a similar pattern over time

and to what degree their levels are differing. There have been studies where expected rates of return to investment in education were calculated (see for example Psacharopoulos and Soumelis, 1979 and, Papas and Psacharopoulos, 1987). Secondary school seniors have been asked to indicate their expected salaries if they remained with a secondary school degree, and if they had a university degree. Availability of these two types of information permits the estimation of an expected or, ex ante, rate of return to investment in university education. Table 5.14 shows that the expected rate of return, as perceived by the students, is sizeable.

Table 5.14. Expected Rates of Return to Higher Education in Greece, 1974 and 1986

Year	Institution/Gender		Expected Rate of Return (%)
1974			29.4
	Non-Univ. Post-Secondary	20.0	
	Non-selective University	28.0	
	Selective University	44.0	
1986			14.8
	Males	18.3	
	Females	8.4	

Source: 1974: from Psacharopoulos and Soumelis, 1979, p. 170
1986: from Papas and Psacharopoulos, 1987, p. 492

In detail, Table 5.14 shows that the expected rate of return to higher education for 1974 was 29.4% while the respective actual (ex post) for 1975 appears to be half the size, i.e. 15.7% (see Table 5.4). Similarly, the expected higher education yield for

1986 appears to be 14.8% against 8.0% for 1985 (see Table 5.4) and 3.9% to 5.0% for 1987 (see Table 5.5), the latter referring to the public sector. Moreover, analogous discrepancies are observed when disaggregating for gender and when referring especially to males, while females seem to be more realistic as far as their labour market expectations are concerned. Thus, one could argue that it is exactly this rate of return that drives behaviour towards higher education, not the actual, ex post, rate of return. Again, consistent with the market forces discussed earlier, the expected rates of return have fallen significantly between 1974 and 1986, as a result of the squeeze of the wage differential cited earlier (see also Section 3.3).

Although international comparisons, in general, do not enjoy much credence in the literature, a selected citation of rates of return to schooling, in general, and higher education, in particular, will be given, so as to assess, relatively speaking, Greece's standing according to patterns observed internationally. Appendix Tables C-21 and C-22, present rates of return to educational investment for a set of selected countries -- mostly European -- borrowed from Psacharopoulos (1981 and, 1985). These countries are mostly European, and Hong Kong, Iran and Malaysia were included because of the significant number of higher education students studying abroad.

In detail, the Mincerian rate-of-return comparison (Appendix Table C-21) suggests that the yield on educational investment in Greece fares quite low as compared to above set of selected countries. However, when comparing the private returns to higher education, Greece appears to hold a competent position among the

majority of the developed countries until 1985, while the higher educational investment levels low when the developing countries of Appendix Table C-22 are considered. A similar pattern is implicit from the social rate of return side.

Finally, the case of the social dimension of the returns to education is considered, in the form of the public subsidisation of higher education, as this was presented in Table 5.8 and Table 5.13 above. The advantage of the private over the social rate of return (or subsidisation index) has been following a declining pattern during the period 1960-1985, relatively speaking. This is justified on the basis of the previous argumentative rationalisation with respect to the private rate of return, which is applicable in this case as well. Social rates of return, in general, follow a similar declining path and, they are consistently lower than the respective private ones (for an international documentation see Appendix Table C-22) alongside with the evolution of the level of economic development and, the apparent educational expansion.

In detail, the only discrepancy appears in the latest year available, namely 1987, referring to analyses of public sector data. All post-secondary education levels considered, presume higher degrees of State subsidy than the observed for 1981 and 1985, the highest being for post-graduate studies. This, in turn, suggests that that there exists room for private finance at the higher education level. To put it in Psacharopoulos' (1981, p. 333) words, "a shift of part of the cost burden from the state to the individual and his family is not likely to lead to a

disincentive of investing in higher education given the present high private profitability margin".

5.4 SUMMARY

To this point, a wide variety/selection of rates of return estimates have been presented. These rates refer to both the individual and the society and, distinguish educational level, gender, and contol for the competitive and the non-competitive sectors of the economy. Also, given that the rate of return is a relative concept, various judgements on the economic efficiency of education should be based mostly on its ratios rather than its levels, being either private or social, with the exception of within year comparisons.

Table 5.15 attempts a grand summary of the rate of return results, presented in this Chapter, over time, that is, 1960 to 1987, in juxtaposition with the changes of the educational composition of the population and the labour force. The rates presented distinguish for the competitive and the non-competitive sectors and refer to males for all the reasons expounded above (see Section 5.3). A graphic presentation of the data in question proves to be very illuminating. That is, Figures 5.1 and 5.2 depict the shifts of the (reduced form) intersections of the implied supply and demand curves for educated labour. Whether the pattern refers to the labour force as a whole, or to those in the labour force with higher education, the trend is clearly downward. Thus, the message is clear; as educational intensity increases, the relative "price" of education (as measured by the rate of return) falls, a fact which is also

Table 5.15. Educational Expansion and the Returns to Education in Greece, 1960-1987

Year	Mean Years of Schooling		Percentage with Higher Education		Private Rate of Return to Education (%)				Index of Public Subsidisation of Higher Education
					Overall (Mincerian)		Higher Education		
	Population	Labour Force	Population	Labour Force	Private Sector	Public Sector	Private Sector	Public Sector	
1960	4.9	3.1	1.7	2.7	9.2	...	15.0	...	50.9
1964	5.2	3.5	2.1	3.4	8.6	...	14.4	...	50.9
1975	6.2	5.8	4.1	7.4	4.8	6.4	15.1	15.9	24.1
1977	6.4	6.5	4.6	8.6	6.8	7.3	10.5	9.8	31.1
1981	6.9	7.9	5.9	10.9	4.9	4.0	13.7	10.7	27.0
1985	7.4	9.3	7.1	13.2	3.9	3.3	10.2	7.4	21.5
1987	7.7	10.0	7.7	14.4	...	2.6	...	3.4	38.5

Source: Educational attainment of the population or the labour forc
extrapolations and interpolations based on the NSSG
Population Censuses of 1961, 1971 and 1981
Rates of return: Appendix Tables C-3, C-15, and C-17
Public Subsidisation Index: Table 5.8
Note: Rates of return refer to males; (...) not applicable
1987 estimates refer to the Ministry of Education data

consistent with theory. This declining trend has been faster in the Greek case as compared to, say, the United States where the "resistance" of the returns, in spite of the rapid higher education expansion experienced during the 1960s, has proved to be more resilient (see Appendix Table C-22). To put it in Welch's (1970, p. 36) terms, the failure of the rate of return to higher education in the USA to decline is due to "changes" that have taken place and which "have resulted in growth in demand for the investment good, education, sufficient to absorb the increased supply with constant or rising returns".

Figure 5.1
Educational Attainment of the Labour Force and the Overall Rate of Return

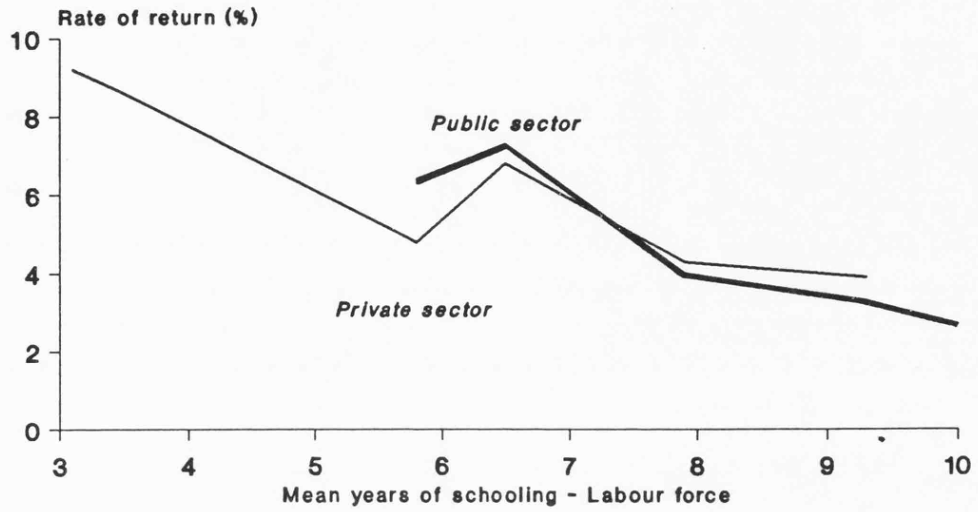
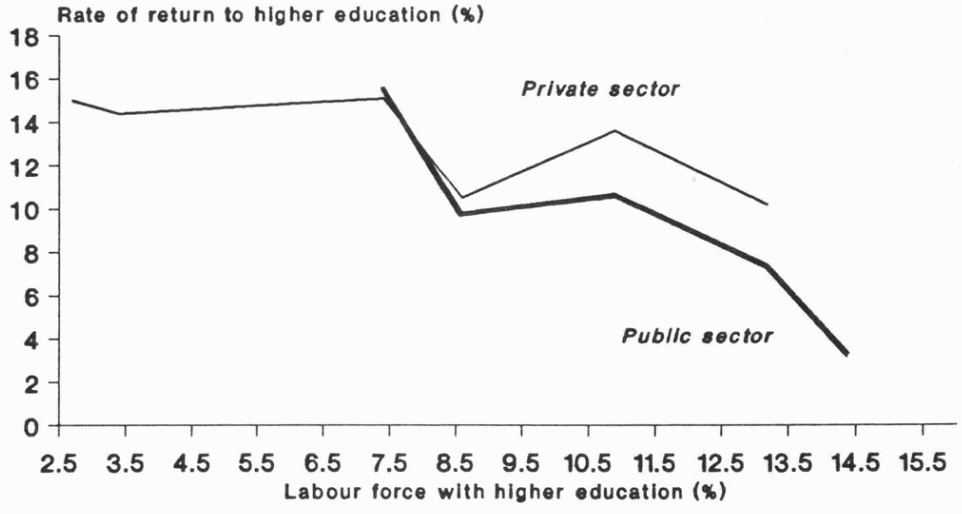


Figure 5.2
Higher Education Expansion and the Rate of Return to Higher Education



In the Greek case though, demand for university graduates has not kept up with the increased supply documented earlier (see Section 2.2.5). Hence, the returns to higher education have fallen, regardless of the sector of employment. he socialist Government alone cannot be blamed for the erosion of the earnings differential of higher education graduates (as argued in Section 3.2.2); market forces have been operating as well. To put it in yet differently(Tinbergen's, 1975) terms, education has lost in its race against technology -- the supply curve has shifted faster to the right relative to the demand curve for educated labour (for an elaboration see Figure 5.2).

In addition, Table 5.16, using data exclusively from the public sector, shows a further deterioration of the returns to education in 1986 and 1987.

Table 5.16. Rates of Return to Schooling in Greece, Public Sector, 1986-1987 (percent)

Year	Mincerian (Overall)	By Level of Education			
		Secon-dary	Non-Univ Post-Sec	Higher	Post-Graduate
1986 a/	2.3	1.1	1.8	3.1	1.1
1987 b/	3.1	1.7	2.9	3.9	1.9
1987 c/	4.0	2.9	...	5.0	...

Source: Based on Tables 5.2 and 5.5
Note: Rates of return refer to both sexes
(...) not available
a/ Ministry of Finance
b/ Ministry of Education
c/ State-controlled bank, HIDB

According to the Mincerian estimate, the overall private rate of

return to investment in education for those employed by the public sector is of the order of two to four per cent. Possession of a university first degree is associated with the highest rate of return, ranging from three to five per cent.

The public sector data also allow for a distinction between additional levels of education (see Table 5.16). They indicate that post-secondary, non-university education (the 3-year Technological Institutes) are associated with returns below two per cent. This significantly low yield points towards the economic inefficiency of such establishments and overturns the common belief that the strict vocational element in higher education programmes is conducive to economic development. It is suggested, therefore, that university graduates fit and are absorbed better by the Greek labour market. Moderate returns are also shown for those who are holders of post-graduate degrees, which appear to hold the last place, profitability-wise, among the rest of higher education levels. This identification is conflicting with the order of the respective approximate private rates of return of Table 5.7, where opposite conclusions were reached. It is reminded though, that the returns appearing in Table 5.16 may be an underestimate of the true ones, based on the argument discussed earlier.

It could be argued, then, that investment in human capital as a whole, with reference to education, suggests a very poor investment in Greece. Investment in higher education represents only a slightly more profitable activity, but one that has experienced a significant decline in its effectiveness over the years. The effect this decline has had on the demand for study

abroad will be discussed in Chapter 7. We now move to a test of the educational screening hypothesis and an application of the earnings function method to evaluate teachers' pay in Greece.

CHAPTER 6

FURTHER APPLICATIONS OF THE EARNINGS FUNCTIONS

In this Chapter we are going to consider two issues with particular importance in educational planning. In detail, in Section 6.1 we are going to test the empirical status of human capital theory, as this is challenged by the Screening Hypothesis (see Section 1.1.1), so as to justify whether our rate of return findings -- of Chapter 5 -- fall within the human capital "laws" or are an outcome of certification. In Section 6.2 we are going to evaluate the pay standing of teachers in Greece against other employees with the same human capital characteristics, so as to assess whether scarce resources to education are allocated efficiently. Both issues are going to be tested as a direct application of the earnings functions in the field of the economics of education.

Therefore, given the importance of these estimates in forming public policy we should then ask: Could the observed positive correlation between education and earnings be attributed to screening or certification? What does human capital tell us about the pay position of teachers in the Greek labour market? Consequently, are the scarce educational resources allocated efficiently?

6.1 TESTING THE SCREENING HYPOTHESIS

As we have already argued in Section 1.1.1 the screening hypothesis challenges directly human capital theory by suggesting

that education primarily serves to screen individuals as opposed to enhancing their productivity. It is well known that the reason for testing such a proposition is to assess whether educational investments fall within the interests of the society rather than the individual. Any individual decision, in general, and whether to undertake further education, in particular, is based on a series of complex evaluations made by the individual which could be either economic or of some other kind. Consequently, what matters most to the individual in aiding his/her decision is the available information. If the signals he/she receives from the labour market are towards the additional certification argument (in the form of better pay) indisputably this will be a "push factor" in encouraging him/her to demand additional studies. The scene is completely opposite and much more serious from the societal angle. Scarce societal funds towards educational investments should be placed to increase the efficiency and equity of the educational mechanism rather than to be wasted as a simple certification -- that is, workers who are non-diploma holders will be actually rejected from jobs they could perform and they were competent to perform. The benefits of such a mismanagement would be exclusively for the individual and consequently the firm(s) he/she is going to be employed. Therefore, the value of such information on educational policy and planning is apparent.

6.1.1 Methodology

A number of empirical studies, designed to test the validity of the screening hypothesis have employed alternative data sets and

techniques, suggesting no clear consensus on the matter by reporting contradictory results. To name but a few, the alternative methodologies "range from (a) comparisons of the rate of return to schooling between the competitive versus the non-competitive sectors of the economy (Psacharopoulos, 1979 & 1983a; Lee, 1980; Shah, 1985; Cohn et al., 1986; Tucker, 1986), (b) comparisons between those in dependent employment and the self-employed in terms of years of schooling (Riley, 1979; Katz and Ziderman, 1980; Cohn et al., 1986), (c) decomposition of earnings (Tucker, 1985), (d) the effect of tenure (Liu and Wong, 1982)" (Arabsheibani, 1989, p. 361), (e) analysis of the relationship between the returns to schooling and job information (Albrecht, 1981; Cohn et al., 1986) and (f) comparisons between the salaries of workers in occupations relevant to their educational qualification to those with the same qualification working in jobs not directly related to their qualification (Wiles, 1974; Miller and Volker, 1983; Arabsheibani, 1989).

Such an argument has not been tested for the Greek context since 1983. Psacharopoulos (1983a) experimented with the 1977 NSSG data (for a description see Section 4.1.2.1) and fitted earnings functions separately for the competitive and the non-competitive sectors of the Greek economy (see Psacharopoulos, 1983a, Table C.2, p. 130).

Given the availability of more recent data, we are going to assess whether screening exists or not in the Greek labour market. In detail, we will utilise the IEIR data, described in Section 4.1.2.2 earlier in the thesis, referring to two post-1980 periods, namely 1981 and 1985. Prior to any empirical analysis

one should expect that a certain degree of screening should exist in the Greek labour market, especially in its weak form, given its structure and functioning (see Section 3.1 and, Psacharopoulos, 1983b and Tzannatos, 1987). It is also informally known that the recruitment policies of the employers in Greece are not so sophisticated and modernised, as compared to the industrialised countries.

A usual confusion among screenists is whether education has a sorting function. This is not the point; education must play a sorting role. However, the focus should be on whether education serves merely and solely as a screening device (for a discussion see Machulp, 1984).

In the analysis that follows the data we utilise do not make possible the separation of the sorting effect from the productivity-enhancing effect. What could be done instead is to test the proposition that education has only a sorting function, using a set of specific hypotheses suggested by previous research methodologies and especially the one on the weak versus the strong versions of the screening hypothesis implicit in Psacharopoulos's (1979) analysis.

Psacharopoulos (op. cit.) investigates the existence of screening by advancing the proposition that screening is more likely to be found in the non-competitive sectors of the economy, where wage scales are often determined by the bureaucracy and linked to education, and where productivity would be more difficult to ascertain. If this is true, then the returns to schooling should be higher in the non-competitive sector than in

the competitive sector.

In other words we should be indifferent to what is defined as "weak" screening, which acknowledges that employers use educational credentials to determine starting salaries, because in most instances this is a common practice. The point which we must test is if earnings at later years are determined indeed by productivity. In other words whether the earnings-age profiles by level of education continue to diverge rather than converge. This is the so-called "strong" screening hypothesis which asserts that if the profiles converge, education has only an informational value, so that earnings differentials by years of schooling must be attributed to screening. Since employers acquire information about workers' abilities over time, it would appear that earnings differentials by years of schooling should gradually diminish and ultimately disappear. In testing such an argument, the null hypothesis should be that the returns to education do not vary with the degree of competitiveness, while the alternative hypothesis states that the returns to education decrease with the degree of competition in the sector where people work. The methodology is based on the traditional human capital regression model (see Section 1.2.2) and the results appear in Table 6.1.

6.1.2 Findings

In order to test the null hypothesis presented above we will look at the schooling coefficients of the fitted earnings functions among male employees of the IEIR data set by economic sector for the years 1981 and 1985. Table 6.1 shows, that the schooling coefficient or the rate of return to an additional year of schooling is highly significant and consistently higher for the

private (competitive) than the public (non-competitive sector) sector of the Greek economy for both years (i.e. 1981 and 1985).

Table 6.1. Earnings Functions by Economic Sector, Males: IEIR Sample, 1981 and 1985

Economic Sector/Year	N	Independent Variables: Constant	Schooling (S)	Experience (EX)	EX^2	Adjusted R^2
1981 b/						
Public	240	9.586	0.040*	0.053*	-0.0006	53.78
Private	116	9.540	0.049*	0.038**	-0.0006	29.94
1985 b/						
Public	256	10.571	0.033*	0.045*	-0.0006**	60.92
Private	124	10.403	0.039*	0.049*	-0.0009	33.15

Source: Appendix Table B-11
Notes: Public sector: employees in public administration, the social services, state-controlled Banks and parastatal firms
Private sector: employees in manufacturing
Dependent variable: natural logarithm of monthly earnings
*/ and **/ denote statistical significance at the 1% and 5% level respectively

In detail, the average rate of return in the private sector was found to be 0.049 (or 4.9%), while the respective statistic for the public sector was 0.040 (or 4.0%) for 1981. Similarly, the 1985 data suggested a rate of return of 3.9% in the private sector as opposed to 3.3% in the public sector. In addition, for 1977, the overall return to schooling did present an advantage in the private sector as compared to the public sector of the economy, i.e. 7.0% vs. 6.2% respectively (Psacharopoulos, 1983a, Table C.2, p.130).

In summary, the eighties data suggests clearly a consistent anti-screening pattern meaning that the market forces work quite well in the small open economy of Greece. The same conclusion was also reached by Psacharopoulos (1979) for the U.K.. The fact that the schooling coefficient (or the overall rate of return to an extra year of schooling) has fallen to a lesser extent in the private than the public sector, also means that competitive employers value indeed the productivity enhancing nature of education and are willing to pay an extra premium to the more educated workers. In contrast, the public sector has experienced a more rapid decrease in the overall rate of return suggesting the indifference of this sector towards productivity. This was expected especially after the post-1982 egalitarian incomes policy for the public sector in the form of the introduction of the so-called "Integrated Payroll" (for a review see Section 3.2.2).

In addition and as an alternative test to the previous one towards the "strong" screening hypothesis is to compute and compare what Psacharopoulos (op. cit.) calls "mid-to-early career earnings ratios" by level of education and by economic sector. Results of the calculated middle career to early career earnings ratios for the IEIR Greek data referring to 1981 and 1985 appear in Table 6.2. There are two different noteworthy patterns elaborated in the following Table 6.2. First, it is found that -- although ascending -- there is no clear pattern regarding the mid-to-early career earnings ratios in the public sector of the economy as one completes more years of schooling (vertical relationship). In detail, Table 6.2 shows that the pattern was

1.713<1.842>1.750 for 1981, and 1.578<1.610>1.588 for 1985, referring to primary, secondary and, tertiary education.

Table 6.2. Mid-to-early Career Earnings Ratios by Level of Education and Economic Sector, Males: IEIR Sample, 1981 and 1985

	1981		1985	
Educational Level	Public Sector	Private Sector	Public Sector	Private Sector
Primary	1.713	1.283	1.578	1.340
Secondary	1.842	1.406	1.610	1.329
Tertiary	1.750	1.618	1.588	1.444

Source: Based on the IEIR data set, see Section 4.1.2.2
Notes: mid-to-early career correspond to groups with 0-6 and 11-20 years of experience respectively

Contrary, the ascending pattern of these ratios is more elaborate when considering the private sector for both years (that is 1.283<1.406<1.618 for 1981 and, 1.340<=1.329<1.444 for 1985). Regarding the horizontal relationship of the initial-to-mid career earnings ratios (that is, by economic sector and level of education) though, it is found from Table 6.2 -- common to both 1981 and 1985 -- that the differential earnings growth is more pronounced in the non-competitive sector of the economy suggesting the existence of screening. This is justified on the grounds that it is the public sector where screening is likely to be applied even after workers have accumulated some work experience. Hence, in the light of the above results we gather that the age-earnings profiles do diverge as one completes more education, especially in the competitive economic sector. But we

add that there is a confusion in the public sector in Greece when considering the secondary and higher education ratios. Albeit our results differ somewhat from those reached by Psacharopoulos using the 1975 U.K. data his main conclusion prevails and it is supported from the Greek data: there is no solid evidence to support the "strong" version of the screening hypothesis.

Given the importance of the screening issue for public policy, it should be pointed out that the results presented for the Greek setting are constrained by the data and methodology utilised. A re-examination of these issues with alternative data and approaches should be undertaken. The Greek data, however, do not offer results which prove the absence of screening. Instead, they only indicate the lack of support in favour of the screening hypothesis. In addition, the Greek evidence against the screening hypothesis, especially in its purest form, suggests that the human capital theory provides the most plausible explanation of earnings differentials by education, therefore it should be a legitimate practice.

6.2 EVALUATING TEACHERS' PAY POSITION

Another application of the earnings functions, as argued in Section 1.2.5, is whether members in a profession are overpaid relative to those who have the same human capital and personal characteristics. This is of particular importance for the case of teachers. The reasoning behind testing for such an issue is because in a typical country teachers' salaries account for the largest single unit of public expenditure on education. In Greece for example, as Appendix Table D-2 shows, their percentage share was about 56 and 61 per cent for the years 1977 and 1984 respectively referring to all levels of education. Thus, it is possible to assess whether reductions (or moderate pay increases) in teacher's relative pay are needed in order to achieve savings in public expenditure for education. This is of great interest especially in an era of economic austerity and budgetary cuts as the one Greece is facing today.

Also, the case that the vast majority of Greek teachers, irrespective of the level of education they are employed, are Civil Servants should be considered as well. In detail, according to NSSG data, during the late seventies the total number of teachers was about 95,000 and their percentage distribution by level of education was around 47, 43 and 10 per cent for primary, secondary and higher education respectively. In addition, only 4-5 per cent of those were employed in private primary and secondary schools. Therefore, by taking into account the strong social demand for the teaching profession in conjunction with the state-controlled limited number of places

available for employment after graduation it would be plausible also to determine their investment criteria (according to the Ministry of Education there is at least a 3 year waiting period for employment after graduation in recent years).

6.2.1 Methodology

The available literature on similar topics, especially in the field of labour economics, permits to establish the framework of the analysis for the Greek experience (see Arrow and Capron, 1959, Rottenberg, 1962, and Psacharopoulos, 1975a and 1987b). The answer though, is not a straight forward one which rather depends on a set of individual labour supply decisions and macro demand conditions that are very difficult to document in an empirical way.

Having said that, a "rigorous criterion of overpayment is whether members in a profession receive rents, that is, salaries above for those for which they would be willing to supply their services to the profession. Unfortunately, evidence on this matter requires experimental data -- a luxury in which researchers can seldom indulge" (Psacharopoulos, 1987b, p. 315). A second-best criterion suggested by Psacharopoulos (ibid.) -- also extensively used by pay-review boards, and by the courts in cases of workers discrimination -- is whether members in a profession, like teachers, are overpaid indeed relative to those in other professions who have the same human capital and personal characteristics as teachers. The main reasons for the use of this approach as second-best are: first, that the reference salary in the control group profession may itself be subject to rents; and second that it is very difficult to fully control for

differences in personal characteristics between individuals, hence compare "similar" persons in the two professions.

In spite of the methodological drawbacks, the second approach will be used. The data utilised in testing for possible discrepancies come from the nationally representative NSSG Employee Survey of 1977 (for a detailed description see Section 4.1.2.1). The sub-sample selected includes all the 1,730 teachers, employed in all levels of education, the 760 employees in public administration, the 130 scientists, and the 301 accountants of the principal data base. It is noted, that Psacharopoulos in his study for the Brazilian setting (ibid.) has chosen salespersons, clerks and engineers to be compared with primary school, secondary school and university teachers respectively. Unfortunately, for the Greek case it is not possible to distinguish for the various educational levels. Alternatively and if we accept that the above occupations are comparable to an extent to teachers in general, as far as their human capital characteristics are concerned, then they will provide the necessary, for the statistical analysis, control groups for the teaching occupation. The rationale is as follows: first, the public administrators were chosen to act as the main comparison group on assessing whether teachers are over- or underpaid; second, scientists and accountants were selected so as to provide an indication of the position of teachers in the labour market and assess their investment criteria.

It is evident from Table 6.3 that female teachers receive substantially less pay, almost 21 per cent, than males. A

similar pattern is observed for the female employees in the rest of the occupations. Also, on aggregate, we could say that teachers being either male or female are paid less with the exception of their counterparts in public administration who seem to receive about 12 per cent less than teachers.

Table 6.3. Mean Monthly Earnings by Occupation and Gender: NSSG Sample, 1977 */

Occupation	Males	Females	Both sexes	N
Teacher	15,578	12,293	13,861	1,730
Scientist	20,364	15,576	19,149	130
Accountant	18,182	12,687	17,178	301
Public Administrator	13,759	10,927	12,507	760

Source: Based on the NSSG sample, see Section 4.1.2.1
Note: */in current Greek Drachmas

Table 6.4 depicts the differences in human capital endowments among the teaching and the non-teaching occupations.

Table 6.4. Years of Schooling, and Age, by Occupation: NSSG Sample, 1977

Occupation	Years of Schooling	Age
Teacher	15.9	39.9
Scientist	15.4	37.9
Accountant	16.0	37.6
Public Administrator	14.7	34.9

Source: Based on the NSSG sample, see Section 4.1.2.1

6.2.2 Findings

Table 6.5 presents the results of the fitted earnings functions. Occupation was entered in a series of 0-1 dummy variables, having the value of 1 if the person belongs to the teaching profession and 0 otherwise. Each function has been fitted to a pair of occupations only, that is teacher and the comparison group, as well as separately among males and females, so as to take into account possible sex discrimination. Therefore, the coefficient for the teacher variable measures the percentage by which the pay of teachers differs from that of each comparison group, controlling for education, and experience.

That is, according to Table 6.5, male teachers in Greece who have the same education and work for the same amount of years as male public administrators, appear to be partly underpaid 7% relative to the control occupation ($e^{-0.069}-1=-0.067$). Concerning female pay, it is evident that they are even more underpaid, that is 12%, other things been equal. One comment in order here is that these results are contradictory as compared with the preliminary raw data averages in Table 6.3, and if relied on the latter one might have reached the opposite conclusion.

Comparing teachers to scientists it is found from Table 6.5 that the former are in a significantly disadvantageous position and they earn 30% and 32% less than male or female scientists respectively. When contrasted to accountants, teachers seem to be on the low paid side as well, by earning 21% (males) and 14% (females) less, relative to the benchmark profession.

Table 6.5. Earnings Comparison Functions by Gender: NSSG Sample, 1977

Independent Variable	Males			Females		
	(1)	(2)	(3)	(4)	(5)	(6)
Teacher Occupation	-0.357 *	-0.231 *	-0.069 *	-0.389 *	-0.150 *	-0.122 *
	(11.99)	(10.42)	(3.96)	(9.01)	(4.61)	(7.05)
Comparator Occupation:						
Scientist a/	0	-	-	0	-	-
Accountant b/	-	0	-	-	0	-
Public Administrator	-	-	0	-	-	0
Controls:						
Years of Schooling, S	0.056 *	0.045 *	0.063 *	0.092 *	0.091 *	0.080 *
	(5.91)	(3.97)	(11.00)	(8.83)	(7.12)	(13.24)
Years of Experience, EX	0.038 *	0.046 *	0.037 *	0.048 *	0.049 *	0.047 *
	(10.42)	(12.95)	(12.64)	(15.10)	(6.29)	(17.66)
Experience-squared	-0.00035 *	-0.00058 *	-0.00036 *	-0.00061 *	-0.00063 *	-0.00060 *
	(3.88)	(6.49)	(4.93)	(7.17)	(7.38)	(7.91)
Constant Term	8.516	8.504	8.140	7.750	7.515	7.679
R-squared (adjusted)	0.450	0.399	0.413	0.580	0.563	0.536
N	923	1072	1250	937	959	1240

Source: Based on the NSSG sample, see Section 4.1.2.1
Notes: Numbers in parentheses are t-ratios
"0" = reference occupation (omitted dummy)
"-" = variable not included in the regression
a/ refers to Mathematics, Physics & Chemistry graduates
b/ refers to Accounting and Economics graduates
*/ indicates statistical significance at the 1% level

Our summary points are restricted by the validity of the control groups chosen for each purpose, as these have been already stated. If we by-pass, though, such a barrier and we accept that our control groups provide a reasonable point of reference, then the Greek data analysed referring to 1977 suggest

the following:

(a) Raw data comparisons can be misleading when attempting to assess the teachers' pay position in Greece relative to other professions. Pay differentials can be reversed, and even if pointing toward the same direction it has been found that they underestimate the actual pay differences, when controlling for differences in endowments.

(b) The teaching profession in Greece referring to all levels of education is underpaid relative to the benchmark profession, that is public administration pay, where job security and tenure are paramount employment characteristics as well.

(c) The decision to join the teaching profession in Greece appears not to be justified if considered on purely economic grounds. Professions requiring almost the same human capital, effort in managing to enter the university, and credentials (that is principally scientists and, secondarily accountants), as teaching are far more rewarding. But it is probably the case that graduates may prefer teaching because of the psychic non-pecuniary benefits associated with it, as well as, other aspects closely linked with social mobility issues. Lastly, the case of the long vacations associated with the teaching profession as compared to the rest of the professions (i.e. three versus one month) and, the possibility of increased earnings through private tuition (else known in Greece as FRONTISTIRIA -- see also Section 2.2.4) may offer a plausible explanation to the issue.

Though, an increase in the primary school teachers' pay during the mid-eighties, as well as the incomes policies of the

eighties (see Section 3.2) might have distorted the pattern. Thus, in view of better and more recent data the exercise should be repeated. Finally, by no means the analysis is suggesting that teachers' salaries should be cut in order to achieve budgetary savings. On the contrary, on efficiency and productivity grounds, these resources were found to be well spent, considering the fact that the comparison was made with public administrators where productivity is an issue of high controversy.

6.3 SUMMARY

The empirical status of human capital in the context of the screening or certification debate has been tested for the Greek setting in Section 6.1 through the use of relatively recent data (that is for 1981 and 1985). The results indicated the lack of support in favour of the screening hypothesis, especially in its purest form, suggesting that human capital theory provides the most plausible explanation of earnings differentials by education.

In addition, in Section 6.2, and as another application of the earnings functions, we have examined the pay position of the teaching profession in Greece. The results indicated that teachers, as compared to a number of other occupations, were in a disadvantageous pay position during the late 1970s, indicating that their investment criteria lie far behind the pecuniary aspects of their jobs, as well as, that -- on efficiency grounds -- these resources were found to be well spent.

CHAPTER 7

THE DEMAND FOR STUDY ABROAD

For the 1964-1987 period we have demonstrated that there has been a dramatic decline of both overall and higher education level specific yields on investment in education in Greece. At the same time demand for domestic post-compulsory education has increased rapidly. Greece has also a long tradition in foreign study which illustrates the strong social demand for tertiary education.

This chapter looks at the issue of the demand for study abroad by analysing original unpublished data provided by the Bank of Greece. The study of such an issue is very important for a country where social demand for post-secondary education, and by extension "freedom of choice", is strictly curtailed by the State. This is also in conjunction with the fact that private higher education is constitutionally prohibited in Greece. How does the Greek case compare internationally? How did the figures of Greek students studying at higher education institutions abroad evolve during the period under consideration? Are post-graduate studies the first preference given the lack of any such programmes in Greece? What are the countries of preference for foreign study? What are the disciplines Greeks tend to demand abroad? Finally, what are the socio-economic implications of such a "student migration" for the country and individual? These are the questions we will try to approach in this chapter, which are connected to the overall question on why someone should spend

both money and four or five years of his/her life studying at the university if that person would realise only three per cent of the capital invested in education?

7.1 BACKGROUND INFORMATION

In numerous cases in the Greek literature the phenomenal migration of Greek students abroad is characterised as a major economic problem of the country because of the massive out-flow of foreign exchange (see Maddison et al, 1966, Sabethai, 1976, Theodorakopoulos, 1978, Kindis, 1980, Pesmazoglou, 1983, Psacharopoulos & Kazamias, 1985 , and for an international overview and bibliography on foreign students see Altbach, 1985). The actual implications of the phenomenon, however, lie far beyond the foreign exchange aspect. They indicate the insufficient supply of education in Greece, at both the undergraduate and, especially, postgraduate levels, the high educational aspirations of Greeks, as well as, the problem of the "brain-drain" and its consequences.

Theodorakopoulos (1978, p.274) illustrates that the origins of the phenomenal migration of Greeks to study abroad can be traced far back to the 15th century, after the conquest of Constantinopolis (Instabul), the last stronghold of the Byzantine Empire, by the Ottoman Empire. The young Greek offsprings of noble and wealthy families were forced to migrate abroad to study. The country that attracted the majority of the young Greeks until the Ethnic Uprising of 1821 was Italy, and especially the Universities of Pisa, Venice, Florence, Genoa and the well-known "Collegio Greco" of Rome. In later days, France

and especially Austria will also be popular destinations. According to Cerais, "the young wealthy Greeks migrate not only for their jobs and businesses, but also to enrich their knowledge and to be educated. In some cities of Macedonia (Northern part of Greece) for example and especially Siatista, all families have at least one of their relatives abroad, in Italy, Hungary, Austria, Germany etc." (cited in Kordatos, G.K., 1925, "Modern Political History", Vol. I, p. 125). The migration continues, highlighting the exceptional propensity of Greeks for higher education, after the liberation and independence of Greece (1829). Buchon (Paris, 1847, cited in Pilavios, 1980) in "La Grece Continentale et la Moree" observed that "The least sophisticated Greek whom you employ for reading and conversation in his language, will put aside what little he earns by this to go and get his law degree in Paris. Hire a servant and he will save up to study medicine at Pisa" (cited in Andrews, K., 1967, "Athens", London: Phoenix House). The flow is uninterrupted, excepting great historic events like such as the Balkan Wars, the First World War, the Asia Minor disaster, the Second World War and, lastly, the internal turbulence of the 1940's.

"Research indicates that there are myriad of push and pull factors involved in foreign study" (Altbach et al, 1985, p. 12). In many instances, therefore, there is more than one motivation involved in the decision of the prospective foreign student. As Altbach et al (1985, p. 12) summarise, it seems likely that a majority of the world's international students provide their own financial support and are not sponsored by any government or

agency. This supports the argument that the decision to undertake foreign study is largely an individual one. A summary of reasons affecting individual decisions appears in Figure 7.1 and there is no particular reason one could claim that the Greek case is an exception to the observed pattern. Thus, excess demand for domestic higher education may not be the only factor which influences or dictates the flow of Greek students abroad. One has to take into account all other factors which can exert an influence.

Figure 7.1. Key Variables Affecting the Personal Decision of Students to Study Abroad

Key Variables Pertaining to Home-Country (Push Factors)	Key Variables Pertaining to Host-Country (Pull Factors)
1. Availability of scholarships for study abroad.	1. Availability of scholarships to international students.
2. Poor quality educational facilities.	2. Good quality education.
3. Lack of research facilities.	3. Availability of advanced research facilities.
4. Lack of appropriate educational facilities.	4. Availability of appropriate educational facilities with likely offer of admission.
5. Failure to gain admission to local institution(s).	5. Presence of relatives willing to provide financial assistance.
6. Enhanced value (in the market place) of a foreign degree.	6. Congenial political situation.
7. Discrimination against minorities.	7. Congenial socio-economic and political environment to migrate to.
8. Politically uncogenial situation.	8. Opportunity for general international life experience.

Source: Altbach et al, 1985, Chart 3, p. 13

7.2 DATA SOURCES AND QUALITY

Data on Greek students studying at higher education institutions abroad is available from two sources. Firstly, the Bank of Greece (Student Foreign Exchange Control Department) and, secondly, UNESCO. The time span covered from the Bank of Greece data is 1956-86, and the UNESCO covers the years 1960-84.

In fact, the two sources supplement each other. This is because of their different methodologies in calculating the number of Greek students abroad. The Bank of Greece collects and reports on data for accounting purposes and so figures are presented on the number of students who have applied and finally got permission for foreign exchange to finance their studies abroad. UNESCO provides figures on students studying abroad by country of origin, collected through a statistical questionnaire administered annually to all countries and territories. A foreign student, according to UNESCO, is a student who is not a permanent resident in the country of study.

Observing data from both sources, can lead to some useful conclusions, presented below. The Bank of Greece's statistics seem to underestimate total foreign enrolment between 1960 and 1972, as compared with UNESCO. UNESCO data are more reliable and accurate because of their sensitivity in catching students who do not receive foreign exchange from Greece. Table 7.1 shows that since 1973 the pattern is completely reversed in favour of the Bank of Greece. In the meantime, a general observation is that the UNESCO figures for Greek students studying abroad are an overestimate, as are those for USA and England. In contrast, German figures are an overestimate.

Table 7.1. Greek Students Abroad According to Two Sources, 1961-84

Year	Total		Bank over UNESCO Ratio
	Bank	UNESCO	
1961	8659	9700	0.89
1962	7964	9450	0.84
1963	7421	9200	0.81
1964	6652	9000	0.74
1965	6285	9200	0.68
1966	6577	9375	0.70
1967	7888	9500	0.83
1968	7346	9745	0.75
1969	8147	12512	0.65
1970	9985	14147	0.71
1971	12819	17034	0.75
1972	17490	19414	0.90
1973	22358	21358	1.05
1974	25628	22587	1.13
1975	29480	23363	1.26
1976	30436	31063	0.98
1977	36999	30945	1.20
1978	35928	31974	1.12
1979	37001	30080	1.23
1980	39786	31509	1.26
1981	41086	30597	1.34
1982	44465	32974	1.35
1983	44046	32145	1.37
1984	40324	34086	1.18

Source: Bank of Greece, Student Foreign Exchange Control Department (Unpublished Data)
UNESCO, Statistical Yearbook, various years

Despite these differences which indicate that the UNESCO figures are more complete, it is interesting to investigate data from the Bank of Greece. Its data set is more detailed, and offers information on country of study (common to both sources), level of study (i.e. undergraduate, postgraduate, other), field of study (i.e. Humanities, Science, etc.), detailed cost figures classified also by country but not level of study, as well as some additional information. This, of course, does not mean that these figures (both flow and cost) are realistic. On the

contrary, it is believed that they are an approximation and deviate by understating real sizes for reasons described below.

1. As we showed above, by definition, reported figures are underestimates of both the magnitude of student migration and foreign exchange out-flow.
2. It is possible that the studies of many students abroad are financed from their parents or relatives who are migrants to the country of study, e.g. USA, Canada, Australia, Germany, Belgium and other European countries where many Greeks have migrated.
3. In some other instances studies are financed from own capital abroad or from sources linked to the seamen's profession and activities;
4. It is also possible that the total or part of the cost of studying abroad is covered either by the students' work (usually part-time) in countries where employment was not impossible, e.g. Germany, USA, Canada, Australia etc., or by the Universities and other organisations in terms of awards, scholarships, bursaries and assistantships (usually applicable to post-graduate students). It is estimated that at least 500 Greek graduates are scholarship recipient for P/G studies or research at HE institutions abroad each year. These scholarships come either from state and private foundations in Greece, or directly from foreign governments;
5. Expenses for the purpose of education paid in Greek Drachmas are not included, e.g. transportation to and from the place of study, etc.;

6. Expenses prior to registration borne by the student are also absent from the calculations, e.g. visits to the place of study to arrange for registration, or to attend language short-courses, as well as correspondence, test and application fees payable where applicable, etc.

7. Illegal flow of exchange from Greece to the place of study has to be taken into consideration as well, especially for students who have been refused permission to obtain foreign exchange by the Bank of Greece for not fulfilling all of the requirements. One may also add the "topping up" of the existing allowance, varying in quantity depending on the country of study. Theodorakopoulos (1978, p. 270), claims that such students support themselves "illegally" for at least one year or more.

Finally, as we have seen, there are differences between the two sources concerning the overall figures on the magnitude of Greek students' migration. In this analysis, information will be provided from both sources. International comparisons will be based on UNESCO data. Reporting on the Greek context we will utilise Bank of Greece data, which is more consistent and offers a variety of information, as compared to UNESCO.

7.3 PRELIMINARY EVIDENCE

In addition to the information discussed in Section 7.2, the Bank of Greece also keeps some statistics which appear to have a qualitative nature and are presented in Table 7.2. This gives the number of new Greek students abroad, those re-qualified and crossed out for foreign exchange allowance, those who have completed, or terminated their studies, students who continue without foreign exchange allowance, National Scholarships' Foundation (IKY) award recipients, and students by place of domicile. When observing that Table, one is able to understand better the nature of the data and come to useful conclusions.

We see that the majority of the student population studying abroad comes from the capital and surrounding area and that a smaller proportion comes from other parts of the country. In detail, figures for 1961-68 show that, 55-65% of the students reside in the Athens area and only 35-45% in the rest of Greece. Therefore, Athens based students are more likely to study abroad and have a comparative advantage in terms of educational opportunities compared with their counterparts living elsewhere.

When moving to the number of new students appearing to the Bank of Greece records for each year, compared with total foreign enrolment, we observe that they form around 21-32% during the 1960's, 15-39% during the 1970's. Then their representation share has dropped considerably, being 20% in 1982, and 11% in 1984 (first year domestic enrolments were about 40% of the total student body, for the 1960's and 1970's).

If we also add to the number of new students above, those re-qualified from past years, they account for an additional 7%

Table 7.2. Qualitative Statistics on Greek Students Abroad, 1961-84 (All Countries)

Year	Total (1)	New Students (2)	Re-Qual. (3)	Crossed Out (4)	Complete Studies (5)	Terminate Studies (6)	Continue no $ (7)	IKY (8)	Athens (9)	Rest of Greece (10)
1961	8659	1826	330	2013	802	423	788	184	4648	4011
1962	7964	1653	340	2670	1041	744	885	156	4387	3577
1963	7421	1869	268	2680	1280	745	655	109	4319	3102
1964	6652	1465	347	2581	1242	781	558	103	4177	2475
1965	6285	1717	450	2534	1260	754	520	99	3915	2370
1966	6577	2095	400	2203	1325	493	385	94	4262	2315
1967	7888	2441	383	1513	804	385	324	77	5153	2735
1968	7346	2133	223	2898	1661	789	448	81	4548	2798
1969	8147	2642	482	2323	1304	569	450	118	...	...
1970	9985	3880	327	2369	1329	470	570	135	...	...
1971	12819	...	...	...	...	...	...	...	...	...
1972	17490	...	...	...	...	...	...	...	...	...
1973	22358	...	...	...	...	...	...	...	...	...
1974	25628	...	...	...	...	...	...	...	...	...
1975	29480	...	...	...	...	...	...	...	...	...
1976	30436	7490	291	6825	3658	3167		208	...	...
1977	36999	9095	256	2788	1453	1335		129	...	...
1978	35928	5615	215	6903	3852	3051		126	...	...
1979	37001	5547	504	4978	2297	2681		103	...	...
1980	39786	5386	355	2956	1348	1608		102	...	...
1981	41086	6704	311	5715	3568	2147		103	...	...
1982	44465	9042	674	6337	3586	2751		109	...	...
1983	44046	5439	335	6193	3457	2736		162	...	...
1984	40324	4372	292	8386	3825	4561		153	...	...
1985	28754	...	...	...	...	...		...	...	...
1986	27085	...	...	...	...	...		...	...	...

Source: Bank of Greece, Student Foreign Exchange Control Department, (Unpublished Data)
Note: (...) not available

during the 1960's but only for a negligible 1% during the 1980's.

The number of those students who have been crossed out in the Bank's records -- because they have either successfully completed or terminated their studies, or continue with no official foreign exchange allowance -- is close to the number of new students for each year. Finally, only a small percentage of students are actually completing their studies, around 20% of the total for the 1960's and a moderate 9% for the 1980's.

7.4 INTERNATIONAL COMPARISONS

The supply-constrained tertiary education at home, in conjunction with other reasons presented in Section 7.1 provides an immediate explanation for the high numbers of Greek students studying abroad. Table 7.3 shows figures of students studying abroad per head of population for selected countries in the UNESCO Yearbook.

Table 7.3. Students Studying Abroad, Selected Countries, mid-1980s

Country of Origin	Year	Students Abroad		Students Abroad as % of	
		Total	per 100K Population	Total Higher Domestic Enrolment	University Domestic Enrolment
Greece	1983	34,086	345	23.0	34.0
Germany	1985	22,424	37	1.4	1.7
France	1984	12,500	23	1.0	1.3
Italy	1984	17,935	31	1.5	1.5
U.K.	1984	14,513	26	1.4	4.2
Portugal	1984	4,187	41	3.7	5.2
Spain	1984	9,406	24	1.1	1.6
Cyprus	1985	9,801	1465	312.7	...
Iran	1985	41,043	92	20.9	33.8
Malaysia	1985	40,493	260	43.4	93.5
India	1979	17,824	2	0.3	...
China	1985	42,481	4	2.4	...
Hong-Kong	1984	23,657	426	30.8	163.9
Canada	1985	16,245	64	1.3	2.2
U.S.A.	1985	19,707	8	0.2	0.3
Israel	1984	4,983	117	4.9	8.1
Japan	1984	15,335	13	0.6	0.8
Lebanon	1984	14,661	550	20.8	20.8
Turkey	1984	16,168	33	3.9	4.6

Source: UNESCO, 1987, Statistical Yearbook, Table 3.16
Note: (...) not available

As shown in Table 7.3, this percentage on a per capita basis is the third highest in the world after Lebanon and Hong-Kong. For example, it is well known that Indians are also "over-educated", but out of 750 million Indians only 17,824 are

studying abroad as Table 7.3 suggests. This is also true even if one standardises this figure for postgraduate students. Even for Malaysia and Iran, where 40,493 and 41,043, respectively, students are reported (in Table 7.3) to study abroad in 1985, the per capita analogy is not as high as it is for Greece. The results are equally illuminating when considering foreign students as a proportion of both the total higher and the university domestic enrolment. Greece maintains the third position internationally, after Hong-Kong and Malaysia, followed by Iran and Lebanon, with two-digit proportions varying between 23 and 34 per cent, while all the rest are defined well below. No wonder of course about China, where the fact of having 42,481 students abroad does not mean a lot in the international comparative statistics. When one looks at the EEC countries, statistics also presented in Table 7.3 suggest, to a greater extent, that Greece is an "outlier".

7.5 THE FLOW OF STUDENTS ABROAD

7.5.1 By level of Higher Education

Table 7.4 enables us to look at the the magnitude of flow of Greek higher education students abroad during the past thirty years, and shows that the stable nature of the 1950s and 1960s is suddenly disturbed. That is the number doubled, tripled and quadrupled during the next decade, and has reached its peak in 1982. However, the number decreased by as much as 30 per cent for the following two years. In addition, Table 7.4 shows that the turning point was during the seven years of the Military Dictatorship (1967-1974), when the number of Greeks studying abroad more than tripled, while domestic enrolment grew by only 40 per cent for the same period.

Given the complete lack of organised postgraduate programmes in Greece, one should expect that the majority, or at least a sizeable proportion of those studying abroad, were pursuing postgraduate studies. On the contrary, Table 7.4 indicates that only a moderate percentage, about 15 to 20 per cent, was actually following such programmes. The rest of the students were seeking the ever-desirable first degree even at foreign Universities of "questionable" quality. In detail, a massive 80% of those students abroad were attending first degree courses throughout the 25-year horizon, although in absolute terms undergraduate foreign enrolment has risen more than five times and, in some instances, more than seven times from the early 1960's to the mid-eighties.

Table 7.4. Greek Students Abroad by Level of Higher Education, 1956-86

Year	Total	Level of Higher Education			(1) as % of Total H.E Domestic	(1) as % of Univ. Domestic Enrolment
		Univ.	Postgr.	Other		
1956	6467	5100	750	617	0.33	0.38
	7638	5900	900	838	0.38	0.43
	9033	7200	900	933	0.37	0.41
	8782	7100	850	832	0.33	0.37
	8516	7000	800	716	0.30	0.33
1961	8659	7056	793	810	0.28	0.31
	7964	6185	878	901	0.22	0.25
	7421	5619	957	845	0.17	0.19
	6652	5056	906	690	0.12	0.13
	6285	4834	841	610	0.10	0.12
1966	6577	5098	898	581	0.09	0.11
	7888	5959	1189	740	0.10	0.12
	7346	5524	1113	709	0.09	0.10
	8147	6183	1368	596	0.10	0.11
	9985	7944	1349	692	0.12	0.14
1971	12819	10176	1757	886	0.15	0.18
	17490	13765	2556	1169	0.19	0.23
	22358	17813	3177	1368	0.23	0.28
	25628	20278	3866	1484	0.23	0.28
	29480	23212	4551	1727	0.25	0.31
1976	30436	24221	4721	1494	0.25	0.32
	36999	29927	5261	1811	0.30	0.38
	35928	29638	4916	1374	0.28	0.37
	37001	30432	5074	1495	0.31	0.44
	39786	32111	5961	1714	0.33	0.46
1981	41086	33108	6150	1828	0.33	0.47
	44465	36161	6280	2024	0.32	0.47
	44046	35455	6756	1835	0.30	0.44
	40324	31609	7144	1571	...	0.36
	28754	21586	6201	967	...	0.26
1986	27085	18618	6287	2180	...	0.24

Source: Bank of Greece, Student Foreign Exchange Control Department, (Unpublished Data)
Note: (...) not available

7.5.2 By Country of Study

As Table 7.5 demonstrates, the countries that attracted most of the Greek students were the European industrial countries, Romania and the USA. In detail, England, France, Germany, Italy, Romania and USA dominated total foreign enrolment and accounted for 90% of it for most of the years, while Italy alone accounted for 30% during the mid-eighties, and around 45% during the late 1960's and 1970's. We can also see that countries like Austria and Germany, were dominated the early 1960's, explaining 25% and 34% of the total foreign enrolment, respectively. Their share has dropped dramatically by the end of the same decade to six per cent and 11% respectively. That was mainly because of the numerus clausus and quotas these countries introduced during the mid-seventies as far as foreign enrolment to their higher education institutions was concerned.

Table 7.5. Greek Students Abroad by Country of Study, selected years

Year	1961	1966	1970	1976	1981	1986
Country of Study						
1. England	563	864	1,410	6,208	6,987	4,072
2. Austria	2,171	1,024	631	509	365	270
3. Belgium	110	92	136	407	475	318
4. France	457	522	832	3,471	5,348	3,063
5. Germany	2,901	1,477	1,066	2,026	2,809	2,353
6. Switzerland	453	361	372	603	690	313
7. USA	646	675	988	2,428	4,956	3,666
8. Italy	1,257	1,465	4,345	13,444	13,753	8,502
9. Romania	-	-	-	-	2,459	2,055
10. Other Countries	101	97	185	1,340	3,232	2,415
Total (All Countries)	8,659	6,577	9,985	30,436	41,086	27,085

Source: Bank of Greece, Student Foreign Exchange Control Department, (Unpublished Data)
Note: (-) negligible or nil

It seems, therefore, that the major changes in the formation of the shape of the country preferences of the Greek students abroad took place during the 1960's, favouring countries like Italy, England, France and USA. On the other hand, countries like Austria and Germany have lost their influence, in relative terms, but maintain a stable number of students. In addition, 90% of the total foreign enrolment is explained during all the 1961-1986 period from six countries and Romania is appearing forcefully in the arena during the late 1970's.

7.5.3 By Country and Level of Study

All the above observations and conclusions, as suggested by Table 7.6, are in line with the undergraduate level foreign enrolment as well. Moving to the postgraduate level enrolment, the most dominant countries appearing in Table 7.6 are only four; namely, England, France, Germany and the USA, accounting for more than 90% of the total foreign postgraduate enrolment during all of the 25 years. The respective share of each country for 1986 is 35%, 25%, 6% and 25%.

In conclusion, one could say that the further training and education of highly qualified personnel and intelligence of the country depends heavily and is left in the hands of England, France, Germany and USA, which are countries with advanced educational systems. It is worthwhile noting that "Greeks who follow postgraduate studies abroad are very selective in terms of courses, universities and countries. The same could not be said though, for the students of the undergraduate level" (Kindis, 1980, p. 75). On the other hand, even if fees are applicable in England and the USA, the student body accounted for 60% of the

respective total in 1986 and more than 50% for the past three decades, elaborating on the strong preference of the students for English-speaking countries, irrespective of financial criteria.

Table 7.6. Greek Students Abroad by Level and Country of Study, 1966, 1976 and 1986

Level of Study		All Levels (1)	Univ. (2)	(2):(1) (%)	P/G (3)	(3):(1) (%)
Country of Study	Year					
1. England	1966	864	463	53.59	248	28.70
	1976	6,208	3,530	56.86	2,067	33.30
	1986	4,072	1,770	43.47	2,169	53.27
2. Austria	1966	1,024	956	93.36	26	2.54
	1976	509	415	81.53	66	12.97
	1986	270	212	78.52	41	15.19
3. Belgium	1966	92	66	71.74	9	9.78
	1976	407	300	73.71	60	14.74
	1986	318	179	56.29	120	37.74
4. France	1966	522	261	50.00	214	41.00
	1976	3,471	2,302	66.32	1,087	31.32
	1986	3,063	1,251	40.84	1,538	50.21
5. Germany	1966	1,477	1,215	82.26	154	10.43
	1976	2,026	1,469	72.51	440	21.72
	1986	2,353	1,789	76.03	381	16.19
6. Switzerland	1966	361	271	75.07	19	5.26
	1976	603	401	66.50	65	10.78
	1986	313	209	66.77	59	18.85
7. USA	1966	675	471	69.78	127	18.81
	1976	2,428	1,643	67.67	639	26.32
	1986	3,666	1,891	51.58	1,579	43.07
8. Italy	1966	1,465	1,351	92.22	77	5.26
	1976	13,444	13,099	97.43	101	0.75
	1986	8,502	8,004	94.14	122	1.43
9. Romania	1966	-	-	...	-	...
	1976	-	-	...	-	...
	1986	2,113	2,055	97.26	19	0.90
10. Other	1966	97	44	45.36	24	24.74
Countries	1976	1,340	1,062	79.25	196	14.63
	1986	2,415	1,859	76.98	259	10.72
Total	1966	6,577	5,098	77.51	898	13.65
(All Countries)	1976	30,436	24,221	79.58	4,721	15.51
	1986	27,085	18,618	68.74	6,287	23.21

Source: Bank of Greece, Student Foreign Exchange Control Department, (Unpublished Data)

Note: (...) not available
(-) nil or negligible

7.5.4 By level and Field of Study

It is instructive to study the composition of the foreign study body by level and field of study through information provided by Table 7.7.

Table 7.7. Percentage Composition of Greek Students Abroad by Level of Education and Field of Study, 1961-1984

Year	1961		1966		1971		1976	
	Univ	PG	Univ	PG	Univ	PG	Univ	PG
Number of Students	7056	793	5098	898	10176	1757	24221	4721
As % of the Grand Total	81.5	9.2	77.5	13.7	79.4	13.7	76.7	15.5
Field of Study								
A. Humanities	3.3	8.2	2.9	7.0	2.9	11.2	4.3	11.2
B. Education	0.3	2.4	0.2	1.8	0.2	2.5	0.2	2.0
C. Art	0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.0
D. Law	0.5	9.8	0.8	12.5	0.9	13.6	1.4	10.3
E. Social Sciences	4.7	12.8	7.7	17.6	6.9	15.1	8.8	20.2
F. Science	6.4	8.6	8.7	7.6	10.3	17.9	11.1	19.5
G. Technology	58.6	7.2	60.2	7.8	45.4	17.4	40.4	18.8
H. Medicine & Pharmacy	20.3	24.6	13.3	14.8	23.5	10.4	27.8	9.4
I. Agricultural Studies	4.8	6.2	3.8	6.1	7.4	3.5	2.1	3.9
J. Other	1.0	20.2	2.4	24.8	2.4	8.4	3.7	4.7
T o t a l	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Bank of Greece, Student Foreign Exchange Control Department, (Unpublished Data)

When asked, Technology is clearly the most popular field of study among first degree students during the last quarter of the century. It has declined, however, in importance during the years. That is, from 60% during the 1960's, it fell to much less than half (27%) in the mid-1980's, relatively speaking. Second in importance over the period is the field of Medicine, to which almost one quarter of the students showed a preference over the years. Science more than doubled its share during the 25 year

span, its share being 14% in 1984. Social Sciences were ranked as the fourth preference, expanding their share to 12% during the eighties, while all the rest accounted for less than 10%.

Table 7.7 (continued)

Year	1981		1982		1983		1984	
	Univ	PG	Univ	PG	Univ	PG	Univ	PG
Number of Students	33198	6150	36161	6280	35455	6756	31609	7144
As % of the Grand Total	80.8	15.0	81.3	14.1	80.5	15.3	78.4	17.7
Field of Study								
A. Humanities	6.1	12.3	7.6	12.9	8.6	12.7	8.5	12.4
B. Education	0.7	3.2	1.7	3.1	2.2	3.2	2.6	3.2
C. Art	1.5	0.0	1.4	0.0	1.4	0.0	1.4	0.0
D. Law	1.9	10.7	2.2	10.4	2.2	9.9	2.0	9.8
E. Social Sciences	10.1	20.8	11.2	21.3	11.3	19.8	11.9	19.5
F. Science	12.9	13.8	13.2	13.9	13.4	14.2	13.9	14.1
G. Technology	32.3	19.8	29.4	20.2	27.8	19.5	26.6	20.2
H. Medicine & Pharmacy	27.8	12.9	26.2	12.5	25.3	12.8	24.4	12.6
I. Agricultural Studies	1.7	3.2	1.8	2.7	1.9	2.9	1.9	2.5
J. Other	5.0	3.3	5.3	3.0	5.9	5.0	6.8	5.7
T o t a l	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

It seems that students, given their free choice of field, tend to choose those subjects which carry the highest social recognition and prestige, as well as the highest income in terms of remuneration during their working lives, and, by extension, high private rates of return, so as to be in a position to justify their investment. The latter is also reflected in the earnings of university graduates by field of study, as shown in Appendix Tables D-3 and D-4.

When moving to the postgraduate level, it is obvious that, during the 1960's, the highest representation share was for students specialising in the Medical field (25%), but during the

past two decades they represent 13%. The shift was in favour of those specialising in Social Sciences and those in Technological fields, accounting for a massive 20% each, highlighting the identification of the need in such subjects for development. Law graduates have showed a strong preference in specialising abroad, as opposed to first degree choice (because of the uniqueness of the Law system in Greece), and they formed about 10% throughout the years. Science graduates have increased rapidly their share from eight per cent in the 1960's to 20% in the 1970's, but declined to 14% lately. Humanities explained, through an ascending pattern during the years, around 13%, and Agriculture graduates, through a descending pattern, around three per cent of the total postgraduate enrolment. However, it is also obvious that students specialising in fields other than the previous ones have lowered their share from around 25% to five per cent in recent years. As in the case of undergraduate studies, the above preferences are also in line with financial data, on the earnings of foreign postgraduate degree holders, provided by Appendix Table D-5.

7.6 THE COST OF STUDYING ABROAD

The most convincing argument against the phenomenon of studying abroad is the excessive out-flow of foreign exchange. In such a context we are going to examine the out-flow in conjunction with relevant figures for the economy.

The reported figures come from the Bank of Greece and are based on the actual amount of foreign exchange which was legally allowed out of the country. This is classified as "Studies Payments" under the accounting category "Travel Payments". Both categories belong to the broader accounting category of "Invisible Payments". As it has already been argued before in Section 7.2, the reported figures are underestimates because of those reasons explained above. Also, in some cases, they deviate from reality by as much as 50%, based on personal estimates under conservative assumptions. In addition, these figures do not distinguish between separate levels of higher education but appear as a total. We should also mention that, foreign expenditure includes maintenance costs, meaning that it is not absolutely comparable with the reported domestic expenditure.

According to the Bank of Greece figures, the total cost of studying abroad exceeded $236 million during the first post-war decade (1949-1962). Out of that figure, only 40% was due to the direct flow of foreign exchange out of the country. The rest was coming from sources outside Greece, such as scholarships from international organisations and foreign governments, or direct funding from relatives of the students abroad. The Public Current Expenditure for higher education in Greece during the same period was about $100 million, according to Ministry of

Education estimates, which is exactly of the same order as the direct flow of exchange out of the country. In an OECD report (Maddison, 1966) that situation was characterised as an "incredibly high waste" for Greece (mentioned by Pesmazoglou, 1983, p. 4).

Table 7.8. Annual Cost of Studying Abroad as Percentage of Balance on Current Account, Invisible and Travel Payments, 1961-86 (in million US $)

Year	Cost of Studies Abroad (1)	Balance on Curr. Account (2)	Invisible Payments (3)	Cost Ab. as % of Bal.Cur. Account (4)	Cost Ab as % of Invisible Payments (5)	Cost Ab. as % of Travel Payments (6)
1961	7.1	-49.5	76.1	14.3	9.3	36.6
	7.1	-50.0	87.6	14.2	8.1	32.5
	7.0	-36.1	99.0	19.4	7.1	25.5
	6.7	-171.3	129.3	3.9	5.2	17.3
	7.0	-267.3	136.8	2.6	5.1	16.8
1966	7.3	-259.0	154.6	2.8	4.7	18.0
	9.5	-224.5	184.0	4.2	5.2	23.3
	9.3	-252.9	194.2	3.7	4.8	21.9
	9.8	-348.2	240.7	2.8	4.1	20.4
	12.8	-408.6	266.9	3.1	4.8	23.1
1971	19.4	-344.2	317.3	5.6	6.1	26.3
	27.2	-401.5	402.1	6.8	6.8	28.4
	37.2	-1191.5	570.3	3.1	6.5	32.8
	52.2	-1145.2	720.4	4.6	7.2	40.1
	56.7	-956.7	764.7	5.9	7.4	36.7
1976	55.6	-932.0	786.8	6.0	7.1	36.9
	69.3	-1079.2	876.9	6.4	7.9	42.3
	73.9	-957.9	1037.7	7.7	7.1	33.0
	88.2	-1881.4	1366.7	4.7	6.5	29.2
	102.6	-2216.1	1566.0	4.6	6.6	33.2
1981	96.3	-2421.0	2206.2	4.0	4.4	26.7
	121.0	-1885.1	2055.8	6.4	5.9	32.3
	119.5	-1875.9	2019.2	6.4	5.9	33.0
	98.7	-2130.1	2068.0	4.6	4.8	29.1
	98.9	-3275.7	2268.3	3.0	4.4	26.9
1986	117.0	-1772.1	2598.0	6.6	4.5	23.7

Source: 1961-84: Bank of Greece, 1986, Tables 14 & 18
1985-86: Bank of Greece, April 1987, "Monthly Statistical Bulletin", Economic Research Department, Vol. LII No. 4, Tables 38 & 42 (1985-86)

Table 7.8 shows a stable out-flow of foreign exchange pattern of about $7 million per year for the period 1961-1966. Between 1967 and 1969 the magnitude of the flow became $9.5 million. From 1970 onwards it exceeded $12 million per year and is doubled every two years reaching $52 million in 1974. That is, of course, in line with the marked increase observed in the number of students abroad for the same period. From 1975 onwards, the rate of increase was not so spectacular and the figure reached its peak, after almost doubling to $103 million, for the decade 1970-80, during 1980. It was during 1982 that the flow reached record heights ($121 million) and one could attribute that to the respective peak on foreign enrolment during the same year. Although the magnitude of the flow of students abroad was deteriorating during the following four years, one should expect the same pattern for the foreign exchange out-flow. This was indeed the case for 1983 and 1984, but then we can notice a slight increase in 1985 (while the number of students have dropped dramatically). That was followed by an unexpected 20% increase from 1984 to 1986, the figure being $117 million. This figure deserves further investigation and it will be discussed later.

If we examine in Table 7.8 the share that studies payments represent in the deficit on the Balance on Current Account of the country, we can identify that it formed a sizeable 15-20% until 1963, but then dropped substantially and ranged around three per cent until the end of the 1960's. The share became larger during the 1970's when it was double, in general, as compared to the late 1960's, reaching its peak during 1978 (7.7%). That was the

highest for the whole of 1964 to 1986 period. During the 1980's the share fluctuated between 6.6% (1986) and, a record bottom for the past 15 years, of three per cent (1985). Finally, it is worthwhile mentioning that the deficit on the Balance on Current Account of the country have reached almost $3.3 billion in 1985 (66 times higher than in 1961).

Let us now move to the share that studies payments occupy in the broader accounting category (where they fit) of invisible payments. We can observe from Table 7.8 a declining trend during the 1960's (from 9.3% in 1961 to 4.1% in 1969), but then the rate increased during the 1970's to around 7%. A further decrease during the eighties resulted to the stabilisation of the share to less than 5%.

Comparing studies with travel payments, their high representation share is evident throughout the 25-year period, ranging between 16.8% (lower bounds) for 1965 to 42.3% (upper bounds) in 1977, and around 25% for 1986, as shown in Table 7.8.

Summarising then, it becomes obvious that the out-flow of foreign exchange for studies abroad has increased rapidly during the years, not only in absolute but also in relative figures. That is, it was forming a sizeable percentage of the deficit on balance on Current Account, as well as Travel and Invisible Payments of the country.

Table 7.9 elaborates on the excessive flow of foreign exchange out of the country by comparing those figures with the respective of the total domestic public expenditure for University and higher education. As we have already pointed out,

though, these two figures are absolutely comparable. We can summarise from Table 7.9, that the total cost of studying abroad accounted for about 47% and 37% of the total University and higher education public and current expenditure, respectively, for the twelve year period, 1976-87. This is a very high price for a small country like Greece to pay, given that domestic higher education institutions are overcrowded, understaffed and increasingly in need for additional investments.

Table 7.9. Cost of Study Abroad and Domestic Public Current Expenditure, 1976-87 (in billion Drachmas)

Year	AEI (1)	TEI (2)	Total Higher (3)	(%) (1):(3)	Abroad (4)	(%) (4):(3)
1981	9.191	2.035	11.226	81.9	5.336	47.5
1976-81	41.800	7.900	49.700	84.1	20.275	40.8
1982-87	162.900	45.300	208.200	78.2	76.302*/	36.6
1976-87	204.700	53.200	257.900	79.4	96.577*/	37.4

Source: Columns 1 & 2: Ministry of Education
Column 4: Bank of Greece
Notes: Cost abroad in drachmas derived by using average annual exchange rates of the US dollar
*/ figure for 1987 assumed to be the same as in 1986

When examining the cost of studying abroad by country of study presented in Table 7.10, we can identify that (i) five EEC countries (ie. England, Belgium, France, Germany and Italy) have increased their share by 10 percentage points from the 1960's to the 1970's, absorbing 75-80% of the total student exchange. During the 1980's, there is a huge decline and their share have dropped to around 60%; (ii) 90-95% of the exchange towards eastern block countries went to Romania, which began accepting

Table 7.10. Annual Cost of Foreign Study by Country of Study, 1961-86 (in thousand US $)

Year	Total	England	Austria	Belgium	France	Germany	Switzerland	USA	Italy	Romania
1961	7205	519	1546	46	387	2450	360	590	1053	-
1962	7099	615	1442	51	467	2505	339	622	1015	-
1963	7031	683	1267	60	429	2243	414	858	1026	-
1964	6745	949	1043	49	494	1947	408	911	889	-
1965	6952	1006	893	79	549	1831	443	1020	1039	-
1966	7291	1116	914	83	603	1678	433	1070	1308	-
1967	9534	1465	997	107	736	1734	642	1598	2166	-
1968	9263	1544	816	113	633	1674	826	1308	2196	-
1969	8009	1349	624	104	604	1326	550	1125	2159	-
1970	16528	2597	779	242	916	2756	707	3728	4525	-
1971	19393	3233	816	400	925	1863	721	4926	6090	-
1972	27238	4115	901	298	1639	2854	1023	4115	11769	-
1973	37214	5228	959	330	2162	3332	1212	6154	17142	-
1974	52155	7717	1184	397	3056	4132	1173	11454	21845	-
1975	56721	9586	1271	583	5198	4005	1437	10280	22723	-
1976	50224	10284	845	512	763	4457	3459	6099	22400	14
1977	61163	12736	1158	642	5364	4226	932	8050	27101	486
1978	66665	15196	758	507	7339	4800	788	7863	25337	1516
1979	79575	18011	741	557	9042	5547	887	9887	29198	3081
1980	102635	22601	867	820	11435	6869	1095	15329	35897	4597
1981	96282	18812	839	994	15714	7864	1133	22409	21260	1638
1982	121008	18874	1009	1286	11225	10869	1558	29281	32906	5425
1983	119470	17142	1022	1205	11410	10057	1529	31094	30736	6421
1984	98671	14078	753	1970	9931	9364	1667	26693	22760	5757
1985	98851	15106	696	1086	8844	10040	1316	28599	20633	5674
1986	117015	15942	1607	1462	11359	15067	3532	27986	27986	4022

Source: Bank of Greece, Economic Research Department, (Unpublished Data)
Note: (-) nil or negligible

students in 1975, accounting for 3.5% of the total; (iii) Italy has strengthened substantially its position by the end of the 1960's, by doubling its share, as compared to the early 1960's accounting for 1/4 of the total and just less than 1/2 for the five EEC countries mentioned above. During the mid-seventies, its share jumped to more than 1/3 of the total and over 1/2 of the EEC total. But Italy's share has declined gradually (although in 1980, Italy alone absorbed $35.9 million, or 35 times more exchange as compared to the early sixties) and settled to the late 1960's levels; (iv) things are also impressive for the case of the USA during the eighties. During that period, USA established their position and absorbed more exchange than any other country; and (v) finally, the picture for 1986 became 23.9% for USA, 23.9% for Italy, 13.6% for England, 12.9% for Germany, 9.7% for France, 3.5% for Romania, 3.0% for Switzerland, 1.4% for Austria and 1.2% for Belgium. All nine countries accounted for 93% of the total, leaving only 7% of the share for the rest of the world.

If we do a further disagreggation of the available cost data we will be able to find out, through averages, why some countries are more popular to students, based on purely financial criteria. A first look at Table 7.11 reveals the ascending pattern of the average cost per student abroad. That cost (in constant US dollars) was around $1,200 during the sixties, $2,000 during the seventies and $2,500 during the late-seventies early-eighties. The average cost per student abroad for 1985 became $3,500 and jumped to $4,300 in 1986. If we use those overall averages as a selection criterion whether a country is "cheap" or "expensive"

Table 7.11. Annual Average Cost per Student Abroad by Country of Study, 1961-70 and 1976-86 (in US $)

Year	Total	England	Austria	Belgium	France	Germany	Switzerland	USA	Italy	Romania
1961	820	922	712	418	847	845	795	913	838	...
1962	892	1092	730	1133	1035	962	960	919	833	...
1963	943	1006	762	1333	941	950	1160	1302	909	...
1964	1007	1394	781	790	1062	959	1106	1395	896	...
1965	1114	1386	788	1013	1149	1086	1303	1553	924	...
1966	1110	1292	893	902	1155	1136	1199	1585	893	...
1967	1204	1355	974	915	1061	1122	1605	1887	1052	...
1968	1266	1343	981	1076	917	1370	2226	1475	1094	...
1969	1203	1014	875	1030	869	1188	1677	1132	803	...
1970	1282	1842	1235	1779	1075	2585	1901	3773	1041	...
										...
1971	1513	...	...	...	...	...	...	...	...	...
1972	1555	...	...	...	...	...	...	...	...	...
1973	1664	...	...	...	...	...	...	...	...	...
1974	2037	...	...	...	...	...	...	...	...	...
1975	1923	...	...	...	...	...	...	...	...	...
1976	1827	1657	1660	1258	220	2200	5736	2512	1666	...
1977	1873	1725	2189	1518	1253	1808	1432	2741	1689	...
1978	2057	2238	1813	1385	1663	2007	1333	2656	1727	...
1979	2384	2589	1915	1403	1834	2249	1456	2890	2140	2066
1980	2579	3095	2337	1839	2150	2601	1677	3603	2557	2447
1981	2344	2692	2299	2093	2938	2800	1642	4522	1546	663
1982	2721	2776	2561	2360	2062	3285	1831	5002	2307	1829
1983	2713	2611	2711	2107	2128	2946	1759	5134	2253	1505
1984	2448	2328	2195	3391	1919	2913	2004	4600	1964	1464
1985	3440	3306	4218	3076	2767	4478	2143	7588	2062	2181
1986	4320	3915	5952	4597	3708	6403	11284	7634	3292	1903

Source: Bank of Greece, Economic Research Department, (Unpublished Data)
Note: (...) not available

in terms of costs, we can say that countries considered "cheap" during the 1960's have reversed their positions during the 1980's and vice versa. In detail, (a) England and Belgium appeared to be "expensive" countries back in the 1960's but then turned to be just below the total average during the 1980's; (b) Italy, France and Romania presented a very low cost throughout the years; (c) Austria, while very "cheap" during the 1960's and 1970's became suddenly "expensive" in 1985 and 1986; (d) Germany depicted a high average cost during the years, but the highest of all belongs to the USA.

In conclusion, students and their families are aware of the cost of studying abroad and tend to choose those countries bearing a relatively low cost. On the other hand, this does not appear as the general rule since 1/4 of Greek students prefer "expensive" countries. There are, of course, other considerations taken into account in deciding the place to study abroad, the three most important being: (1) remoteness of Greece from the country of study, (2) the so-called "numerus clausus" (e.g. entrance examination tests, restriction to enrol in particular fields and quotas, or, in general, how easy it is to register with a higher education institution), and, lastly (3) the medium of instruction. All three previous reasons explain to an extent the low-cost choices towards Italy and Romania. Finally, it is worth noting that the increased mobility of the 1990's due to European integration and the fact that EEC students are treated as home students in the host EEC member country will contribute to the idea of universal European education with substantial economic benefits. The first of those benefits would

be the minimisation of the "brain-drain" and economies of scale for the less developed member countries.

7.7 SUMMARY AND POLICY IMPLICATIONS

So far we have portrayed the phenomenal migration of third level Greek students abroad. This, could not be predetermined as good or bad in the first place. This is so, given that knowledge is ecumenical, that is it has no intellectual or material limits. As in most cases, there are advantages and disadvantages, but it is clear, in this particular case, that room for improvement in the system exists. We could summarise the advantages and disadvantages of studying abroad, to both the individual and the society, as follows:

(i) Advantages

1. Given the complete lack of organised postgraduate (P/G) studies and research in Greece, P/G studies abroad act as a substitute and fill the gap, even at high cost.
2. Extremely low social cost while the vast majority of the students are either self-financed or financed by foreign institutions.
3. Enormous flow of additional educated human stock in the country during the past decades through return migration (one could evaluate benefits in the form of human capital formation).
4. Considerable economies of scale associated with third level education.
5. Transfer of technology in terms of new developments in science and modern theories.
6. Cultural plurality and development contribution, through experiences acquired abroad.
7. Highly specialised fields benefit more, because diseconomies of scale prevent their offering in Greece (ie. those demanding heavy investment for equipment).

(ii) Disadvantages

a. The "brain-drain" effects.
b. Huge flow of foreign exchange out of the country and the subsequent consequences in the balance of payments.
c. Because of the distant facing of Greek reality, knowledge

is based sometimes on models and methodology unrealistic for Greece.
d. No planning in terms of the specialisations that the country needs.
e. Inequality effects and the "elitist" mentality of foreign graduates.
h. Forgone benefits from research (direct-indirect).

Finally, the analysis of the demand for study abroad draws attention to a series of policy implications, which could be summarised as follows:

1. Encourage private higher education in Greece in order to satisfy the excess social demand for higher education, as this will decrease the exodus of Greek students abroad, which in turn, will result in substantial foreign exchange savings. In addition, it has been argued that such a move will increase substantially the efficiency of the system in terms of management, quality of education, and responsibility, through the increased competition among public higher education institutions, and between private and public institutions (see World Bank, 1986, and James, 1987; for the Greek case, see Lambropoulos, 1990b);

2. Introduce user charges based on egalitarian criteria, that is selective fees (and student loan schemes), given the willingness of students to pay for their higher education, as witnessed by the fact that the vast majority of students privately finance their education abroad (see World Bank, 1986);

3. Some postgraduate programmes could be offered in Greece in co-operation with foreign research centres and institutions of higher education (ie. Social sciences, Medicine, Technology, etc.);

4. In view of the European integration of 1992, Greek authorities should start thinking about making the higher education system more competitive and flexible; for example, the possibility of new undergraduate courses should be considered, especially those needing low investment, such as Anthropology, Tourism Development, Shipping Economics, and so on; and

5. Lastly, for better information distribution on the functioning of the labour market and available opportunities to students, Careers Offices should be established.

CHAPTER 8

CONCLUSIONS

The purpose of this thesis is to examine the characteristics of education and employment in Greece, evaluate the effect of schooling on the earnings of employees in both the public and private sectors of the economy, and calculate rates of return to investment in education, in general, and to higher education, in particular. The Greek case is of specific interest to the educational planner because of the apparent excess demand for tertiary education during the post-World War II period.

Therefore, the study of the levels and ratios of the profitability of the educational investment will enable us to assess the effect of demand and supply forces in the Greek labour market, and thus rationalise the investment criteria of the Greeks in aspiring higher education.

8.1 FINDINGS

The majority of our findings are associated with the phenomenon of the apparent strong demand for higher education among Greeks, both domestically and abroad, which is amply demonstrated throughout the thesis (Section 2.2 and Chapter 7). In an attempt to answer the question on what drives the demand for education, we utilised the human capital approach. Based on the assumption that prospective students act as rational investors, the various economic indicators -- and mainly the rate of return to the

specific level and kind of education -- would be the determinants of the excess demand for education.

It is instructive, however, to classify our findings in two separate categories, presented below. The first category is related to findings on the methodology utilised to study the economic aspect of educational investment. That is, the Human Capital model as it is presented in Chapter 1 of the thesis and empirically tested in Chapters 4, 5 and 6. The second category of findings refer to a set of distorted incentives pertaining to the Greek educational system today, stemming from Chapters 2 and 3 of the thesis.

8.1.1 The Human Capital Model

The first major finding is associated with the importance of human capital variables, schooling and experience, in explaining the variance of earnings. The data sets we have analysed cover a time span of 13 years, that is from 1975 to 1987 (for an illustration and summary of the data sets see Figure 4.3). Although the data sets are not strictly comparable, they enable us to form an overall picture on the decomposition of earnings from salaried employment in Greece by fitting human capital earnings functions in Section 4.2. These functions have been fitted separately for males and females in the private and the public sectors of the economy.

The overall conclusion from these earnings functions analyses is that there is a strong and positive relationship between the education and the earnings of employees. The two basic human capital characteristics of employees, that is

schooling and labour market experience, account for more than one third of personal earnings. For example, in the case of the 1977 national data (see Section 4.1.2.1) the two basic human capital variables explain 37 per cent of the earnings of employees, which is very good for cross-section estimates (Table 4.2). When we disaggregate for the two economic sectors, that is private and public, it is clear that the basic human capital model has superior explanatory power in the public sector. For example, the analysis of public sector employment data (Ministry of Education, see Section 4.1.2.3) show that human capital explains a significantly higher proportion of the earnings of employees, that is 66% (Table 4.10), compared to the private sector employment analyses. That is expected and is mainly due to the fact of the highly institutionalised pay of that sector (see Section 3.2.2) as opposed to the private sector, where productivity related characteristics are valued more.

Further to the above, it has also been found that the basic human capital model behaves remarkably well. That is, the schooling and experience variables are found, in the majority of the analyses, to be highly significant and negatively related, in the sense that the more the schooling the less the individual has had time to work. The negative and significant coefficient of the experience-squared variable indicated that earnings rise, and then level off as experience increases (except in the Ministry of Education data set where it is found to be positive, denoting non-strictly parabolic experience-earnings profiles -- see Table 4.10). The step specification of the fitted earnings functions produced results indicating that secondary education has lost its

importance in determining earnings over time, mainly because of its near universalisation (see Section 2.1.2). University education though, is found to be significantly and consistently associated with a considerable earnings premium over the other levels of education. However, the non-linear in years of schooling specification does not give a clear consensus concerning the signs of the coefficients.

A second major finding relates to the empirical status of human capital theory. The screening or certification hypothesis, claiming that education, or higher education in particular, acts only as a screen for ability and does not relate to productivity, has been tested for the Greek setting in Section 6.1. The results indicate the lack of support in favour of the screening hypothesis, especially in its purest form, suggesting that human capital theory provides the most plausible explanation of earnings differentials by education.

The third major finding, stemming from the earnings functions analyses of Section 4.2, is that males, ceteris paribus, earn on average more than females, while the effect of the income equalisation policies of the socialist administration of the 1980s -- as argued in Section 3.2 -- is evident for the year 1985.

When other personal characteristics of employees are entered in the analyses the explanatory power of the model increases substantially (that is by more than an additional 10 per cent, except for the case of the public sector payrolls where the increase varies from three to eight per cent -- Table 4.12). The

inclusion of those characteristics in the human capital earnings functions points towards bias-free results, by leaving the schooling coefficient virtually unaffected. The extended earnings functions of Section 4.2.1.4 confirm that: (a) being male is automatically associated with higher pay, (b) married employees earn on average more than their counterparts with no family responsibilities, (c) an additional child in the family implies higher earnings, and (d) specialised training is associated with a substantial earnings premium, significantly higher than that for an additional year of schooling.

Another finding, on methodological grounds, concerns the issue on the use of potential, in the absence of real, labour market experience in earnings functions. This issue is tested in Section 4.2.1.5. The analysis indicates that the potential specification of variable experience (that is, EX=AGE-S-6) used in earnings functions analyses points to the "correct" direction, although it is intuitively assuming no periods of unemployment.

Perhaps the most important finding is that market forces are stronger than any implicit or explicit regulatory policy. In the case of Greece it is found in this thesis that the earnings premium associated with higher education has declined in response to the increased supply of graduates. This has happened under both conservative and socialist administrations, both in the private and public sectors of the economy. In other words, as predicted by economic theory, the returns to education do decline over time pari passu with increases in the stock of human capital (as this is depicted in Sections 2.3.3 and 3.1.1 referring to the population and the labour force, respectively). The decline,

however, is more impressive and faster in the non-competitive sector of the economy. In addition, the same was found to apply for the social rates of return, as they are studied relative to the index of public subsidisation. That is, the higher the rhythm of the evolution in enrolments, the less the degree of subsidy (Section 5.3).

In detail, Table 5.14 presents a grand summary of the estimates of the rate of return over time, in juxtaposition with the changes of the educational composition of the population and the labour force. Figures 5.1 and 5.2 depict the shifts of the (reduced form) intersections of the implied supply and demand curves for educated labour. Irrespective of whether the pattern refers to the labour force as a whole, or to those in the labour force with higher education, the trend is found to be clearly downward. Thus, we could argue that as educational attainment increases, the relative "price" of education (as measured by the rate of return) falls, suggesting a reverse relationship between the demand for and the returns to education. Therefore, one could say that the declining returns to education, in general, and to higher education, in particular, do not justify an acute incentive, whatsoever, to explain sufficiently the phenomenon of the excess demand for higher education among Greeks, both at home and abroad.

A significant finding of the thesis is that an explicit incomes policy or the setting of civil service pay scales are not adequate in themselves to achieve a more equal income distribution (as discussed in Section 3.2); market forces have

been operating as well. Human Capital theory predicts, and it is confirmed in this thesis, that educational expansion, a natural phenomenon in every society, means an increase in the ratio of the more-to-less educated in the labour force that automatically leads to wage compression and hence to a more equal income distribution (Section 3.3, and Table 3.21).

Despite the spectacular drop in the profitability of educational investment during the period under consideration, we also find that individual demand substantially exceeds the availability of places. It is rational, therefore, to assume that it is not the low actual (or ex post), but the unrealistically high expected (or ex ante), rate of return that drives students to demand further education (Table 5.16). Thus, the perception which the secondary school graduates have regarding the labour market seem to be highly influenced by past trends, meaning that there may be some inertia in adjusting to the evolution of the "true" levels of the profitability of education, acting as a "push factor" for further post-secondary education, which is inelastic.

Finally, we found that there is no way that the State, in a democratic society, can set an effective cap (quotas) on higher education enrolments. If the market forces are such that the acquisition of a university degree is justified, students and their parents will find a way to circumvent the government-set restrictions. In the case of Greece, as evidenced in Chapter 7, excess demand for higher education has found an outlet abroad. In addition, the demand for study abroad inasmuch as it absorbs excess demand reflects the "true" intentions of students and

their families (prospective investors) towards further education. A recent development, however, is the substantial decline in the demand for study abroad, best explained by the low and diminishing returns to investment in higher education evidenced in the thesis. This is a very important finding, given that study abroad is privately financed, in contrast to "free" public higher education at home, meaning that, among others, economic considerations predominate in any private decision to pursue further education.

8.1.2 Distorted Incentives

The thesis shows clearly the major incentives, which are distorted and result in the phenomenal excess social demand for higher education, pertaining to the Greek educational system today. They could be summarised in the following two categories. These are: (i) the low direct cost of attending higher education (Section 2.2.5) and, (ii) the significant number of graduates employed in the public sector, stemming from the excessive use of educational qualifications as a method of hiring civil servants (Section 3.1).

The former distortion exists because of insufficient public funds to fully satisfy the demand for higher education and for this reason entry is restricted; in 1986, for example, less than one out of five candidates entered a proper university in Greece (Section 2.2.4), while one out of four higher education students by-pass the public finance filter and study abroad (Section 7.5). The second distortion exists because of the students' belief that "guaranteed employment" for higher education graduates is

applicable for the public sector (Section 2.2.6), and because the public sector remuneration package is overestimated in terms of externalities (i.e. tenure, social security, job environment, automatic promotion, reduced responsibilities -- Section 3.2.2). Furthermore, in periods of low employment prospects for secondary school leavers (Section 2.2.6 and 3.1.4), or when government-set criteria favour the hiring of graduates, university study becomes cheap and investment in it can be carried out beyond the social optimum.

As established throughout the thesis, however, these incentives, created by the State, and influencing students and their families in demanding increasingly larger quantities of higher education, are not reflected in the rewards of individuals in the labour market (due to the diminishing and low returns to educational investments). It is therefore considered that the State is mainly responsible for the mismatches occurring today in the Greek labour market. Given the above, the argument that the Greek State, in its role, is providing the "directions" and the incentives to the students is further strengthened; and it should be the State, again, that should make every possible effort in correcting the previously recorded distortions. Any serious attempt to correct these distortions would result, undoubtedly, in the realisation of the numerous noble goals set in the past towards "true" educational reform.

Another important lesson is that excessive legislation cannot alter society, as this has been attempted through a series of Laws -- and more recently the Law-Framework (see Section 2.2.3). This is justified on the grounds that so many attempts

at reforming the educational system have failed, mainly because of abstraction from the dynamics that drive behaviour, along with the lack of technocrats in Greece in the field of educational policy analysis. A solution, therefore, would be the de-emphasis of the legislative front and the introduction/encouragement of the incentives system. If the distorted incentives previously recorded are corrected, then improvements in the educational system would follow automatically without a need for a new Law.

8.2 POLICY IMPLICATIONS

Several policy implications could be drawn from the findings summarised in the previous section. In this section, we present these policy alternatives and consider their equity/efficiency aspects.

A major policy implication concerns educational finance. If the private rates of return to investment in education are found to be on the low side, the social returns to investment in education are found to be even lower, due to the public subsidisation of education (Table 5.14). Up to what point should a country publicly support higher education? Greece spends 15 percent of its state budget on education, and one quarter of that budget is devoted to higher education. Higher education in Greece is proclaimed to be free, that is, students attend university free of tuition. However, as we have already argued in Section 2.2.5, it is by no means free. The lower strata spend a larger percentage of their annual income on the higher education of their offspring than do the upper strata (in terms of expenditures other than fees), while the former benefit much less from these State subsidies. This is not to suggest that investment in education should be decreased, but rather that other methods of educational finance should be explored, so as to achieve greater efficiency and equity in the educational system. Some possible alternatives are enumerated below.

Selective charges for attending domestic universities can enhance both the efficiency and equity aspects. These charges could range from zero, or even negative for poor students, to the

full marginal cost of a higher education place for students from more prosperous families. The classification of students into those who pay and do not pay, could be directly related to their family income and/or wealth. A direct effect of this measure would be the automatic discouragement of casual applicants and the less able -- in other words, those who feel that they will not recover the cost of their education -- in applying for a higher education place, thus reducing the number of applicants for admission. Also, this system would act as a further incentive for students to graduate as quickly as possible, discouraging those who stay in the system for an "infinite" number of years (Section 2.2.2), keeping the cost of their education minimal, and it would increase internal efficiency. In addition, since students would have to pay for their schooling, they may demand higher quality of instruction.

The replacement of the present system of indiscriminate subsidy by the selective policy of recovering the costs of higher education would result in increased equity by providing the subsidy to those students in greater financial need. This, in conjunction with a scheme of low-interest educational loans, would increase both efficiency and equity because of the above reasons as well as the fact that it would provide additional revenue for the universities.

As we have already stated, private higher education is constitutionally prohibited in Greece (see Section 2.2.2, and Appendix A.3), and this clause of the Constitution could be viewed as the main reason for the exodus of Greek students abroad and the massive outflow of foreign exchange, evidenced in Chapter

7. Given that a satisfactory solution could be achieved by removing this clause from the Constitution, a policy implication of significant importance is the encouragement of private tertiary education in Greece. The private higher education institutions could be either domestic or foreign subsidiaries. They would be free to set their level of tuition fees, and to apply their own criteria in the selection of staff and students.

These institutions would absorb a substantial part of the excess demand for higher education, and they would also introduce an element of competition with the public higher education institutions. The acceptance of private tertiary education institutions may result in the retention of scarce foreign exchange.

All in all, if we combine the issues of selective charges and private tertiary education, we may achieve a more efficient and equitable system of higher education. In such a case, the bulk of the government's subsidy for higher education could be given directly to students from families of low income, so that they could choose the institution they wish to attend. Also, they would be free to choose either a public or a private institution. The objective of equity would also be enhanced by adding a "freedom of choice" dimension in the system, while efficiency in the system would be encouraged by the increased competition among these institutions in attracting students.

Moreover, previous analysis suggests that more money should be allocated by the State, through the higher education budget, towards the direction of post-graduate studies (Table 5.15).

Such a move would suggest almost double the yield of first university degrees and, unquestionably, undergraduate post-secondary, non-university diplomas. In addition, their operation should overcome any of the existing obstacles, given the recent evidence of the will of the State now that their legal status has been partially cleared. It would also be appropriate to introduce competitive post-graduate programmes in the post-secondary, non-university cycle of education. Such a policy would increase the social profitability of this type of education and would offer incentives to students leading them willingly towards them, while providing the employers with the opportunity to justify higher rewards. This is in contrast to the recent government proposal of upgrading these institutions to university status.

In addition, apart from the statistically significant contribution of formal schooling on earnings, the importance of on-the-job training has explicitly been demonstrated as well (Section 4.2.1.4). Specialised on-the-job training is a paramount factor which enhances significantly the competitiveness and earnings capacity of employees, as well as the profitability of their educational investment, acting as a value added for the bearer. Therefore, the value of training should be seriously considered when formulating educational policy in Greece. In the context of the modernisation of Greek higher education, special provision for the introduction and organisation of various specialised seminars would lead to the enhancement of the educational activities of higher education institutions and will contribute to the efficiency of the labour force.

Another policy implication relates to teachers' pay in Greece. In an attempt to evaluate their pay position, it is found that, given the scarce resources and "poor" finances evidenced in Section 2.2.6, they are relatively low-paid (see Section 6.2). However, this finding contradicts frequent statements about the significance of their role in the educational process of the country. An increase in teachers' salaries, according to their human capital characteristics, would, undoubtedly, result in the harmonisation of their pay with the rest of the civil servants, and would contribute towards improving the quality of education in Greece.

Finally, it is possible that the imminent European integration of 1992 will lead to the relaxing of current laws about the operation of private universities in Greece. This, with the acceptance of some of the policy alternatives suggested above, may result in increased efficiency and equity in the Greek system. Inasmuch as the above recommendations would lead to greater efficiency, the State should act to ensure that the education system serves the interests of the country, making Greece competitive among other European countries.

8.3 SUGGESTIONS FOR FUTURE WORK

The empirical part of this analysis demonstrates that one of the most serious issues concerning research on education and the labour market in Greece relates to scarcity of data. This is the main reason perhaps that there have been no rates of return estimates since 1977. In an attempt to fill this "gap", we have faced serious data problems and have had to use figures relating to the pay of individual companies. Our first suggestion is that there should be systematic collection of detailed data on earnings and personal characteristics of the population and additional data concerning the student body. This will stimulate significant research in the field of the Economics of Education in Greece, inasmuch it will encourage prospective researchers to get involved with research on education in general. The way this could be achieved is: first, by including questions on the income, earnings, and employment status of individuals in the Census questionnaire of the National Statistical Service of Greece (carried out every 10 years), and second, by introducing a series of new questionnaires, to be carried out by the same organisation, on specific educational issues. Special attention should be given to the elaboration of tracer studies. It is needless to say, however, that special provisions should be taken, so as for these data to be made available for "public" use.

A second suggestion, which is in conjunction to the above, concerns the close monitoring of the returns to education at, say, five-year intervals.

Another recommendation, relates to the thorough study of the effectiveness of educational reforms, in terms of feasibility and technical evaluation studies, that is, before and after their implementation, respectively. In such a case, it is secured that educational reforms are going to be based on scientific research rather than value judgements.

A final recommendation, is about the further examination of the consumption aspect, or sociological explanation, of the excess demand for higher education. This is of particular interest for educational policy decisions, as it will throw additional light on this matter, which is of national importance.

APPENDIX A

Tables to Chapter 2

A.1 Tertiary Education Institutions

(a) University level education is provided by 6 universities, 1 polytechnic and 6 other independent faculties at this level as follows:

i. the University of Athens, founded in 1837, which has 7 schools: Theology, Philosophy and Literature, Law, Economics, Medicine, Science and Dentistry. The Faculty of Philosophy includes the departments of Archaeology, History and Foreign Languages;

ii. the Metsovian National Technical University (POLYTECHNEIO, EMP) of Athens, founded in 1836, which has 6 schools: Civil Engineering, Mechanical and Electrical Engineering, Architecture, Chemical Engineering, Topography-Agronomy, Marine Engineering and Naval Architecture;

iii. the University of Thessaloniki, founded in 1925, which has 10 schools: Theology, Philosophy and Literature (including History, Archaeology and a separate Institute of Foreign Languages), Law and Economics, Medicine, Dentistry, Agriculture, Forestry, Veterinary Studies, Engineering, Science;

iv. the University of Patras, founded in 1964, which has 3 faculties: Science (Mathematics, Physics, Chemistry, Biology, Geology), Engineering (Electrical-Mechanical Engineering, Civil Engineering, Chemical Engineering), Medicine;

v. the University of Ioannina, founded in 1966 and given independent status in 1971, which has 3 faculties: Science, Philosophy (including Literature), Medicine;
vi. the University of Thrace, founded in 1975, with faculties of Law (at Komotini) and Engineering (at Xanthi);

vii. the University of Crete (at Rethymnon and Herakleion), founded in 1977, with faculties of Philosophy and Mathematics;

viii. Athens Graduate School of Economics and Business Sciences, founded in 1920;

ix. Panteios School of Political Sciences, Athens, founded in 1930;

x. Piraeus Graduate School of Industrial Studies, founded in 1938;

xi. Thessaloniki Graduate School of Industrial Studies,

founded in 1958;

xii. Athens Graduate School of Agriculture, founded in 1920;

xiii. Athens Graduate School of Fine Arts, founded in 1836.

The establishment of a Technical University in Crete (Chania) is at a very early stage. The government has announced plans to found 3 new universities: for the Ionian Islands (based in Corfu), for the Aegean, and another university in Thessaly.

(b) Five technical-vocational post-secondary, non-university institutions (named KATEE in the first instance and then renamed to TEI) were established with IBRD capital loans in 1973. Eight new TEI have been established since 1977, bringing the total to 13 TEI by the end of 1982. There are also 4 state and 12 private post-secondary, non-university vocational schools for various fields of engineering, whose diplomas are considered equivalent to those awarded by TEI.

Teacher training for primary school teacher was provided by special colleges, named Pedagogical Academies. These colleges have ceased to operate recently (1988/89) and teacher's education was upgraded to university level status, lasting 4 years instead of the existing 2 years.

A.2 Law 1268/1982 for University Education

The most important innovations of the Law-Framework (Law 1268/1982) are:

(a) the abolition of the" University Chair" system and its replacement by the "Department-Section" (TMIMA-TOMEAS) system which has been criticised in some quarters in giving too much power to individual professors;

(b) limitation in the number of times students may re-sit examinations and on the number of additional years they may take to complete their degrees;

(c) the substantial participation of representatives of the junior academic staff, the technical and administrative staff and the high representation share of the student body in the operation and decision-making procedures within each university, (ie. 30 per cent representation in the general departmental meetings and even higher in the elections of the Dean and the Rector);

(d) the establishment of the National Academy of Letters and Sciences (EAGE) and the National Council for Higher Education (ESAP) as the supreme control and advisory bodies responsible for the planning and development of the Universities, i.e. to co-ordinate academic and research programmes and to decide on academic equivalences, on-going education at tertiary level and establishment of new courses;

(e) the establishment of Post-Graduate studies in Greece, offered by the newly established Graduate Schools of each University; and

(f) the restructuring of the various grades of assistant teaching staff to make all future appointments in these grades, as well as promotion from one grade to the next, dependent on judgement of the academic and research accomplishments of the individual by a team of academics rather than by the Head of the Chair personally as it was done until then.

Article 14 of Law 1268/1982 states that the prerequisite of a candidate for a university post is to hold a Doctorate degree in the field he/she is applying to. The puzzling part of the article though, is that a two-year elapsing period is required between the Doctorate award date and the date of application for the Lecturer post, becoming six years for Full Professors. It is

obvious therefore, that elapsing time itself as a selection criterion acts as a deterrent to promising prospective academics. The aim of the law though, was to attract Greek academics from foreign Universities which case is not yet fully justified.

Also, the high representation rate of students in all procedures of academic life -- although it is gladly accepted in theory -- creates various problems, given the excessive politicisation, student activism and structure/administration of the Universities (see also Psacharopoulos, 1988).

Additionally, although solicitude for P/G studies is anticipated in the law-framework in question, no such programme has been organised yet, mainly because of the existing poor financial situation and staff shortage.

It is also worthwhile pointing out that the non-university, post-secondary Technical Education Institutions (TEI) -- the equivalent of British Polytechnics -- have received no attention in the Law, particularly as far as P/G studies are concerned. This is contradicting to the official policy and proclamations of the Ministry of Education towards "upgrading" the TEIs and feeds with further suspicion prospective students (for a more detailed presentation of the TEIs' environment, see Dragonas & Kostakis, 1986).

Finally, it becomes evident that the law itself encourages students to stay on for as many years as they wish, transferring in some cases past knowledge and contributing to the phenomenon of overcrowding, thus obstructing any planning policy and plan (conservative estimates suggest that the percentage of those

students could be 15-20% of the student body per year). In detail, article 25 (paragraph 12) prescribes that the student completes his studies and is awarded his degree when he will successfully pass the examinations in the appropriate subjects and collect the appropriate number of units/credits. Article 29, Paragraph 9, states that after a certain time (1.5 times the duration of degree) the student loses some of his privileges, but Paragraph 1 of the same Article, states that the student status is gained by the time of registration in the University and expires when the degree is awarded.

A.3 Article 16 of the 1975 Greek Constitution

The provisions contained in Article 16 of the 1975 Greek Constitution with regard to education are summarised as follows:

"1. Art and science, research and teaching, shall be free of impediment, and it shall be incumbent on the State to develop and advance them. Academic freedom and freedom in teaching shall be subject to the provisions of the Constitution;
2. Education shall be a fundamental concern of the State. Its purpose shall be to develop national and religious awareness and to provide for the moral, intellectual, physical and vocational education of the Greeks, and to engender their upbringings as free and responsible citizens.
3. Compulsory education shall last for not less than nine years.
4. All Greeks shall be entitled to free education in the state institutions, at all levels. The State shall support distinguished students and those in need of assistance or special protection, according to their abilities."

A.4 Tertiary Education Entrance "Beneficial Provisions"

These "beneficial provisions" for tertiary education, and especially university, entry can be summarised as follows:

(a) One could register on the grounds of being of Albanian refugee descent (minority group provision), even if he has never seen Albania (abolished in 1983/84).

(b) It is quite a common practice for intending students who fail to qualify for entry in the national entry examination to register (usually without further post-secondary qualifications) with an Italian, French, Romanian etc. university and then transfer to the corresponding year in a Greek university of their choice (lately only to the 2nd or 3rd year after examination).

(c) The children of Greek emigrants who domicile permanently abroad (OMOGENEIS) can register without sitting the national examination up to a maximum 5 per cent of the total student population enrolled. Athletes also get bonus marks and have a comparative advantage.

(d) Existing graduates from any institution can re-register as students for any other degree and if in a similar subject, they get generous credit. The latter is particularly popular among TEI students (towards proper engineering degrees) or para-medical colleges students (towards proper medical degrees).

Table A-1. Primary Education, EEC Countries, mid-1980s

Country	Year	Number of Schools	Teaching Staff	Pupils Enrolled	Pupil/ Teacher Ratio
Greece	1975	9,633	30,953	935,730	30
	1980	9,461	37,315	900,641	24
	1984	8,941	37,942	889,648	23
Belgium	1984	4,383	43,958	739,522	17
Denmark	1984	2,557	34,807	415,148	12
France	1984	48,605	170,692	4,126,435	21
Germany	1984	19,626	136,154	2,306,479	17
Ireland	1984	3,337	15,521	420,665	27
Italy	1984	28,244	276,553	3,904,143	14
Luxemburg	1983	...	1,660	25,695	15
Netherlands	1984	8,454	56,371	1,094,980	19
Portugal	1984	13,134	74,903	1,274,887	17
Spain	1984	6,054	117,730	3,569,744	30
U.K.	1984	24,993	244,000	4,275,000	...

Source: UNESCO, 1988, Statistical Yearbook, Table 3.4
Notes: (...) not available

Table A-2. Secondary Education, EEC Countries, mid-1980s

Country	Year	Teaching Staff (1)	Pupils Enrolled (2)	Pupil/ Teacher Ratio (2):(1)
Greece	1975	...	661,796	...
	1980	39,571	740,058	19
	1984	48,217	802,817	17
Belgium	1986	103,999	812,991	8
Denmark	1984	...	483,859	...
France	1984	313,433	5,320,621	17
Germany	1984	426,623	5,568,164	13
Ireland	1982	21,060	316,878	15
Italy	1984	547,148	5,338,731	10
Luxemburg	1984	2,307	24,788	11
Netherlands	1985	109,292	1,439,275	13
Portugal	1984	40,250	529,855	13
Spain	1984	198,107	4,222,836	21
U.K.	1984	...	5,024,000	...

Source: UNESCO, 1988, Statistical Yearbook, Table 3.5 (first two columns)
Note: (...) not available

Table A-3. Registered Students Attending Lectures, Selected University Institutions, 1977

University School/Institution	Percent attending
Philosophy, University of Athens	89
Physics/Mathematics, University of Athens	39
Law School, University of Athens	21
National Technical University (Polytechneio)	38
Panteios School of Political Sciences, Athens	26
Piraeus Graduate School of Industrial Studies	10

Source: Psacharopoulos and Kazamias, 1985, Table 5.1

Table A-4. Higher Education Entrance Examinations, Success Rates, 1961-86

	Success Rate (%)			Success Rate (%)	
Year	Total Higher	University	Year	Total Higher	University
1961	28.3	...	1976	22.7	13.0
	28.5	...		22.5	14.2
	27.5	...		24.5	14.5
	36.9	...		23.0	13.5
	31.7	...		28.4	16.7
1966	30.1	...	1981	35.6	19.4
	38.1	...		42.2	20.8
	25.6	20.7		37.8	17.1
	22.3	17.7		39.5	17.7
	24.6	19.8		34.4	15.4
1971	27.8	22.7	1986	29.3	14.2
	29.2	24.5	1987	29.3	15.9
	30.7	23.4	1988	32.2	17.7
	27.6	21.3	1989	...	...
	24.5	18.0			

Source: Derived from Table 2.8
Note: (...) not available

Table A-5. Tertiary Education, EEC Countries, mid-1980s

Country	Year	Teaching Staff (1)	Students Enrolled (2)	Student/Teacher Ratio (2):(1)
Greece	1975	...	117,246	...
	1980	10,542	121,116	12
	1984	11,735	167,957	14
Belgium	1986	19,452	252,236	13
Denmark	1984	...	114,559	...
France	1984	...	1,255,538	...
Germany	1984	182,310	1,519,050	8
Ireland	1984	5,761	67,378	12
Italy	1984	49,997	1,181,953	24
Luxemburg	1983	318	982	3
Netherlands	1985	...	404,866	...
Portugal	1984	11,272	112,851	10
Spain	1984	47,539	857,036	18
U.K.	1984	79,544	1,006,969	13

Source: UNESCO, 1988, Table 3.7 (first two columns)
Note: (...) not available

Table A-6. University Level Education, EEC Countries, mid-1980s

Country	Year	Teaching Staff (1)	Students Enrolled (2)	Student/Teacher Ratio (2):(1)
Greece	1975	5,956	95,385	16
	1980	6,924	85,718	12
	1984	6,778	111,446	16
Belgium	1986	5,349	103,505	19
Denmark	1984	...	88,812	...
France	1984	44,678	967,490	22
Germany	1984	134,566	1,311,475	10
Ireland	1984	3,238	37,813	12
Italy	1984	49,472	1,173,910	24
Netherlands	1985	...	168,858	...
Portugal	1984	6,949	81,293	12
Spain	1984	46,632	804,273	17
U.K.	1984	31,043	345,760	11

Source: UNESCO, 1988, Table 3.7
Note: (...) not available

Table A-7. Total Third Level Students by Field of Study, 1980 and 1985

Field of Study	1980 Total	1980 Females	1985 Total	1985 Females
Total	121,116	50,204	167,957	81,181
Teacher Training	6,138	3,366	12,710	9,770
Humanities	12,238	8,885	26,451	17,506
Fine Arts	1,177	687	1,721	1,058
Law	9,919	5,344	11,805	6,668
Social Sciences	15,910	7,684	18,485	9,425
Business Admin.	17,157	6,369	19,038	9,507
Mass Communication	291	160	537	417
Home Economics	220	220	337	159
Service Trades	1,309	586	2,104	1,203
Natural Science	7,449	2,271	8,643	3,195
Mathematics	5,901	2,212	7,276	2,550
Medical Science	13,249	6,602	19,700	10,741
Engineering	21,831	3,217	27,525	4,748
Architecture	965	497	1,525	739
Industrial Progr.	427	212	478	212
Transport & Com.	670	119	1130	103
Agriculture	4,957	1,725	8,492	3,180
Other	1,078	48	0	0

Source: UNESCO, 1988, Table 3.8

Table A-8. Total Third Level Graduates by Field of Study, 1984

Field of Study	1984 Total	1984 Females
Total	27,818	14,073
Teacher Training	4,954	3,589
Humanities	2,952	2,089
Fine Arts	284	175
Law	1,637	967
Social Sciences	2,253	1,171
Business Admin.	4,060	2,064
Mass Communication	81	55
Home Economics	32	32
Service Trades	461	273
Natural Science	1,590	562
Mathematics	1,095	384
Medical Science	2,713	1,494
Engineering	3,674	565
Architecture	156	86
Industrial Progr.	69	38
Transport & Com.	815	103
Agriculture	992	426

Source: UNESCO, 1988, Table 3.10

Table A-9. Percentage Distribution of the Public Current Expenditure, 1960-84

Year	Total Expenditure (mm. Drs.)	Defence	Education		Health
				% GNP	
1960	12,307	38.0	13.8	1.95	8.0
	13,386	36.5	13.9		8.8
	14,602	34.0	13.9		9.8
	15,840	32.6	14.5		10.3
	18,407	30.1	15.8		10.5
1965	21,076	30.5	16.0	2.10	11.1
	23,621	30.8	16.2		10.9
	28,130	35.0	15.4		9.7
	30,225	35.8	15.2		9.3
	33,872	37.0	14.8		9.3
1970	37,742	36.7	15.0	1.85	4.3
	41,362	36.0	15.2		9.6
	45,963	36.4	14.8		9.8
	55,444	35.0	15.1		9.9
	78,071	40.7	13.8		9.1
1975	102,007	44.5	12.7	1.83	8.5
	124,332	42.1	13.2	1.87	9.5
	153,840	36.9	13.9	2.02	9.6
	185,150	41.1	14.9	2.12	9.9
	233,530	39.2	14.2	2.05	10.6
1980	280,050	35.7	13.3	1.89	11.5
	368,550	36.7	13.0	1.99	11.2
	471,210	35.3	13.7	2.15	11.8
	579,370	33.8	15.0	2.44	12.1
1984	724,490	33.9	15.2	2.51	11.2

Source: National Accounts of Greece of the respective years

Table A-10. Educational Finance Statistics, EEC Countries, mid-1980s

Country	Year	Total Public Educ. Exp. as % of GNP	Total Public Educ. Exp. as % of Budget	Higher Education Allocation (%)
Greece	1984	2.6	8.9a/	22.3
Belgium	1985	6.1	15.2	16.7
Denmark	1986	7.7	13.4	20.7
France	1983	6.0	18.5	12.1
Germany	1985	4.6	9.2	20.8
Ireland	1985	6.7	8.7	17.7
Italy	1983	4.8	9.6	10.1
Netherlands	1984	6.9	16.8	26.6
Portugal	1985	4.6	8.7b/	12.7
Spain	1985	3.3	14.1	14.0c/
U.K.	1984	5.2	11.3	21.4

Source: UNESCO, 1988, Table 4.1 (first two columns) and Table 4.3 (last column)

Notes: a/ figure from 1984 State Budget
b/ refers to 1983
c/ refers to 1979

Table A-11. State Budget: Total and Educational Expenditure, 1961-84 (million current Drs)

Year	Expenditure		
	Total (1)	Education (2)	(%) (2):(1)
1961	16,665	1,252	7.5
	20,190	1,370	6.8
	21,288	1,521	7.1
	26,543	2,272	8.6
1965	29,593	2,547	8.6
	34,195	2,988	8.7
	41,604	3,611	8.7
	45,697	3,937	8.6
	51,221	4,027	7.9
1970	54,570	3,883	7.1
	59,570	4,428	7.4
	68,229	5,156	7.6
	72,304	5,913	8.2
	79,129	8,581	10.8
1975	133,876	10,591	7.9
	166,792	12,156	7.3
	193,967	15,455	8.0
	252,996	28,131	11.1
	319,764	33,936	10.6
1980	375,285	41,584	11.1
	661,612	53,709	8.1
	720,564	72,173	10.0
	952,565	85,381	9.0
1984	1,212,143	107,514	8.9

Source: Pesmazoglou, 1987, Table 3, p. 82

Table A-12. Distribution of the Population (over 10 years) by Educational Level and Gender, 1961-1981 (%)

Educational Level	1961			1971			1981		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
Higher Complete	1.8	2.9	0.8	2.9	4.3	1.6	5.9	7.8	4.1
Higher Incomplete	1.3*/	1.9*/	0.8*/	1.6	2.1	1.1	1.9	2.3	1.5
Secondary Complete	6.3	7.0	5.6	9.4	10.0	8.8	13.6	13.5	13.7
Secondary Incomplete	8.1*/	10.6*/	5.8*/	7.7	9.5	6.1	9.9	12.0	7.9
Primary Complete	35.2	40.3	30.5	41.7	45.8	37.9	43.9	45.7	42.1
Primary Incomplete**/	29.5	29.7	29.3	22.7	22.1	23.2	16.2	15.1	17.3
Illiterates	17.8	7.6	27.2	14.0	6.2	21.3	8.6	3.6	13.4
Population over 10 in (000)	6877.5	3314.2	3563.3	7269.2	3515.7	3753.5	8215.0	3995.6	4219.4
Total Population in (000)	8388.3	4091.7	4296.6	8768.4	4286.8	4481.6	9739.6	4779.6	4960.0
Population over 10 as % of the Total	82.0	81.0	82.9	82.9	82.0	83.8	84.3	83.6	85.1
Average Years of Schooling	5.0	5.8	4.1	5.7	6.5	5.0	6.9	7.5	6.3

Source: NSSG, Population Censuses for 1961, 1971, and 1981 respectively

Notes: */ Estimates based on the 1961 'full secondary' column and the 1971 proportion of secondary school graduates who have had some higher education

**/ Includes the 'not classified elsewhere' category

Table A-13. Distribution of the Population (over 10 years) by Educational Level and Region, 1961-1981 (%)

	1961			1971			1981		
Educational Level	Urban	S-Urban	Rural	Urban	S-Urban	Rural	Urban	S-Urban	Rural
Full Higher	3.2	1.2	0.6	4.4	1.9	0.9	8.4	4.0	1.9
Part Higher	2.7	0.4	0.2	2.8	0.4	0.2	2.9	0.8	0.4
Full Secondary	11.5	3.8	1.4	15.1	5.2	1.9	19.1	9.3	4.9
Part Secondary	12.1	7.2	4.1	10.1	7.2	4.2	11.6	9.6	6.9
Full Primary	34.6	36.2	35.6	40.5	44.0	42.9	40.2	47.1	49.5
Part Primary	24.1	32.7	34.2	18.2	25.8	28.6	12.6	19.1	22.0
Illiterates	11.8	18.5	23.9	8.9	15.5	21.3	5.2	10.1	14.4
Regional Population in (000)	3083.0	889.5	2905.0	3925.7	835.8	2507.7	4754.9	945.3	2514.8
Total Population in (000)	6877.5	6877.5	6877.5	7269.2	7269.2	7269.2	8215.0	8215.0	8215.0
Regional Population as % of the Total	44.8	12.9	42.2	54.0	11.5	34.5	57.9	11.5	30.6
Average Years of Schooling	6.2	4.5	3.8	6.8	5.1	4.2	7.9	6.1	5.2

Source: NSSG, Population Censuses for 1961, 1971, and 1981 respectively

APPENDIX B

Tables to Chapter 4

Table B-1. Mean Sample Characteristics by Gender and Type of Employment: NSSG Data Set, 1977 (Salary Earners)

Characteristic	Entire Sample			Private Sector			Public Sector		
	Both Sexes	Males	Females	Both Sexes	Males	Females	Both Sexes	Males	Females
Earnings (Drs per month)	15,441	17,313	11,287	15,272	16,972	9,129	17,521	18,847	12,094
	(8,132)	(8,668)	(4,600)	(9,652)	(9,986)	(4,629)	(7,680)	(7,744)	(4,285)
Years of Schooling	13.8	13.7	14.1	11.9	12.1	11.2	14.5	14.5	14.6
	(3.7)	(3.8)	(3.4)	(4.2)	(4.3)	(3.9)	(2.9)	(9.3)	(2.3)
Age	39.6	41.4	35.4	37.9	39.7	31.4	41.7	43.3	35.4
	(10.5)	(10.3)	(9.8)	(11.3)	(11.1)	(9.9)	(10.3)	(10.0)	(9.0)
Experience	18.0	19.4	15.0	17.8	19.1	13.4	19.2	20.4	14.4
	(11.0)	(10.9)	(10.6)	(12.0)	(11.9)	(11.4)	(10.3)	(10.2)	(9.5)
Age when employed	21.5	22.0	20.4	20.0	20.6	18.0	22.2	22.5	20.8
	(3.6)	(3.6)	(3.3)	(4.3)	(4.2)	(4.1)	(3.2)	(3.2)	(2.4)
Marital Status	0.7	0.8	0.6	0.7	0.8	0.4	0.8	0.9	0.7
	(0.4)	(0.4)	(0.5)	(0.5)	(0.4)	(0.5)	(0.4)	(0.3)	(0.5)
Number of Children	...	...	...	...	...	...	...	...	...
Number of Observations	7,058	4,865	2,193	1,319	1,033	286	1,462	1,175	287

Note: Numbers in parentheses are standard deviations
(...) not available

Table B-2. Mean Sample Characteristics by Gender and Type of Employment: IEIR Data Set, 1975

Characteristic	Entire Sample			Private Sector			Public Sector		
	Both Sexes	Males	Females	Both Sexes	Males	Females	Both Sexes	Males	Females
Earnings (Drs per month)	16,449	16,736	16,095	10,952	11,925	8,398	17,803	18,420	17,161
	(11,442)	(11,310)	(11,614)	(5,502)	(6,060)	(2,168)	(12,105)	(12,213)	(11,985)
Years of Schooling	10.7	10.7	10.8	10.5	10.1	11.3	10.8	10.9	10.7
	(4.4)	(4.5)	(4.4)	(4.2)	(4.4)	(3.8)	(4.5)	(4.5)	(4.5)
Age	...	...	...	...	...	...	...	...	...
Experience	12.7	12.5	13.0	10.6	10.6	10.8	13.3	13.2	13.3
	(8.2)	(8.1)	(8.2)	(7.8)	(7.8)	(7.9)	(8.2)	(8.2)	(8.2)
Age when employed	...	...	...	...	...	...	...	...	...
Marital Status	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5
	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Number of Children	...	...	...	...	...	...	...	...	...
Number of Observations	587	324	263	116	84	32	471	240	231

Note: Numbers in parentheses are standard deviations
(...) not available

Table B-3. Mean Sample Characteristics by Gender and Type of Employment: IEIR Data Set, 1981

Characteristic	Entire Sample			Private Sector			Public Sector		
	Both Sexes	Males	Females	Both Sexes	Males	Females	Both Sexes	Males	Females
Earnings (Drs per month)	39,711	40,912	38,190	33,600	36,280	27,254	41,848	43,151	40,499
	(20,977)	(21,647)	(20,030)	(18,998)	(21,257)	(9,599)	(21,233)	(21,521)	(20,891)
Years of Schooling	10.6	10.4	10.7	10.7	10.3	11.6	10.5	10.5	10.5
	(4.4)	(4.5)	(4.4)	(4.4)	(4.5)	(4.1)	(4.5)	(4.5)	(4.5)
Age	...	...	...	...	...	...	...	...	...
Experience	12.8	12.8	12.8	11.4	11.8	10.6	13.3	13.3	13.3
	(8.1)	(8.1)	(8.2)	(7.7)	(7.8)	(7.6)	(8.2)	(8.2)	(8.2)
Age when employed	...	...	...	...	...	...	...	...	...
Marital Status	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Number of Children	...	...	...	...	...	...	...	...	...
Number of Observations	637	356	281	165	116	49	472	240	232

Note: Numbers in parentheses are standard deviations
(...) not available

Table B-4. Mean Sample Characteristics by Gender and Type of Employment: IEIR Data Set, 1985

Characteristic	Entire Sample			Private Sector			Public Sector		
	Both Sexes	Males	Females	Both Sexes	Males	Females	Both Sexes	Males	Females
Earnings (Drs per month)	84,248	85,662	82,533	67,691	71,769	58,820	90,102	92,391	87,812
	(33,911)	(35,109)	(32,369)	(28,074)	(31,148)	(16,895)	(33,885)	(34,997)	(32,643)
Years of Schooling	10.5	10.4	10.7	10.5	10.0	11.3	10.6	10.5	10.6
	(4.5)	(4.5)	(4.4)	(4.4)	(4.5)	(4.1)	(4.5)	(4.5)	(4.5)
Age	...	...	...	...	...	...	...	...	...
Experience	12.9	12.9	13.0	12.1	12.3	11.6	13.3	13.3	13.3
	(8.1)	(8.1)	(8.2)	(7.9)	(7.9)	(7.9)	(8.2)	(8.2)	(8.2)
Age when employed	...	...	...	...	...	...	...	...	...
Marital Status	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Number of Children	...	...	...	...	...	...	...	...	...
Number of Observations	693	380	313	181	124	57	512	256	256

Note: Numbers in parentheses are standard deviations
(...) not available

Table B-5. Mean Sample Characteristics by Gender: Public Sector Data Set, 1986 and 1987

Characteristic	1987 State-controlled Bank (HIDB)			1987 Ministry of Education			1986 Min. of Finance
	Both Sexes	Males	Females	Both Sexes	Males	Females	Both Sexes
Earnings (Drs per month)	87,415	93,468	77,394	69,587	73,875	66,724	62,333
	(23,479)	(24,971)	(16,483)	(10,597)	(10,320)	(9,794)	(12,153)
Years of Schooling	13.0	13.5	12.2	13.6	13.9	13.5	13.4
	(3.4)	(3.5)	(3.0)	(2.7)	(2.8)	(2.6)	(2.8)
Age	43.0	45.3	39.1	41.0	44.2	38.9	...
	(10.2)	(10.0)	(9.3)	(7.5)	(7.4)	(6.8)	
Experience	18.2	19.6	15.6	14.0	15.6	12.9	12.4
	(8.6)	(9.4)	(6.3)	(6.9)	(7.8)	(6.1)	(8.1)
Age when employed	25.4	25.8	24.8	27.4	29.0	26.4	...
	(7.0)	(7.4)	(6.2)	(4.7)	(4.3)	(4.7)	
Marital Status	0.7	0.9	0.5	0.6	0.8	0.5	0.8
	(0.5)	(0.4)	(0.5)	(0.5)	(0.4)	(0.5)	(0.4)
Number of Children	1.3	1.4	1.1	0.8	1.1	0.6	1.1
	(1.0)	(1.0)	(1.0)	(0.9)	(0.9)	(0.9)	(1.0)
Number of Observations	786	490	296	632	253	379	18,337

Note: Numbers in parentheses are standard deviations
(...) not available

Table B-6. Earnings Functions by Economic Sector, Males: NSSG Sample, 1977

	All Sectors		Private Sector		Public Sector	
Independent Variable	Mincerian	Step	Mincerian	Step	Mincerian	Step
Years of Schooling, S	0.048 *		0.068 *		0.073 *	
	(31.30)		(21.70)		(27.01)	
Years of Experience, EX	0.053 *	0.054 *	0.057 *	0.057 *	0.043 *	0.045 *
	(29.91)	(30.19)	(14.73)	(14.89)	(15.65)	(16.31)
Experience-squared	-0.00088 *	-0.00091 *	-0.00104 *	-0.00106 *	-0.00051 *	-0.00058 *
	(22.01)	(22.57)	(12.13)	(12.47)	(8.19)	(9.18)
Educational Level						
- Secondary Incomplete		0.193 *		0.165 *		0.177 *
		(6.62)		(3.18)		(3.54)
- Secondary		0.301 *		0.273 *		0.290 *
		(14.24)		(7.06)		(7.57)
- University Incomplete		0.298 *		0.236 *		0.520 *
		(6.63)		(3.04)		(5.71)
- University		0.497 *		0.694 *		0.682 *
		(29.03)		(21.35)		(20.54)
Constant Term	8.406	8.674	8.218	8.650	8.096	8.585
R-squared (adjusted)	0.313	0.310	0.385	0.403	0.545	0.546
N	4,865	4,865	1,033	1,033	1,175	1,175

Source: Based on the NSSG data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-7. Earnings Functions by Economic Sector, Females: NSSG Sample, 1977

	All Sectors		Private Sector		Public Sector	
Independent Variable	Mincerian	Step	Mincerian	Step	Mincerian	Step
Years of Schooling, S	0.068 *		0.074 *		0.086 *	
	(32.62)		(15.90)		(12.96)	
Years of Experience, EX	0.051 *	0.054 *	0.043 *	0.043 *	0.042 *	0.040 *
	(26.34)	(28.16)	(8.57)	(8.70)	(7.37)	(6.64)
Experience-squared	-0.00083 *	-0.00090 *	-0.00061 *	-0.00070 *	-0.00055 *	-0.00048 *
	(16.83)	(18.74)	(5.01)	(5.81)	(3.79)	(3.13)
Educational Level						
- Secondary Incomplete		0.250 *		0.100		0.536 *
		(4.66)		(1.46)		(2.60)
- Secondary		0.584 *		0.375 *		0.817 *
		(20.92)		(8.13)		(6.98)
- University Incomplete		0.501 *		0.381 *		0.729 *
		(9.13)		(3.51)		(5.07)
- University		0.780 *		0.778 *		1.125 *
		(30.72)		(16.08)		(9.73)
Constant Term	7.810	8.086	7.818	8.302	7.633	7.907
R-squared (adjusted)	0.524	0.529	0.520	0.548	0.514	0.526
N	2,193	2,193	286	286	287	287

Source: Based on the NSSG data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-8. Mincerian Earnings Functions, Non-linear in 'S', by Economic Sector, Males: NSSG Sample, 1977

Independent Variable	All Sectors	Private Sector	Public Sector
Years of Schooling, S	0.055 *	-0.031	0.022
	(5.16)	(1.46)	(1.24)
Years of Experience, EX	0.053 *	0.058 *	0.044 *
	(29.74)	(15.11)	(15.91)
Experience-squared	-0.00088 *	-0.00107 *	-0.00054 *
	(21.72)	(12.61)	(8.56)
Schooling-squared	-0.0003	0.005 *	0.002 *
	0.65	(4.65)	(2.95)
Constant Term	8.375	8.664	8.349
R-squared (adjusted)	0.313	0.397	0.548
N	4,865	1,033	1,175

Table B-9. Mincerian Earnings Functions, Non-linear in 'S', by Economic Sector, Females: NSSG Sample, 1977

Independent Variable	All Sectors	Private Sector	Public Sector
Years of Schooling, S	0.101 *	-0.025	0.134
	(9.15)	(1.03)	(3.29)
Years of Experience, EX	0.050 *	0.042 *	0.042 *
	(25.67)	(8.67)	(7.18)
Experience-squared	-0.00078 *	-0.00066 *	-0.00053 *
	(15.44)	(5.53)	(3.55)
Schooling-squared	-0.002 *	0.005 *	0.002
	(3.11)	(4.17)	(1.19)
Constant Term	7.649	8.296	7.354
R-squared (adjusted)	0.526	0.547	0.514
N	2,193	286	287

Source: Based on the NSSG data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-10. Mincerian Earnings Functions, All Sectors, Males: IEIR Sample, 1975, 1981 and 1985

Independent Variable	1975	1981	1985
Years of Schooling, S	0.062 *	0.043 *	0.037 *
	(11.85)	(10.15)	(11.61)
Years of Experience, EX	0.062 *	0.045 *	0.042 *
	(4.97)	(4.64)	(5.48)
Experience-squared	-0.00097 **	-0.00048	-0.00060 **
	(2.23)	(1.36)	(2.28)
Constant Term	8.325	9.577	10.506
R-squared (adjusted)	0.476	0.445	0.473
N	324	356	380

Table B-11. Mincerian Earnings Functions by Economic Sector, Males: IEIR Sample, 1975, 1981 and 1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Schooling, S	0.048 *	0.064 *	0.049 *	0.040 *	0.039 *	0.033 *
	(5.44)	(10.65)	(5.73)	(8.81)	(6.36)	(10.93)
Years of Experience, EX	0.042 **	0.070 *	0.038	0.053 *	0.041 *	0.045 *
	(2.07)	(4.74)	(1.91)	(4.75)	(2.81)	(5.98)
Experience-squared	-0.00087	-0.00113 **	-0.00064	-0.00060	-0.00092	-0.00059 **
	(1.17)	(2.23)	(0.89)	(1.57)	(1.79)	(2.31)
Constant Term	8.503	8.288	9.540	9.586	10.403	10.571
R-squared (adjusted)	0.343	0.505	0.299	0.538	0.331	0.609
N	84	240	116	240	124	256

Source: Based on the IEIR data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-12. Mincerian Earnings Functions, All Sectors, Females: IEIR Sample, 1975, 1981 and 1985

Independent Variable	1975	1981	1985
Years of Schooling, S	0.054 *	0.038 *	0.030 *
	(8.10)	(8.22)	(9.10)
Years of Experience, EX	0.067 *	0.052 *	0.042 *
	(4.27)	(4.74)	(5.30)
Experience-squared	-0.00110 **	-0.00061	-0.00054 **
	(1.97)	(1.61)	(1.97)
Constant Term	8.276	9.508	10.507
R-squared (adjusted)	0.398	0.484	0.497
N	263	281	313

Table B-13. Mincerian Earnings Functions by Economic Sector, Females: IEIR Sample, 1975, 1981 and 1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Schooling, S	-0.010	0.062 *	0.005	0.047 *	0.029	0.036 *
	(0.94)	(9.15)	(0.41)	(10.36)	(1.90)	(12.61)
Years of Experience, EX	0.035	0.070 *	0.038	0.057 *	0.029	0.047 *
	(1.65)	(4.31)	(1.50)	(5.24)	(1.62)	(6.67)
Experience-squared	-0.00065	-0.00118 **	-0.00073	-0.00075 **	-0.00053	-0.00065 *
	(0.84)	(2.10)	(0.80)	(1.99)	(0.85)	(2.70)
Constant Term	8.860	8.237	9.821	9.426	10.540	10.478
R-squared (adjusted)	0.257	0.448	0.122	0.583	0.201	0.655
N	32	231	49	232	57	256

Source: Based on the IEIR data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-14. Mincerian Earnings Functions, Non-linear in 'S', All Sectors, Males: IEIR Sample, 1975, 1981, 1985

Independent Variable	1975	1981	1985
Years of Schooling, S	-0.283 *	-0.204 *	-0.122 *
	(6.94)	(4.84)	(3.73)
Years of Experience, EX	0.063 *	0.045 *	0.041 *
	(5.38)	(4.62)	(5.62)
Experience-squared	-0.00100 **	-0.00046	-0.00060 **
	(2.45)	(1.37)	(2.33)
Schooling-squared	0.016 *	0.011 *	0.007 *
	(6.94)	(5.90)	(4.86)
Constant Term	9.870	10.685	11.217
R-squared (adjusted)	0.544	0.494	0.503
N	324	356	380

Table B-15. Mincerian Earnings Functions, Non-linear in 'S', All Sectors, Females: IEIR Sample, 1975, 1981, 1985

Independent Variable	1975	1981	1985
Years of Schooling, S	-0.268 *	-0.185 *	-0.121 *
	(5.45)	(4.41)	(3.76)
Years of Experience, EX	0.066 *	0.050 *	0.042 *
	(4.41)	(4.82)	(5.48)
Experience-squared	-0.00104 **	-0.00057	-0.00055 **
	(2.01)	(1.59)	(2.05)
Schooling-squared	0.015 *	0.010 *	0.007 *
	(5.45)	(5.33)	(4.73)
Constant Term	9.741	10.526	11.187
R-squared (adjusted)	0.458	0.530	0.530
N	263	281	313

Source: Based on the IEIR data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-16. Mincerian Earnings Functions, Non-linear in 'S', by Economic Sector, Males: IEIR Sample, 1975-1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Schooling, S	-0.296 *	-0.263 *	-0.251 *	-0.186 *	-0.169 *	-0.107 *
	(3.81)	(4.45)	(2.94)	(4.15)	(2.64)	(3.39)
Years of Experience, EX	0.044 *	0.070 *	0.037 *	0.053 *	0.039 *	0.045 *
	(2.40)	(5.06)	(1.92)	(4.99)	(2.81)	(6.25)
Experience-squared	-0.00090	-0.00114 **	-0.00059	-0.00060 **	-0.00088	-0.00060 *
	(1.35)	(2.40)	(0.86)	(1.65)	(1.77)	(2.44)
Schooling-squared	0.016 *	0.015 *	0.014 *	0.010 *	0.010 *	0.006 *
	(4.45)	(5.56)	(3.53)	(5.08)	(3.27)	(4.47)
Constant Term	10.024	9.762	10.887	10.600	11.343	11.196
R-squared (adjusted)	0.468	0.560	0.364	0.582	0.381	0.637
N	84	240	116	240	124	256

Source: Based on the IEIR data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-17. Mincerian Earnings Functions, Non-linear in 'S', by Economic Sector, Females: IEIR Sample, 1975-1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Schooling, S	0.039	-0.269 *	-0.181 **	-0.172 *	-0.018	-0.105 *
	(0.52)	(4.20)	(2.06)	(3.97)	(0.28)	(3.61)
Years of Experience, EX	0.035	0.070 *	0.033	0.057 *	0.029	0.047 *
	(1.64)	(4.53)	(1.35)	(5.52)	(1.62)	(6.96)
Experience-squared	-0.00065	-0.00116 **	0.00062	-0.00075 **	-0.00054	-0.00065 *
	(0.84)	(2.19)	(0.71)	(2.10)	(0.85)	(2.82)
Schooling-squared	-0.002	0.015 *	0.009 **	0.010 *	0.002	0.007 *
	(0.67)	(5.20)	(2.14)	(5.07)	(0.52)	(4.88)
Constant Term	8.626	9.727	10.720	10.408	10.697	11.111
R-squared (adjusted)	0.242	0.505	0.187	0.623	0.190	0.684
N	32	231	49	232	57	256

Source: Based on the IEIR data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-18. Step Earnings Functions, All Sectors, Males: IEIR Sample, 1975, 1981 and 1985

Independent Variable	1975	1981	1985
Years of Experience, EX	0.063 *	0.045 *	0.041 *
	(5.38)	(4.62)	(5.62)
Experience-squared	-0.00100 **	-0.00046	-0.00060 **
	(2.45)	(1.37)	(2.33)
Educational Level			
- Secondary	0.018	0.011	0.059
	(0.32)	(0.22)	(1.55)
- University	0.666 *	0.475 *	0.391 *
	(13.58)	(11.49)	(12.60)
Constant Term	8.745	9.874	10.747
R-squared (adjusted)	0.544	0.494	0.503
N	324	356	380

Source: Based on the IEIR data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-19. Step Earnings Functions by Economic Sector, Males: IEIR Sample, 1975, 1981 and 1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Experience, EX	0.044 **	0.070 *	0.037 **	0.053 *	0.039 *	0.045 *
	(2.40)	(5.05)	(1.93)	(4.99)	(2.81)	(6.25)
Experience-squared	-0.00090	-0.00114 **	-0.00059	0.00060	-0.00088	-0.00060 **
	(1.35)	(2.40)	(0.86)	(1.64)	(1.77)	(2.44)
Educational Level						
- Secondary	-0.049	0.047	-0.007	0.014	0.029	0.057
	(0.55)	(0.68)	(0.08)	(0.27)	(0.39)	(1.57)
- University	0.556 *	0.681 *	0.542 *	0.442 *	0.435 *	0.354 *
	(6.89)	(11.90)	(6.55)	(9.98)	(7.14)	(11.89)
Constant Term	8.825	8.726	9.882	9.861	10.675	10.788
R-squared (adjusted)	0.468	0.560	0.364	0.582	0.381	0.637
N	84	240	116	240	124	256

Source: Based on the IEIR data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-20. Step Earnings Functions, All Sectors, Females: IEIR Sample, 1975, 1981 and 1985

Independent Variable	1975	1981	1985
Years of Experience, EX	0.066 *	0.050 *	0.042 *
	(4.41)	(4.83)	(5.48)
Experience-squared	-0.00104 **	-0.00057	-0.00055 **
	(2.01)	(1.59)	(2.05)
Educational Level			
- Secondary	0.002	0.002	0.029
	(0.03)	(0.05)	(0.77)
- University	0.598 *	0.417 *	0.327 *
	(9.30)	(9.37)	(10.01)
Constant Term	8.671	9.786	10.715
R-squared (adjusted)	0.458	0.530	0.530
N	263	281	313

Source: Based on the IEIR data set
Notes: Absolute, t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-21. Step Earnings Functions by Economic Sector, Females: IEIR Sample, 1975, 1981 and 1985

	1975		1981		1985	
Independent Variable	Private	Public	Private	Public	Private	Public
Years of Experience, EX	0.035	0.070 *	0.033	0.057 *	0.029	0.047 *
	(1.64)	(4.53)	(1.35)	(5.52)	(1.62)	(6.96)
Experience-squared	-0.00065	-0.00116 *	-0.00062	-0.00075 **	-0.00054	-0.00065 *
	(0.84)	(2.19)	(0.71)	(2.10)	(0.85)	(2.82)
Educational Level						
- Secondary	-0.014	0.035	-0.162	0.061	0.059	0.073 **
	(0.15)	(0.47)	(1.45)	(1.20)	(0.71)	(2.16)
- University	-0.115	0.670 *	0.073	0.506 *	0.161	0.382 *
	(1.03)	(10.34)	(0.64)	(11.62)	(1.93)	(13.76)
Constant Term	8.777	8.662	9.941	9.740	10.643	10.715
R-squared (adjusted)	0.242	0.505	0.187	0.623	0.190	0.684
N	32	231	49	232	57	256

Source: Based on the IEIR data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively

Table B-22. Earnings Functions, Males: Public Sector Sample, 1986 and 1987

	1986 a/		1987 b/		1987 c/	
Independent Variable	Mincerian	Step	Mincerian	Step	Mincerian	Step
Years of Schooling, S	0.023 *		0.026 *		0.043 *	
	(67.64)		(12.64)		(19.73)	
Years of Experience, EX	0.023 *	0.023 *	0.007 **	0.005	0.037 *	0.038 *
	(59.51)	(59.42)	(2.09)	(1.56)	(14.98)	(14.80)
Experience-squared	-0.00023 *	-0.00023 *	0.00011	0.00015 **	-0.00053 *	-0.00054 *
	(17.17)	(17.06)	(1.19)	(1.62)	(10.03)	(9.90)
Educational Level						
- Secondary		0.063 *		0.088 *		0.231 *
		(16.90)		(3.42)		(9.45)
- Non-Univ., Post-Sec.		0.117 *		0.134 *		---
		(3.05)		(3.61)		
- University		0.186 *		0.222 *		0.422 *
		(49.06)		(8.65)		(18.32)
- Post-Graduate		0.207 *		0.255 *		---
		(18.35)		(7.10)		
Constant Term	10.489	10.837	10.709	10.935	10.408	10.865
R-squared (adjusted)	0.633	0.644	0.608	0.627	0.629	0.663
N	18,337	18,337	212	212	468	468

Source: Based on the public sector data set

Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively
(---) not applicable
a/Ministry of Finance, refers to both sexes
b/Ministry of Education
c/State-controlled Bank (HIDB)

Table B-23. Earnings Functions, Females: Public Sector Sample, 1986 and 1987

Independent Variable	1986 a/		1987 b/		1987 c/	
	Mincerian	Step	Mincerian	Step	Mincerian	Step
Years of Schooling, S	0.023 *		0.029 *		0.028 *	
	(67.64)		(16.23)		(9.94)	
Years of Experience, EX	0.023 *	0.023 *	0.013 *	0.011 *	0.046 *	0.046 *
	(59.51)	(59.42)	(4.15)	(3.58)	(9.22)	(9.35)
Experience-squared	-0.00023 *	-0.00023 *	0.00000	0.00006	-0.00100 *	-0.00100 *
	(17.17)	(17.06)	(0.03)	(0.64)	(6.15)	(6.26)
Educational Level						
- Secondary		0.063 *		0.116 *		0.114 *
		(16.90)		(5.67)		(4.59)
- Non-Univ., Post-Sec.		0.117 *		0.179 *		---
		(3.05)		(4.01)		
- University		0.186 *		0.256 *		0.274 *
		(49.06)		(12.19)		(9.83)
- Post-Graduate		0.207 *		0.272 *		---
		(18.35)		(6.07)		
Constant Term	10.489	10.837	10.549	10.781	10.483	10.686
R-squared (adjusted)	0.633	0.644	0.660	0.671	0.512	0.526
N	18,337	18,337	336	336	267	267

Source: Based on the public sector data set

Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
"Primary-education-or-less" is the omitted education dummy
* and ** indicate statistical significance at the 1% and 5% level, respectively
(---) not applicable
a/Ministry of Finance, refers to both sexes
b/Ministry of Education
c/State-controlled Bank (HIDB)

Table B-24. Mincerian Earnings Functions, Non-linear in 'S', Males: Public Sector Sample, 1986 and 1987

Independent Variable	1986 a/	1987 b/	1987 c/
Years of Schooling, S	-0.024 *	-0.017	0.022
	(11.50)	(1.33)	(1.39)
Years of Experience, EX	0.023 *	0.005	0.037 *
	(59.52)	(1.65)	(14.96)
Experience-squared	-0.00023 *	0.00016	-0.00054 *
	(17.17)	(1.87)	(10.11)
Schooling-squared	0.002 *	0.002 *	0.001
	(22.78)	(3.43)	(1.35)
Constant Term	10.755	10.996	10.476
R-squared (adjusted)	0.643	0.64	0.664
N	18,337	212	468

Table B-25. Mincerian Earnings Functions, Non-linear in 'S', Females: Public Sector Sample, 1986 and 1987

Independent Variable	1986 a/	1987 b/	1987 c/
Years of Schooling, S	-0.024 *	-0.010	-0.190
	(11.50)	(0.92)	(1.16)
Years of Experience, EX	0.023 *	0.011 *	0.046 *
	(59.52)	(3.59)	(9.35)
Experience-squared	-0.00023 *	0.00070	-0.00100 *
	(17.17)	(0.70)	(6.26)
Schooling-squared	0.002 *	0.002 *	0.002 *
	(22.78)	(3.65)	(2.94)
Constant Term	10.755	10.782	10.723
R-squared (adjusted)	0.643	0.675	0.526
N	18,337	336	267

Source: Based on the public sector data set
Notes: Absolute t-values in parentheses
Dependent variable: natural logarithm of monthly earnings
* and ** indicate statistical significance at the 1% and 5% level, respectively
a/Ministry of Finance, refers to both sexes
b/Ministry of Education
c/State-controlled Bank (HIDB)

APPENDIX C

Tables to Chapter 5

Table C-1. Mincerian Rates of Return to Schooling, Males, Entire Samples, 1975-85

Sample	Year	Rate of Return (%)	Number of Observations (N)	Adjusted R-squared
IEIR	1975	6.2	324	0.48
NSSG	1977	4.8	4,865	0.31
IEIR	1981	4.3	356	0.45
IEIR	1985	3.7	380	0.47

Source: IEIR: from Appendix Table B-10
NSSG: from Appendix Table B-6

Table C-2. Mincerian Rates of Return to Schooling, Females, Entire Samples, 1975-85

Sample	Year	Rate of Return (%)	Number of Observations (N)	Adjusted R-squared
IEIR	1975	5.4	263	0.40
NSSG	1977	6.8	2,193	0.52
IEIR	1981	3.8	281	0.48
IEIR	1985	3.0	313	0.50

Source: IEIR: from Appendix Table B-12
NSSG: from Appendix Table B-7

Table C-3. Mincerian Rates of Return to Schooling by Economic Sector, Males, 1975-87 (percent)

Sample	Year	Economic Sector: Private	Economic Sector: Public
IEIR	1975	4.8	6.4
NSSG	1977	6.8	7.3
IEIR	1981	4.9	4.0
IEIR	1985	3.9	3.3
Public Sector a/	1987	...	2.6
Public Sector b/	1987	...	4.3

Source: IEIR: from Appendix Table B-11
NSSG: from Appendix Table B-6
Public Sector: from Appendix Table B-22
Notes: a/ Ministry of Education
b/ State-controlled Bank (HIDB)

Table C-4. Mincerian Rates of Return to Schooling by Economic Sector, Females, 1975-87 (percent)

Sample	Year	Economic Sector: Private	Economic Sector: Public
IEIR	1975	*/	6.2
NSSG	1977	7.4	8.6
IEIR	1981	*/	4.7
IEIR	1985	*/	3.6
Public Sector b/	1987	...	2.9
Public Sector c/	1987	...	2.8

Source: IEIR: from Appendix Table B-13
NSSG: from Appendix Table B-7
Public Sector: from Appendix Table B-23
Notes: */ statistically insignificant
a/ Ministry of Education
b/ State-controlled Bank (HIDB)

Table C-5. Mincerian Rates of Return to Schooling by Level of Education, Males, Entire Samples, 1975-85 (percent)

Sample	Year	Level of Education		
		Primary	Secondary	Higher
IEIR	1975	-9.1	10.1	22.9
NSSG	1977 */	5.1	4.8	4.5
IEIR	1981	-7.2	6.0	14.8
IEIR	1985	-3.8	4.6	10.2

Source: IEIR: from Appendix Table B-14
NSSG: from Appendix Table B-8
Note: */ not statistically significant

Table C-6. Mincerian Rates of Return to Schooling by Level of Education, Females, Entire Samples, 1975-85 (percent)

Sample	Year	Level of Education		
		Primary	Secondary	Higher
IEIR	1975	-8.8	9.2	21.2
NSSG	1977	8.3	6.5	5.3
IEIR	1981	-6.5	5.5	13.5
IEIR	1985	-3.7	4.7	10.3

Source: IEIR: from Appendix Table B-15
NSSG: from Appendix Table B-8

Table C-7. Mincerian Rates of Return to Schooling by Level of Education, Both Sexes, Public Sector, 1975-87 (%)

Sample	Year	Primary	Secondary	Higher Education		
				TEI d/	University	Post-graduate
IEIR	1975	-8.8	9.2	...	21.2	...
NSSG	1977 */	4.3	7.6	...	9.9	...
IEIR	1981	-6.0	6.0	...	14.0	...
IEIR	1985	-2.2	6.2	...	11.8	...
Public Sector a/	1986	0.0	2.4	3.6	4.0	4.8
Public Sector b/	1987	0.6	3.0	4.2	4.6	5.4
Public Sector c/	1987 */	1.6	4.1	...	5.8	...

Source: IEIR: from Table 4.24
NSSG: from Table 4.12
Public Sector: from Table 4.36

Notes: (...) not available
*/ not statistically significant
a/ Ministry of Finance
b/ Ministry of Education
c/ State-controlled Bank (HIDB)
d/ Non-university, Post-secondary

Table C-8. Mincerian Rates of Return to Schooling by Level of Education, Males, Public Sector, 1975-87 (percent)

Sample	Year	Primary	Secondary	Higher Education		
				TEI c/	University	Post-graduate
IEIR	1975	-8.3	9.7	...	21.7	...
NSSG	1977 */	4.8	7.5	...	9.2	...
IEIR	1981	-6.6	5.4	...	13.4	...
IEIR	1985	-3.5	3.7	...	8.5	...
Public Sector a/	1987 */	0.7	3.1	4.3	4.7	5.5
Public Sector b/	1987 */	3.3	4.4	...	5.1	...

Source: IEIR: from Appendix Table B-16
NSSG: from Appendix Table B-8
Public Sector: from Appendix Table B-24

Notes: (...) not available
*/ not statistically significant
a/ Ministry of Education
b/ State-controlled Bank (HIDB)
c/ Non-university, Post-secondary

Table C-9. Mincerian Rates of Return to Schooling by Level of Education, Females, Public Sector, 1975-87 (percent)

Sample	Year	Primary	Secondary	Higher Education		
				TEI c/	University	Post-graduate
IEIR	1975	-8.9	9.1	...	21.1	...
NSSG	1977 */	11.1	8.8	...	7.3	...
IEIR	1981	-5.2	6.8	...	14.8	...
IEIR	1985	-2.1	6.3	...	11.9	...
Public Sector a/	1987 */	1.4	3.8	5.0	5.4	6.2
Public Sector b/	1987 */	0.6	3.1	...	4.8	...

Source: IEIR: from Appendix Table B-17
NSSG: from Appendix Table B-9
Public Sector: from Appendix Table B-25

Notes: (...) not available
*/ not statistically significant
a/ Ministry of Education
b/ State-controlled Bank (HIDB)
c/ Non-university, Post-secondary

Table C-10. Mincerian Rates of Return to Schooling by Level of Education, Both Sexes, Private Sector, 1975-85 (%)

Sample	Year	Level of Education		
		Primary	Secondary	Higher
IEIR	1975	-8.3	6.1	15.7
NSSG	1977	2.3	9.5	14.3
IEIR	1981	-8.6	7.0	17.4
IEIR	1985	-4.6	3.8	9.4

Source: IEIR: from Table 4.24
NSSG: from Table 4.12

Table C-11. Mincerian Rates of Return to Schooling by Level of Education, Males, Private Sector, 1975-85 (percent)

Sample	Year	Level of Education		
		Primary	Secondary	Higher
IEIR	1975	-10.4	8.8	21.6
NSSG	1977 */	2.9	8.9	12.9
IEIR	1981	-8.3	8.5	19.7
IEIR	1985	-4.9	7.1	15.1

Source: IEIR: from Appendix Table B-16
NSSG: from Appendix Table B-8
Note: */ not statistically significant

Table C-12. Mincerian Rates of Return to Schooling by Level of Education, Females, Private Sector, 1975-85 (percent)

Sample	Year	Level of Education		
		Primary	Secondary	Higher
IEIR	1975 */	1.5	0.9	-2.5
NSSG	1977 */	3.5	9.5	13.5
IEIR	1981	-6.4	3.5	10.7
IEIR	1985 */	0.6	3.0	4.6

Source: IEIR: from Appendix Table B-17
NSSG: from Appendix Table B-9
Note: */ not statistically significant

Table C-13. Rates of Return to Schooling by Level of Education, Males, Entire Samples, 1975-85 (percent)

Sample	Year	Secondary (vs. Primary)	Higher (vs. Secondary)
IEIR	1975	0.3	16.2
NSSG	1977	5.0	4.9
IEIR	1981	0.2	11.6
IEIR	1985	1.0	8.3

Source: IEIR: from Appendix Table B-18
NSSG: from Appendix Table B-6

Table C-14. Rates of Return to Schooling by Level of Education, Females, Entire Samples, 1975-85 (percent)

Sample	Year	Secondary (vs. Primary)	Higher (vs. Secondary)
IEIR	1975	0.0	14.9
NSSG	1977	9.7	4.9
IEIR	1981	0.0	10.4
IEIR	1985	0.5	7.5

Source: IEIR: from Appendix Table B-20
NSSG: from Appendix Table B-7

Table C-15. Rates of Return to Schooling by Level of Education, Males, Public Sector, 1975-87 (percent)

Sample	Year	Secondary vs. Primary	TEI c/ vs. Secondary	University vs. Secondary	Postgraduate vs. University
IEIR	1975	0.8 */	...	15.9	...
NSSG	1977	4.8	...	9.8	...
IEIR	1981	0.2 */	...	10.7	...
IEIR	1985	1.0 */	...	7.4	...
Public Sector a/	1987	1.5	1.5	3.4	1.7
Public Sector b/	1987	3.9	...	4.8	...

Source: IEIR: from Appendix Table B-19
NSSG: from Appendix Table B-6
Public Sector: from Appendix Table B-22

Notes: (...) not available
*/ not statistically significant
a/ Ministry of Education
b/ State-controlled Bank (HIDB)
c/ Non-university, Post-secondary

Table C-16. Rates of Return to Schooling by Level of Education, Females, Public Sector, 1975-87 (percent)

Sample	Year	Secondary vs. Primary	TEI c/ vs. Secondary	University vs. Secondary	Postgraduate vs. University
IEIR	1975	0.6 **/	...	15.9	...
NSSG	1977	13.6	...	7.7	...
IEIR	1981	1.0 **/	...	11.1	...
IEIR	1985	1.2	...	7.7	...
Public Sector a/	1987	1.9	2.1	3.5	0.8
Public Sector b/	1987	1.9	...	4.0	...

Source: IEIR: from Appendix Table B-20
NSSG: from Appendix Table B-7
Public Sector: from Appendix Table B-23

Notes: (...) not available
*/ not statistically significant
a/ Ministry of Education
b/ State-controlled Bank (HIDB)
c/ Non-university, Post-secondary

Table C-17. Rates of Return to Schooling by Level of Education, Males, Private Sector, 1975-85 (percent)

Sample	Year	Secondary (vs. Primary)	Higher (vs. Secondary)
IEIR	1975	-0.8 */	15.1
NSSG	1977	4.6	10.5
IEIR	1981	-0.1 */	13.7
IEIR	1985	0.5 */	10.2

Source: IEIR: from Appendix Table B-19
NSSG: from Appendix Table B-6
Note: */ not statistically significant

Table C-18. Rates of Return to Schooling by Level of Education, Females, Private Sector, 1975-85 (percent)

Sample	Year	Secondary (vs. Primary)	Higher (vs. Secondary)
IEIR	1975	-0.2 */	*/
NSSG	1977	6.3	10.1
IEIR	1981	-2.7 */	5.9 */
IEIR	1985	1.0 */	2.6 */

Source: IEIR: from Appendix Table B-21
NSSG: from Appendix Table B-7
Note: */ not statistically significant

Table C-19. Mean Monthly Earnings by Level of Education, 1964-1987 (in current Drs.)

Sample	Year	Secondary	Higher		
			Non-Univ./ Post-Sec.	University	Post-graduate
KEPE	1964 a/	2,792	---	5,100	---
IEIR	1975 a/	12,010	---	24,105	---
NSSG	1977 a/	13,639	---	16,837	---
IEIR	1981 a/	32,873	---	53,192	---
IEIR	1985 a/	76,130	---	105,283	---
Public Sector	1987 a/	65,754	67,336	75,129	79,213

Source: KEPE: from Table 3.16
IEIR: analyses for the respective years
NSSG: from Table 3.17
Public Sector: from Table 3.18

Note: (---) not applicable
a/ refers to net monthly earnings because of the non availability of gross salary in the sample

Table C-20. The Returns to Education by Sector, Selected Countries (percent)

Country	Sector Reference	Competitive	Non-Competitive
Greece-1977	Private, Public	7.0	6.2
Greece-1981	Private, Public	4.9	4.0
Greece-1985	Private, Public	3.9	3.3
Brazil	Private, Public	19.3	14.9
Colombia-1	Private, Public	14.6	13.4
Colombia-2	Informal, Formal	11.7	12.9
Guatemala	Self-Employed, Employees	12.7	10.6
Japan	Fam. Workers, Employees	19.3	6.5
Malaysia	Private, Public	22.5	17.7
Pakistan	Self-Employed, Employees	7.6	7.4
Portugal	Private, Public	8.0	4.9
United Kingdom	Private, Public	8.7	6.3
Tanzania	Private, Public	14.2	10.7

Source: Unless otherwise stated, Psacharopoulos, 1985, Appendix Table B-2
Greece-1981 & -1985: own estimates, Appendix Table C-3
Note: Rates of return for Greece-1981 & -1985 refer to males

Table C-21. The Coefficient on Years of Schooling: Mincerian Rate of Return, by Year, Selected Countries

Country	Year	Coefficient (percent)
Greece	1960	9.2
	1964	8.6
	1975	6.2
	1977	4.8
	1981	4.3
	1985	3.7
	1987	2.6
Austria	1981	11.6
Brazil	1970	19.2
Colombia	1965	17.3
	1971	16.7
	1973	17.6
	1974	12.8
	1975	15.4
	1977	14.4
	1978	14.4
	1984	11.0
Cyprus	1975	12.5
	1979	9.8
	1981	5.2
	1984	11.0
France	1962	16.3
	1970	19.2
	1977	15.4
Germany	1974	12.1
	1977	12.6
Hong Kong	1976	6.3
	1981	6.1
Iran	1975	11.6
Malaysia	1970	14.0
	1978	22.8
Portugal	1977	9.1
United Kingdom	1972	9.7
	1975	8.0
United States	1959	10.7
	1969	7.8
	1973	8.2

Source: Unless otherwise stated, Psacharopoulos, 1985, Appendix Table B-1
Greece: 1975, 1981, 1985 and 1987, own estimates, Appendix Tables C-1 and C-3

Table C-22. The Returns to Investment in Higher Education, by Year, Selected Countries (percent)

Country	Year	Social	Private
Greece */	1960	13.7	15.0
	1975	20.3	15.1
	1977	4.5	10.5
	1981	12.2	13.7
	1985	7.9	10.2
	1987	2.6	3.4
Austria	1981	...	4.2
Belgium	1960	6.7	8.7
Brazil	1970	13.1	13.9
Colombia	1973	...	20.7
	1976	18.4	24.9
Cyprus	1975	9.7	14.8
	1979	7.6	14.1
	1984	...	14.1
Denmark	1964	7.8	10.0
France	1962	...	9.3
	1969	10.9	9.6
	1976	...	9.3
Germany	1964	...	4.6
	1978	...	10.5
Hong Kong	1976	12.4	25.2
Iran	1972	15.0	...
	1976	13.6	18.5
Italy	1969	...	18.3
Malaysia	1978	...	34.5
Netherlands	1965	5.5	10.4
Norway	1966	7.5	7.7
Spain	1971	12.8	15.5
Sweden	1967	9.2	10.3
United Kingdom	1971	7.0	27.0
	1972	8.2	9.9
	1973	8.0	16.0
	1975	7.0	22.0
	1977	6.0	17.0
	1978	7.0	23.0
United States	1939	10.7	...
	1949	10.6	...
	1959	11.3	...
	1969	10.9	15.4
	1972	...	7.8
	1976	...	5.3

Source: Unless otherwise stated, Psacharopoulos, 1985, Appendix Table A-1
Greece: own estimates, Tables 5.26 and 5.34

Note: (...) not available
*/ Social and Private rates of return for Greece are not strictly comparable, because of different estimation method

APPENDIX D

Tables to Chapters 3, 6, and 7

Table D-1. Economically Active Population by Educational Level, and One-digit Occupational Code, 1961, 1971, 1981

Occupation \ Educational Level		Higher Education Graduates	Secondary Education Graduates	Primary Education Graduates	Others	Total
Professional,	1961	72,000	28,300	20,400	6,500	127,200
Technical and Related	1971	111,300	37,860	28,920	8,140	186,220
	1981	256,205	41,837	31,606	2,631	332,279
Administrative, Execu-	1961	7,800	12,900	7,100	700	28,500
tive and Managerial	1971	11,140	9,080	1,820	340	22,380
	1981	25,558	23,386	11,479	1,196	61,619
Clerical and	1961	7,900	102,000	29,200	3,900	143,000
Related	1971	18,640	171,160	54,180	5,400	249,380
	1981	38,504	240,594	53,456	3,169	335,723
Tradesmen and	1961	2,600	36,700	124,900	55,200	219,400
Related Workers	1971	4,680	53,920	137,440	35,640	231,680
	1981	12,542	94,685	167,245	26,599	301,071
Farmers	1961	400	17,800	855,900	1,075,900	1,950,000
	1971	880	12,280	674,040	643,280	1,330,480
	1981	1,535	20,539	595,997	355,161	973,232
Craftsmen Labourers	1961	200	27,500	426,900	248,200	702,800
and Non-agricultural	1971	1,100	51,220	685,900	228,000	966,220
	1981	12,136	110,404	854,089	142,768	1,119,397
Services Workers	1961	10,200	36,500	190,800	112,900	350,400
	1971	2,520	22,360	140,280	62,860	228,020
	1981	15,356	52,566	170,109	40,049	278,080
Not Classified	1961	3,600	27,900	75,900	34,400	141,800
	1971	10,660	16,120	27,160	15,560	69,500
	1981	22,442	50,986	58,376	10,628	142,432
Total	1961	104,700	289,600	1,731,100	1,537,700	3,663,100
	1971	160,920	374,000	1,749,740	999,220	3,283,880
	1981	384,278	634,997	1,942,357	582,201	3,543,833

Source: NSSG, Population Censuses of the respective years

Table D-2. Educational Budget, (Actual) 1977 and 1984 */

Level of Education	1977 Total	1977 Teachers' Salaries	1984 Total	1984 Teachers' Salaries
Primary	10,880	7,280 (66.9)	47,300	33,300 (70.4)
Secondary	8,730	5,184 (59.4)	50,970	31,950 (62.7)
Tertiary	6,040	1,950 (32.3)	26,900	10,450 (38.8)
All Levels	25,650	14,414 (56.2)	125,170	75,700 (60.5)

Source: Ministry of Education, unpublished data
Notes: Figures in parentheses are percentages and refer to the respective row totals
*/ Current prices in million Drachmas

Table D-3. Mean Annual Earnings of University Graduates by Field of Study, 1977

Field of Study	Mean Earnings (Drs)	Earnings Index	Number of Observations
A. Humanities	181,724	94	597
B. Education	186,192	96	900
C. Art	192,633	99	12
D. Law	290,215	149	326
E. Social Sciences	238,764	123	1,303
F. Science	222,097	114	461
G. Technology	324,948	167	340
H. Medicine & Pharmacy	192,105	99	442
I. Agricultural Studies	238,351	123	176
J. Military	301,608	155	300
Sample Total	194,213	100	8,756

Source: Psacharopoulos, G., and Kazamias, A., 1985, Table 17.2, p. 266

Table D-4. Mean Annual Earnings of New University Graduates by Field of Study, 1977

Field of Study	Mean Earnings (Drs)	Earnings Index	Number of Observations
A. Humanities	115,771	88	117
B. Education	96,407	74	73
C. Art	-	-	-
D. Law	124,563	95	30
E. Social Sciences	141,016	108	162
F. Science	143,031	109	92
G. Technology	203,360	155	43
H. Medicine & Pharmacy	128,529	98	67
I. Agricultural Studies	131,744	101	32
J. Military	214,900	164	2
Sample Total	130,948	100	711

Source: Psacharopoulos, G., and Kazamias, A., 1985, Table 17.8, p. 269

Table D-5. Mean Annual Earnings of Foreign Postgraduate Degree Holders by Field of Study, 1977

Field of Study	Mean Earnings (Drs)	Earnings Index	Number of Observations
1. Humanities	351,400	85	40
2. Law	595,000	143	8
3. Social Sciences	469,840	113	25
4. Science	440,667	106	21
5. Technology	555,692	134	13
6. Medicine & Pharmacy	228,000	55	7
7. Vague Answer	378,378	91	37
Sample Total	414,808	100	151

Source: Psacharopoulos, G., and Kazamias, A., 1985, Table 17.2, p. 266

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