The Profitability of Investment in Education in Israel

Ruth Klinov-Malul

The Maurice Falk Institute for Economic Research in Israel, affiliated to the Kaplan School of Economics and Social Sciences, is an independent nonprofit organization whose purpose is to encourage research, with particular emphasis on the economy of Israel.

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CONTENTS

List of Tables ix
Symbols and Abbreviations xii
Preface xiii

Chapter 1. INTRODUCTION 1
1. Aims of the study 1
2. Measuring cost and income in a cross section 5

Chapter 2. HISTORICAL BACKGROUND: 1948–1961 8
1. The level of education 8
2. Changes in educational level and in the amount of tangible capital 14
3. Income differentials: 1950–61 15

Chapter 3. CROSS SECTION OF INCOMES BY EDUCATIONAL LEVEL: 1957 17
1. The Family Savings Survey 1957/58 17
2. Average current income by level of education 18
3. The present value of income at age 21 and over, by educational level 23
4. The effect of continent of origin and duration of residence on incomes 28
5. Incomes at age 14–17 29
6. Gross and net incomes by level of education 30
7. The income cross section: Israel and the United States 31

Chapter 4. CROSS SECTION OF INCOMES OF PERSONS IN THE LIBERAL PROFESSIONS: 1949–1957 33
1. The income tax sample 33
2. Comparison with the Savings Survey data 34
3. The rise of incomes in the professions 35

4. Incomes of salaried and of self-employed graduates 39
5. The present value of incomes: 1957 40

Chapter 5. DIRECT EXPENDITURES ON EDUCATION: 1957 43
1. Direct individual expenditures, by educational level 43
2. Primary education—direct expenditures by society 45
3. Secondary education—direct expenditure by society 48
4. The Hebrew University 52
5. Other institutions of higher education 52
6. Total direct educational expenditures by society 54

Chapter 6. PROFITABILITY ESTIMATES OF INVESTMENT IN EDUCATION 57
1. The formulation of the profitability account 57
2. Primary education 61
3. Secondary education 63
4. Higher education 65
5. The profitability accounts corrected for future growth in GNP 71

Chapter 7. SUMMARY AND CONCLUSION 73

Appendixes
A. Education and Occupation 77
B. The Transitory Element in Engineers' Income: 1950–57 81
C. Women's Income by Education Level: 1957 83
D. Income of Engineers and Scientists: 1960 85
E. Tuition Fees in Schools 88
F. Expenditure per Student at the Technion: 1949–1960 90
G. Expenditure per Student at the Hebrew University: 1953–1958 93
H. Tests of "Innate Ability' by Education Level 95
I. Average Tuition Fees at the Hebrew University and the Technion 97
J. Appendix Tables to Chapter 3 99
K. Appendix Tables to Chapter 4 102

Bibliography 105
Index 108

LIST OF TABLES

Text Tables

2–1	The population aged 15 and over, by educational level, sex, and length of residence: June 1954	8
2–2	The ratio between the number of persons at adjacent levels of education: 1949 and 1954	10
2–3	Median number of years of education of foreign-born males, by age and length of residence: 1961	10
2–4	School attendance at ages 14–17and 20–24: 1952–62	11
2–5	Median number of years of schooling (Jews) by age and length of residence: 1961	12
2–6	The population aged 25 and over, by level of education, Israel and the United States	13
2–7	The per capita stock of reproducible fixed assets: 1950–60	14
2–8	Distribution of gross family incomes—Jewish urban employees: selected years	16
3–1	Jewish population, by level of education	19
3–2	Annual earned income of heads of units, by level of education: 1957	20
3–3	Annual earned income of heads of units, by level of education—crude and standardized averages: 1957	22
3–4	Present value at age 21 of earned income for age 21 and over: 1957 (by educational level, continent of origin and length of residence)	25
3–5	Present value at age 21 of earned income for age 25–54: 1957 (by educational level, continent of origin and length of residence)	26
3–6	Present value at age 21 of earned income for age 25–54: 1957 (by educational level, continent of origin and year of immigration)	27
3–7	Income of youths aged 14–17 from clerical jobs: 1957	29
3–8	Present value of incomes by level of education, gross and net of income tax: 1957	30
3–9	Present value of gross incomes by level of education: United States and Israel	32
4–1	Sample sizes of persons in liberal professions	34
4–2	Average annual income of engineers, physicians and lawyers: 1957	35
4–3	Nominal income—liberal professions and total labor force: 1950–57	36
4–4	Present value at age 21 of nominal income in selected liberal professions, at 8 per cent interest. 1952–57	37
4–5	Income differentials, by age: 1952, 1954 and 1956	38
4–6	Average annual income in liberal professions: 1949–57	39

4–7 Percentage of salaried persons in the liberal professions: 1950–55 40
4–8 Current income of Hebrew University students, by faculty: 1957 • 41
4–9 Present value at age 21 of income of Hebrew University students, by faculty: 1957 41
4–10 Present value at age 21 of incomes of employees in three professions: 1957 42
5–1 Annual family expenditure per child on various education items: 1956/57 44
5–2 Present value at age 21 of students' average direct expenditure: 1957 45
5–3 Pupils in the primary school network, by type of school: 1957 46
5–4 Government and local authorities expenditures on primary education: 1957 47
5–5 Pupils in post-primary schools (Jews and non-Jews): 1957 and 1958 48
5–6 Number of pupils in post-primary schools, by school ownership (Jews): 1957 49
5–7 Expenditure of secondary schools: 1957 50
5–8 Direct expenditure of the economy on post-primary education: 1957 51
5–9 Current expenditure per student at the Hebrew University, by faculty: 1957 53
5–10 Direct expenditure in institutions of higher learning: 1957 54
5–11 Current expenditure of the economy on formal education: 1957 55
6–1 Present value at age 21 of average income and expenditure for persons with primary education: 1957 61
6–2 Present value at age 21 of income of persons with and without primary education (immigrants from Asia and Africa): 1957 62
6–3 Present value at age 21 of average income and expenditure of persons with secondary education: 1957 63
6–4 Number of pupils remaining at secondary schools out of a beginning class of 100 64
6–5 Present value at age 21 of average income and expenditure in higher education: 1957 66
6–6 Drop-out rates from the Technion 66
6–7 Completion of accountancy course at the School of Law and Economics: 1953–57 68
6–8 Present value at age 21 of average income and expenditure in medicine: 1957 70
6–9 Profits per individual at various levels of education corrected for a 3 per cent annual growth in GNP: 1957 71

Appendix Tables

A-1 Average annual income of employees by level of education and occupation: 1957 78
A–2 Coefficient of correlation for engineers incomes: 1950–57 81
A–3 Annual income from employment—women and heads of units, by level of education: 1957 84
A–4 Median gross monthly salary of engineers and scientists, by academic degree and age: June 1960 85
A–5 Median gross monthly salary of engineers and scientists, by academic degree, by date and place of graduation: June 1960 86

A–6	Index of school fees: 1951–62	88
A–7	Secondary school fees—full fees and actual payments: 1959–62	89
A–8	Average annual expenditure per Technion student: 1949–60	91
A–9	Average annual expenditure per Hebrew University student: 1953–58	93
A–10	Pupils in secondary school in 1958, as percentage of primary school graduates in 1955, by IQ group.	95
A–11	Average tuition fees paid by Hebrew University students 1953–59	97
A–12	Average tuition fees paid by Technion students: 1949–60	98
A–13	Discount coefficients for annual income and expenditure at age 21, by age-group	99
A–14	Annual average earned income by continent of origin, length of residence, educational level and age: 1957	100
A–15	Average annual income of salaried engineers, by age: 1950–57	102
A–16	Average annual income of salaried physicians, by age: 1950–57	102
A–17	Average annual income of salaried lawyers, by age: 1950–57	103
A–18	Average annual income of salaried certified public accountants, by age: 1950–57	103

SYMBOLS AND ABBREVIATIONS

Abstract	Statistical Abstract of Israel
Bulletin	Statistical Bulletin of Israel
CBS	Central Bureau of Statistics, Prime Minister's Office, Jerusalem
CPA	Certified public accountant
CPI	Consumers' Price Index
FP	Falk Project
GNP	Gross National Product
NBER	National Bureau of Economic Research
..	Not available
—	Zero
0.0	Less than half last digit

Year notation: Academic or school year 1950 means October 1949–September 1950; fiscal or tax year 1950 means April 1950–March 1951.

PREFACE

Since education is such a crucial problem in Israel nowadays, I find it necessary to dwell first on the limitations of this study as a guide to policy. The study tries to measure the profitability of investment in formal education by comparing the cost of education with the incomes attributable to it. There is clearly a wide gap between the question of profitability as measured here, and questions on matters of the economics of education and educational policy asked by the public. Furthermore, the estimate of profitability, even within the limited scope in which I have tried to stay, rest on many assumptions, not all of which are necessarily realistic. It should also be emphasized that the estimates are based on data for 1950–1957, and since then changes may have taken place in both costs and incomes.

Accordingly, the reader must ke warned against the indiscriminate application of the findings to specific policy problems. I have stressed this time and again in the text, but would like to make the point here, since the main purpose of the text is to present findings, and their shortcomings are always liable to be overlooked both by readers and by the writer.

I believe, however, that the study can fulfil a positive function simply as an attempt—however limited in scope—to systematize thought in an important field. In addition, the study may serve as a basis for further research. Information on incomes and expenditures in the field of education is continually being accumulated, and it is hoped that by comparing it to the present results some better understanding of the problem will be achieved.

In the course of my work I benefited from the advice of my colleagues at the Falk Institute. In the first stages I had the invaluable advice of the late Yehuda Grunfeld, who introduced me to the literature of the economics of education and helped me to crystallize the structure of the study. I had also the constant advice of Giora Hanoch and Yoram Ben-Porath, both working in adjacent fields of study. Nadav Halevi, Ephraim Kleiman and Tsvi Ophir of the Hebrew University read the various drafts and gave valuable criticism.

Throughout I was guided by Professors Don Patinkin and Simon Kuznets.

Both went to much trouble in advising me about the general structure of the study and its details. An earlier draft was presented to the Hebrew University as a doctoral thesis, and the final version owes much to the criticism and suggestions made by my readers, Professors H. V. Muhsam of the Hebrew University and Jacob Mincer of Columbia University.

Susanne Freund and Yaakov Kop, who edited this study, and Michael Roman, who assisted in the collection and processing of the data, helped to weed out errors and to clarify obscure ideas.

During the process of collecting the data I drew on the cooperation of many people. In particular, I would like to thank Mr N. Nessiahu of the Technion and Mr A. Shertz of the Hebrew University for their generous help. Needless to say, the responsibility for the study, errors and misrepresentations included, is entirely mine.

RUTH KLINOV-MALUL

CHAPTER 1

INTRODUCTION

1. *Aims of the study*

In recent years an extensive literature dealing with the connection between education and economics has come into being, stimulated by the interest of economists in two subjects: the growth of national product, and income distribution and how it changes.

Several studies have attempted to explain the growth of national product by the increase in the amount of factors of production. The technique often used is that of aggregate production functions in which output is the dependent variable and the factors of production are the independent ones. Until recently, most production functions dealt with only two factors of production: tangible capital and labor, the latter measured by number of persons employed or by time worked. A production function of this type has been used for, *inter alia*, historical analyses of the economic growth of the United States and Norway [1] in which it was found that growth in output was much more rapid than might have been anticipated from the increase in capital and labor alone. This result has given grounds for believing that labor and capital do not constitute a complete specification of the factors of production, and that a fuller explanation of the increase in product may be obtained if other variables are added. Among such added variables 'knowledge' has been singled out as a factor of production in itself. For our present purpose one type of knowledge is central: formal education acquired in regular schools. It was indeed found [2] that growth in formal

[1] M. Abramovitz, "Resource and Output Trends in the United States since 1870," *American Economic Association Papers and Proceedings*, XLVI (May 1956), 5–23. O. Aukrust, "Investment and Economic Growth," *Productivity Measurement Review* (No. 16, February 1959), OEEC, Paris p. 35. O. Aukrust and J. Bjerke, "Real Capital and Economic Growth in Norway 1900–1956," in *Conference in Research on Income and Wealth*, Series VIII, 1959. For a more complete bibliography on the subject, see: Theodore W. Schultz, *The Economic Value of Education*, Columbia University Press, 1963, pp. 78-79.

[2] E. F. Denison, "Education, Economic Growth and Gaps in Information," *Journal of Political Economy*, LXX (No. 5, Part 2, Supplement, October 1962), 124–28.

education could explain a substantial part of the increase in national product in the United States that was unaccounted for when the only factors of production specified were tangible capital and labor.

The role of education as a factor of production was thus established through the historical production functions approach. It was also established, apparently independently, by cross-sections of income distribution. In so far as education is a factor of production, its owners will get returns on it, and the pattern of the distribution of formal education will thus be one of the determinants of income distribution. It was found that introducing education as a variable explaining inequality in incomes accounted not only for a significant part of this inequality but also for the shape of the income distribution.[3]

Granted that education is a factor of production, the next step is to estimate the economic profitability of investment in this factor as compared with investment in other factors of production. Such estimates abstract from other roles of education which may be far more important, and attempt to answer a very limited question: is it worth while to invest resources in education purely from the viewpoint of a net increase in incomes?

The dichotomy between education as an investment and in its other roles is by no means simple. The level and content of education determine, and are determined by, the structure of society and the type of culture developed, which in turn are determinants of the economic structure. It is thus impossible to give an overall evaluation of the economic profitability of investment in education. In order to make the problem manageable, one may distinguish broadly between three types of costs and returns to education: pecuniary costs and returns to the person investing; pecuniary costs and returns to persons other than the investor, and non-pecuniary costs and returns either to the investor or to others.

The first category is clearly analogous to costs and returns on other forms of investment, and is therefore amenable to the type of analysis used in estimating the profitability of investment generally. By using data on personal expenditures (such as school fees) and on the increase in income due to additional education one can find out whether such expenditures are profitable to the individual as an investment, disregarding non-pecuniary elements. Assuming that individuals react to pecuniary incentives, findings about profitability can help to explain trends in demand by individuals for various forms of education.

[3] J. Mincer, "Investment in Human Capital and Personal Income Distribution," *Journal of Political Economy*, LXVI (August 1958), 281–302.

As mentioned, pecuniary costs and returns are realized indirectly by other members of society as well. This is so for two reasons. First, the marginal productivity of workers and their income from work are often unequal, because of imperfect competition or because of subsidies and taxation. Any difference between income and marginal productivity accrues to persons other than the investor. Second, and less clear-cut, is the case of external economies, i.e. where the activities of one firm raise productivity in other firms without the latter having to incur additional costs. Thus, scientific research in any one firm may be exploited by other firms and raise their productivity; the income of the scientist represents only that portion of his contribution to the firm employing him, and is less than his total contribution. The difference accrues to other firms.

The third category consists of non-pecuniary costs and benefits, by which we mean such imponderables as personal satisfaction or dissatisfaction, or a change in social standing, due to becoming educated, as well as the non-monetary benefits or otherwise conferred by the educated person on his milieu.

This study attempts to measure only a small part of the costs and returns to education in Israel. By techniques to be explained later it is possible to approximate pecuniary returns to individuals, and thus to derive some conclusions about individual incentives to invest in education. Of the costs and returns accruing to persons other than the investor this study tackles two: public subsidies to education and income tax. Subsidies to education reduce expenditures and increase profitability to individuals, and thus create an initial gap between profitability to the individual and to society as a whole. Since subsidies will increase profitability to individuals, the educational network can be expected to expand; this will require the transfer of teachers and other factors of production from other sectors of the economy, and will raise the average and marginal cost to society of education. Income tax, on the other hand, will capture some of the individual returns on education and distribute the benefit to other members of society. The complex of external economies and market imperfections, as well as non-pecuniary costs and returns is outside the scope of this study.

The limited scope of measurement of costs and benefits does not permit us to draw conclusions about the profitability of investment in education to the Israel economy as a whole. Thus, it is a very serious deficiency to disregard market imperfections and especially the effect of collective wage bargaining. In Israel, where collective bargaining is centralized to a considerable degree in the hands of the Histadrut, it is often felt that earnings in various occupations have only a very loose connection with the produc-

tivity of workers, and especially that the lower occupation-education strata get, through group-pressure, higher wages than warranted by economic considerations alone. Nevertheless, it seems that changes in the wage structure did take place in the direction one would expect on *a priori* considerations of general economic trends, and that collective-bargaining institutions did adjust themselves, to some degree at least, to the changes in supply and demand.[4] However, it may well be that the adjustment was not complete, and that measuring returns by earnings therefore overestimates the contribution to the economy of low education groups, and underestimates the contribution of more educated groups.

As for external economies, pecuniary and non-pecuniary, we can plausibly assume first, that on balance education has external economies rather than diseconomies, and second, that they are much larger than those created by tangible capital. If this is true then disregarding external economies means that measured returns are the lower limit of the true ones, and can as such be compared to returns on tangible capital. However, under these assumptions it is still impossible to compare the returns to education at various levels.

The analysis of subsidies and income tax is useful in itself, since it makes it possible to evaluate their effect on individual incentives to invest in education.

To summarize, the empirical evidence presented is concerned with (a) income differentials by educational level; (b) the effect of income tax on these differentials; (c) expenditures on education; and (d) public subsidies to expenditures on education.

The analysis is mainly of profitability to the individual and the way it is affected by subsidies and income tax; and also of the lower limit of profitability to the economy compared with that of other forms of investment.

Chapter 2 presents the changes in the educational level of the Jewish population in Israel since 1948, and compares them with the growth of national product and tangible capital. On the basis of these data, hypotheses as to the trends over time in returns to investment in education will be suggested. The rest of the study consists of the presentation and analysis of cross-sectional data on income (Chapters 3 and 4), expenditures (Chapter 5) and returns to education (Chapter 6). The main body of data is a cross-section for 1957/58, while information on earlier and later years serves primarily as background.

[4] See U. Bahral, *The Effect of Mass Immigration on Wages in Israel*, FP, Jerusalem, 1965.

2. *Measuring cost and income in a cross section*

For a profitability analysis the data gathered should ideally be on incomes and costs expected by an individual (or by society) throughout his lifetime. Measuring them from cross-section data introduces two major difficulties. First, incomes and costs are averages for groups, and thus other factors besides education may affect them. Second, future changes in supply and demand are disregarded.

In order to predict on the basis of a cross section, we must measure the income over working life at a certain level of education by ascertaining the income of persons of various ages at a point of time. Since our aim is to measure the return on education alone, it is however necessary to isolate and exclude two other types of factors:

a. Factors systematically connected with educational level. Of these, innate ability, continent of origin, and length of residence are very important.[5] The first is connected with educational level because less able persons tend to drop out of school at an earlier stage. Continent of origin and length of residence in Israel are also connected with level of education: persons of European origin are concentrated in higher levels of education than persons from Asia and Africa, and the level of education rises together with the duration of residence in the country. In so far as innate ability, length of residence in the country, and continent of origin get an independent return, this return must be deducted in order to calculate the net return to education. Such an adjustment is particularly important if it is anticipated that the school system will expand so as to bring into the schools a population different from the existing one.

b. Factors which have no systematic connection with level of education. These are numerous, and we shall call them random factors.

Of the systematic factors we have isolated duration of residence in Israel and continent of origin, while innate ability has not been taken into account.

The method of measuring the effects of educational level net of the continent-residence influences varies, depending on whether there is interaction between income due to those factors and income due to education. Absence of interaction means that the degree of influence of continent and residence on the level of income is fixed for different levels of education. The model which we assume in such a case can be solved by the least squares method, which is efficient and unbiased. Another solution, which is arithmetically

[5] Sometimes briefly referred to as 'continent', 'residence' or when in combination, 'continent-residence'.

simpler and unbiased, although it is inefficient, is that of standardization. Here we assume that the continent and residence composition of each educational group in the population is identical. Accordingly, we change the weights of the observations within each educational level and compute a new weighted—standardized—average of income at each educational level, which represents the income due to the net effect of educational level.

In both methods, we can calculate whether the basic assumption about a lack of interaction between continent-residence and education holds good. Examination has disproved the assumption. A model is therefore needed which will take the influence of the interaction into account. With such a model the least squares solution does not enable us to arrive at the net effect of the level of education as a single value, but we are forced to calculate the net effect of education separately for the population of each continent-residence combination. This is the principal method which we have used in this work, though in a number of places figures have been presented on the assumption of lack of interaction, either by standardization or by the least squares method.

The main bias remaining is, of course, that of natural ability. There are as yet no data for Israel on natural ability classified by educational level. It is however interesting to look at the results obtained in the United States about the same question. The main conclusion in a study made by Gary S. Becker for the United States[6] is that the higher the educational level the smaller the impact of ability on the rate of return. Thus, the rate of return on high school is reduced substantially after adjusting for ability, while that on college is less affected.

The adjustments made in the present study for length of residence and country of origin are only for incomes. No such adjustments were made for cost.

Cross sections also disregard future changes in supply and demand. If supply and demand conditions remain static, it is reasonable to assume that owing to market forces highly profitable educational courses will become less so, and vice versa. Therefore, there is an upward bias in cross-section profitability measures of presently profitable types of education, and a downward bias for those which are at present unprofitable. More important, however, are expected changes in demand and supply conditions. Of these, we can only deal with that caused by the steady growth in national income. Suppose per capita income increases by K per cent annually, in such a way

[6] Gary S. Becker, *Human Capital*, NBER, New York, 1964, pp. 79–88, 91–94, 124–29.

that every earner gets an additional K per cent of income each year. This in itself would make additional education more profitable, since absolute differentials will increase.[7] It remains an open question whether an increase in the supply of educated manpower induced by the increased profitability will lower profitability and if so, by how much. In the present study an estimate is made of the effect of continuous growth of national product on profitability, without adjustment for market forces increasing the supply of educated manpower.

[7] Gary S. Becker, *op. cit.*, pp. 52–55.

CHAPTER 2

HISTORICAL BACKGROUND: 1948–1961

1. *The level of education*

The earliest information we have on the population structure by level of education is from a June 1954 sample survey. Table 2–1 shows the distribution of the Jewish adult population by level of education, distinguishing between persons who were in the country before 1948 (veterans) and those who immigrated subsequently (immigrants). The distribution for the veterans gives us a conjectural picture of the educational level of the Jewish population as it was at the beginning of 1948. The inaccuracies in this picture derive from the fact that six years had passed since 1948, during which

TABLE 2–1. *The Population Aged 15 and Over, by Educational Level, Sex and Length of Residence: June 1954*
(*per cent*)

	Males			*Females*		
	Total	*Veterans*[a]	*Immigrants*[b]	*Total*	*Veterans*[a]	*Immigrants*[b]
Did not attend school	8.2	4.1	12.0	21.7	11.8	30.3
Primary, 1–4 years	25.2	17.9	32.1	18.3	13.8	22.2
Primary, 5–7 years	6.6	4.4	8.7	5.9	4.7	7.1
Primary, 8 years	25.4	28.1	22.8	24.1	27.8	20.9
Partial secondary	9.8	11.5	8.2	9.3	12.1	6.8
Completed secondary	18.0	24.0	12.3	17.1	24.3	10.9
Academic	*15.3*	*20.3*	*10.5*	*15.2*	*21.5*	*9.7*
Agricultural	*0.6*	*1.0*	*0.3*	*0.4*	*0.7*	*0.2*
Vocational	*2.1*	*2.7*	*1.5*	*1.5*	*2.1*	*1.0*
Partial higher	1.9	2.8	1.1	1.2	1.8	0.6
Complete higher	4.9	7.2	2.8	2.4	3.7	1.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

[a] Immigrated before 1948 and Israel-born.

[b] Immigrated from 1948 on.

SOURCE: CBS, *Standard of Education of the Population (June 1954)*, Special Series No. 66, Jerusalem, 1958, pp. 5–8.

six new cohorts of 15-year-old children of veterans entered the population and during which some veterans had died or emigrated. The educational composition of the difference between those who entered and those who left the veteran group is not necessarily equal to that of the total veteran population in 1948, but we are unable to adjust the data. One must also take into account the deficiencies in the sampling procedures of the 1954 survey, in particular: giving too much weight to classes with large families, which, for the most part, also have little education;[1] and, probably, response errors. With these qualifications, we present the data on the educational level of veterans, new immigrants, and the whole population.

Table 2–1 shows a marked decline in educational level between 1948 and 1954. The proportion of men who completed post-primary education or more dropped from 34 per cent to 25 per cent. There was a corresponding increase in the proportion of persons who failed to complete primary education, from 26 per cent to 40 per cent.

While the average level of education declined, the spread of the educational distribution between the various classes of the population increased. Thus, the inter-quartile deviation,[2] in terms of years of education, was 3 years for veterans and 4.5 years for the total population in 1954.

Also of interest is the change that took place in the ratio of the number of persons at adjoining levels of education. For this purpose, a two-stage computation was made: first, we calculated the ratio between the number of persons at adjoining levels of education in 1948 and in 1954, and second, the index of change in the ratio between 1948 and 1954. Assuming fixed demand conditions and complementarity between adjacent levels, a change in the ratio between any two levels of education will cause a change in the opposite direction in the relative prices of labor. The ratio of persons at adjacent levels of education (Table 2–2) in fact declined most in the lowest pair, with diminishing declines at successive levels. The wage gap between each educational level and the next should therefore have widened, especially that between persons with and without primary education.

Two main factors influenced the changes in the educational structure of the population: the composition of the immigrants, and the scope of the local school network. We shall consider each in turn.

The level of education declined between 1948 and 1954 because of the low level of education of the immigrants who came in that period. Table 2–3,

[1] Y. Grunfeld and Y. Ben-Porath, *The Measurement of Human Capital in Israel*, FP, Jerusalem, 1961 (unpublished), p. 31.

[2] Half the difference between the upper and lower quartiles.

taken from the data of the 1961 Population Census, shows roughly what happened after 1954.

These figures show that the educational level of the immigrants declined only until 1954. In every age group (except 65+) the educational level of those who arrived in 1948–51 is lower than that of the pre-1948 immigrants,

TABLE 2–2. *The Ratio Between the Number of Persons*[a] *at Adjacent Levels of Education: 1948 and 1954*[b]

	1948	*1954*	*1954/1948 (per cent)*
5–8 years / 0–4 years primary education	1.48	0.96	64
Incomplete secondary education / 5–8 years primary education	0.35	0.31	86
Complete / Incomplete secondary education	2.09	1.84	88
Higher education (incomplete and complete) / Complete secondary education	0.42	0.38	90

[a] Males aged 15 and over.
[b] 1948—veterans; 1954—total population.
SOURCE: Table 2–1.

TABLE 2–3. *Median Number of Years of Education of Foreign-Born Males, by Age and Length of Residence: 1961*

	Year of immigration				
	Up to 1947	*1948–51*	*1952–54*	*1955–57*	*1958–61*
14–29	9.6	8.4	7.8	8.1	8.9
30–44	9.8	7.8	7.1	7.3	8.2
45–64	10.2	7.2	6.1	7.1	7.7
65+	9.1	6.2	6.6	6.1	6.7
All ages	9.9	7.7	7.3	7.6	8.2

SOURCE: CBS, *Languages, Literacy and Educational Attainment—Part I*, Census Publication No. 15, Jerusalem, 1963, p. 79.

and that of the immigrants of 1952–54 is lower still. From 1954, the educational level rises in all the age groups (except 65+) up to the time of the census.

The local school system has become steadily more comprehensive since the early 1950s. The Compulsory Education Law of 1951 led to the inclusion of the great majority of children aged 5–13 in the educational network, and there was also a steady rise in the proportion of youths aged 14–17 attending school, and in the proportion of students in post-secondary education, computed for ages 20–24 (Table 2–4).

TABLE 2–4. *School Attendance at Ages 14–17 and 20–24: 1952–62*[a]

(*per cent*)

	Primary and secondary education at age 14–17	*Higher education at age 20–24*
1952	42.8	4.5
1954	51.5	..
1957	55.9	6.3
1958	58.8	7.4
1959	61.8	8.3
1962	60.5	9.6[b]

[a] Number of students during the academic year (e.g. 1952 means October 1951–September 1952) as per cent of beginning-of-calendar-year population of age group.

[b] Per cent of population on 22.V.61.

SOURCE: Primary and secondary schools: CBS, *Abstract 1963*, No. 14, p. 636.
Post-secondary institutions: CBS, *Abstracts—1956/57*, No. 8, p. 12; *1959/60*, No. 11, pp. 22, 378; and *1963*, No. 14, pp. 38, 634.

Since immigration and the local educational system were the main variables which influenced the changes in the educational composition of the population, their combined influence should have led to a rise in the educational level from about 1956,[3] but we cannot accurately gauge the extent of the rise, since statistical difficulties prevent us from comparing the 1948 educational level with that of 1961. A rough idea can be obtained from Table 2–5, which shows the median number of years of education for the population in 1961, by length of residence. From this table we see that while the median number of years of schooling for the total population aged 30+ was 7.8, the median for the population that was in the country in 1948 was

[3] We disregard here changes in the educational distribution due to mortality and emigration.

9.9. The median for the entire adult population was 8.9, and for the veterans 10.3. It seems therefore that although educational level rose in the period 1955–61 it did not regain the 1948 level.

TABLE 2–5. *Median Number of Years of Schooling, by Age and Length of Residence: 1961*[a]

	Total	*Veterans*		
		Total	*Israel-born*	*Immigrated before 1948*
Total population 14 and over	8.9	10.3	10.7	9.9
Total population 30 and over	7.7	9.9	9.8	10.0
30–44	8.6	9.8	10.1	9.8
45–64	8.6	10.2	9.3	10.2
65+	7.4	9.1	8.5	9.1

[a] Jewish males.

SOURCE: CBS, *Language, Literacy and Educational Attainment—Part I*, Census Publication No. 15, Jerusalem, 1963, pp. 53, 65, 69–72, 79.

Comparisons with other countries are quite difficult because of lack of data, but an attempt has been made to make such a comparison.[4] Easterlin's conclusion is that in 1948 the percentage of secondary and higher education graduates in Israel was second only to that in the U.S., and higher than that of any other country examined, and that in 1954, even after mass immigration had lowered the educational level, Israel still ranked very high. These comparisons do not take into account the shape of educational distribution below twelve years of schooling and raise many questions of comparability among countries. The only detailed comparison available is with the United States (Table 2–6), and this shows that the gap is quite large: median years of schooling in Israel in 1961 were about 8.0, compared with 9.3 years in the United States in 1950, and 9.9 in 1960.

These developments may be summed up as follows:

a. In 1948 the level of education of the Jewish population appears to have been high compared with other countries.

b. The immigration of 1948–54 caused a decline in the educational level

[4] Richard A. Easterlin, "Israel's Development: Past Accomplishments and Future Problems," *Quarterly Journal of Economics*, LXXV (February 1961), 70–76.

of the population. The main change that occurred was the increase in the proportion of persons with four or less years of schooling. The decline in the level of education was accompanied by increased inequality of distribution of education. The local school network was not able to offset the decline caused by immigration.

TABLE 2–6. *The Population aged 25 and over, by Level of Education, Israel and the United States*
(*per cent*)

Years of schooling	*Israel*[a] *1961*	*United States*	
		1950	*1960*
0–4	23.8	10.4	8.3
5–8	35.3	36.2	31.4
9–12	29.7	37.2	43.8
13+	10.5	13.2	16.5
Not known	0.7	3.0	—
Total	**100.0**	**100.0**	**100.0**
Median	8.0	9.3	9.9

[a] Jewish population

SOURCES: Israel—CBS, *Languages, Literacy and Educational Attainment—Part I*, Census Publication No. 15, Jerusalem, 1963, p. 54.
United States—US Bureau of the Census, *Statistical Abstract of the United States, 1962*, Washington D.C., 1962, p. 117.

c. Since 1955 the educational level of arriving immigrants has risen. This, combined with the influence of the local school system, led to a rise in the educational level of the whole population. However, in 1960 the level of formal education was presumably still lower than it had been in 1948.

d. Assuming unchanged demand conditions throughout the period, the decline in the level of education should in itself have led to a rise in the marginal productivity of all persons with education compared with those lacking it. Calculation of the relative changes between adjacent levels of education shows a continuous increase in the number of persons with less education relative to the number at the next higher level. On the assumption of complementarity in production between adjacent levels of education, we can therefore expect marginal product and income differences between persons at different educational levels to become greater.

2. *Changes in educational level and in the amount of tangible capital*

The changes in the number of persons at various stages of education should in themselves have widened the income gaps, at least until the mid-fifties, and therefore also raised the profitability of investment in education during the period. An additional factor which enhanced income differentials was the contemporaneous rise in the quantity of tangible capital per capita. This rise is presented in Table 2–7, which shows that per capita tangible capital rose from IL 2,100 (in 1957 prices) in 1950 to IL 4,300 in 1960.

TABLE 2–7. *The Per Capita Stock of Reproducible Fixed Assets: 1950–60*[a]
(thousands of 1957 IL)

	Capital stock		*Capital stock*
1950	2.1	1956	3.4
1951	2.2	1957	3.6
1952	2.4	1958	3.7
1953	2.7	1959	4.0
1954	2.9	1960	4.3
1955	3.1		

[a] Beginning of year figures.

SOURCE: A. L. Gaathon, *Capital Stock, Employment and Output in Israel: 1950–1959*, Bank of Israel Research Department Special Studies No. 1, Jerusalem, 1961, p. 5, Table 2.

Some economists[5] assume that tangible capital is complementary to education and a substitute for unskilled labor. A rise in the quantity of tangible capital will thus raise the demand for education and reduce the demand for unskilled labor. Without empirical evidence it is impossible to know for which educational levels demand will rise most as a result of an increase in the capital stock. For the rise in demand for specific education levels depends not only on the growth *per se* of the capital stock, but also on the economy's stage of technological development. Blank and Stigler assume that in the United States the main influence of an increase in tangible capital is to raise the demand for persons with higher education, but it is impossible to apply this assumption to less-developed economies.

[5] See D. M. Blank and G. J. Stigler, *The Demand and Supply of Scientific Personnel*, NBER, New York, 1957, p. 63.

In 1955 per capita tangible capital in Israel was substantially lower than in other developed countries. Gaathon found that the level was less than one-third that of the United States, and 70 per cent of West Germany's.[6]

We can therefore supplement the summary made at the end of the previous section:

a. The level of per capita physical capital was low in Israel in contrast with the high level of education at the time of the establishment of the State. Compared with developed countries, Israel had a 'surplus' of education in relation to tangible capital.

b. The rapid rise in per capita tangible capital and in the general level of technology should have raised the demand for education, and at the same time increased wage differentials and the profitability of investment in education. Without further examination it is difficult to say for which levels of education demand rose most. Until the mid-fifties at least two forces acted to increase wage differentials by education: the decrease in the educational level on the supply side and the rapid growth of tangible capital and the general technological advance on the demand side. In the mid-fifties the education level began to rise, and a more detailed analysis is necessary in order to find out whether this rise was sufficient to satisfy the growing demand. One way of approaching the problem is to find out what happened to the profitability of investment in education at each level during the period. For lack of data we can, however, only find out what happened to wage and salary differentials.

3. *Income differentials: 1950–61*

There is by now ample evidence of the increasing inequality in earned incomes during the fifties. Table 2–8 summarizes the change between 1950 and 1963. It seems that the main increase in inequality occurred between 1950 and 1956/57, and that since then the rate of change has been slower. An analysis of wage differentials by occupation for the period 1950–58 shows the same trend.[7] Evidence of increasing income differentials between members of the liberal professions and the rest of the labor force is supplied in Chapter 4, where it is shown that while average nominal wages and salaries in the economy rose 3.6 times between 1950 and 1957, those of

[6] A. L. Gaathon, *Capital Stock, Employment and Output in Israel: 1950–1959*, Bank of Israel Research Department Special Studies No. 1, Jerusalem, 1961, p. 57.

[7] U. Bahral, *The Effect of Mass Immigration on Wages in Israel*, FP, Jerusalem, 1965; and Giora Hanoch, "Income Differentials in Israel," *Fifth Report 1959 and 1960*, FP, Jerusalem, 1961.

TABLE 2–8. *Distribution of Gross Family Incomes—Jewish Urban Employees: Selected Years*[a]

(*per cent*)

	1950	*1956/57*	*1959/60*	*1963/64*
Lowest decile	5.5	3.2	3.2	2.8
Second decile	7.0	6.0	5.4	5.3
Third decile	7.3	7.2	6.6	6.4
Fourth decile	8.6	8.2	7.6	7.2
Fifth decile	8.6	8.2	8.4	8.0
Sixth decile	10.1	10.1	9.2	9.1
Seventh decile	10.5	10.3	10.5	10.6
Eighth decile	11.4	12.0	12.2	12.2
Ninth decile	13.3	14.4	15.0	14.9
Highest decile	17.7	20.4	21.9	23.5
Index of inequality (D)[b]	0.144	0.191	0.218	0.236

[a] August 1950; May 1956–April 1957; October 1959–September 1960; and July 1963–June 1964.

[b] The numerator of this index is the absolute sum of the differences between the per cent of income actually received by each group and the income it would have received with equal distribution; the denominator is the upper limit of the absolute differences.

SOURCES: 1950, 1956/57—Ministry of Finance, *Sixth Report on State Revenue, 1959/60—Part A*, Jerusalem, 1961, p. 254 (Hebrew).
1959/60, 1963/64—CBS, *Family Expenditure Survey, 1963/64—First Results* Special Series No. 175, Jerusalem, 1965, p. 20 (Hebrew).

salaried workers in several academic professions rose 4.3 to 7.8 times (Table 4–3).

The 1950s were, therefore, years of widening income differentials. These increasing differentials are an indication of increased profitability of investment in education during the period. However, two questions require an answer: first, which levels of education became relatively more profitable, and second, whether wage differentials widened sufficiently to guarantee an absolute profit, or whether they only reduced a loss previously suffered by investors in education. Answering these questions requires a more detailed analysis over time of expenditures, incomes and profitability at each level of education. Unfortunately, except for 1957/58, the data are meager. I think that the evidence of increasing income inequality throughout the fifties makes it safe to assume that profitability in 1957/58 was higher than in previous years and that it continued to rise.

CHAPTER 3

CROSS SECTION OF INCOMES BY EDUCATIONAL LEVEL: 1957

1. *The Family Savings Survey 1957/58*[1]

The main source of data on incomes according to level of education is the Family Savings Survey 1957/58; it covers the period from April 1957 to March 1958[2] and is based on 3,000 families. The survey covered only the Jewish urban population[3] (about 82 per cent of total Jewish population).

From the survey we took the data on the earned income of wage and salary earners who are heads of units, and the earnings from business of self-employed heads of units. The head of a unit is defined as an adult over 18 who has his own income, of which he keeps at least IL 50 a month. A married woman working outside her home is not regarded as the head of a unit; as a result heads of units are practically all men.

The income measured for employees is gross income from wages and salaries, including overtime and special payments, such as a 'thirteenth month salary,' bonuses, and holiday expenses (but excluding lump-sum payments such as severance pay). The income measured for the self-employed includes their private withdrawals plus profits remaining in the business before payment of income tax.

The unit heads were asked in the survey about the last school they had attended, the respondent being left to describe the type of school. In addition, respondents were asked whether they had completed, had not completed, or were still attending the school mentioned. The final classification of educational levels was: never attended school; primary school (including

1 The survey was conducted by the Central Bureau of Statistics in cooperation with the Falk Project for Economic Research in Israel, the Bank of Israel, the Institute for Applied Social Research, and the Department of Economics of the Hebrew University.

2 Referred to here as fiscal year 1957.

3 Defined as resident in towns of more than 5,000 inhabitants where less than half of the labor force is engaged in agriculture, and in towns of between 2,000 and 5,000 inhabitants where less than one third of the labor force is engaged in agriculture.

heder[4]); secondary schools (including the vocational schools that do not prepare for a high school leaving certificate); and post-secondary schools (including teachers' colleges, etc.); this group included all schools which require a high school leaving certificate or its equivalent for admission. Each of these categories was sub-divided into those who completed and those who did not complete their studies.

The reliability of the survey in its description of the population distribution by level of education can be checked by a comparison with two other surveys. The first was conducted in June 1954, together with a labor force survey, and included the population aged 14 and over.[5] The second was in June 1961, in which a 20 per cent sample of the population was questioned, as part of a general population census.

Table 3–1 presents the distribution by educational level as obtained in the three surveys. The main conclusion is that the results of the 1957/58 and the 1961 surveys are consistent and that both diverge from the results of the 1954 survey. For reasons already mentioned, it seems plausible that the 1961 survey is more accurate than that of 1954,[6] and therefore that the findings on the distribution of population by level of education in 1957/58 are fairly reliable.

There is no way of testing the reliability of reports on incomes in the survey. If the difference between reported and true income increases with true income, then our estimates of income differentials, and hence of profitability, are understated.

2. *Average current income by level of education*

Income from employment of all earners and of heads of units at each level of education in 1957/58 is presented in Table 3–2. The measurement of the income of the self-employed [column (2)] is less reliable than that for employees [column (1)]; this is because the data are based on proprietors' withdrawals, making it difficult to distinguish between imputed salary and profit, and because the reporting is more dependent on the respondent's memory than on documentation (such as pay slips).

Conceptually, columns (4) and (5) are the most important. Column (4) shows the income of heads of units who worked throughout the year. This is an approximation to the price of labor at various levels of education for a standard period of time. This column answers the question: what is the

[4] Religious school with no secular studies at all.

[5] CBS, *Standard of Education of the Population (June 1954)*, Special Series No. 66, Jerusalem, 1958.

[6] See p. 9 above, note 1 and text.

TABLE 3–1. *Jewish Population, by Level of Education*
(per cent)

	Heads of urban units		*Males aged 14 and over:*
	Labour Force Survey 1954[a]	*Family Savings Survey 1957/58*	*Census of Population 1961*[b]
Did not attend school	9.3	9.9	7.7
Primary school	55.6	41.4	43.7
Did not complete	..	*10.4*	*7.4*
Completed	..	*31.0*	*36.3*
Secondary school	26.5	35.3	36.7
Did not complete	*6.4*	*13.0*	*18.9*
Completed	*20.1*	*22.3*	*17.8*
Post-secondary school	8.6	13.4	11.9
Did not complete	*1.8*	*4.7*	*4.7*
Completed	*6.8*	*8.7*	*7.2*
Total[c]	**100.0**	**100.0**	**100.0**

[a] Adapted from the original Labour Force Survey, which included the entire population aged 14 and over.

[b] Based on a 20 per cent sample of the population (Stage B of the Census, June 1961). The distribution by school-levels in 1961 was made according to years of attendance as follows:

Did not attend school: 0; did not complete primary school: 1–4; completed primary school: 5–8; did not complete secondary school: 9–10; completed secondary school: 11–12; did not complete post-secondary school: 13–14; completed post-secondary school: 15+. This distribution was made according to our conjecture for 1957/58, when the survey contained no question on the number of years of schooling. It may be assumed that persons who completed primary schools (or *heder*) whose formal period of study was 4–7 years were included in the category 'completed primary school'. As a *minimum* for the number of persons who did not complete primary school we took, in 1961, the number of those who attended less than five years. For secondary and post-secondary school we arbitrarily divided the group into those who completed their studies and those who did not, as described above.

[c] Does not include 'other', which came to 3.1 per cent in 1954; 0.5 per cent in 1957/58; and 0.9 per cent in 1961.

SOURCES: Columns (1) and (2)—Y. Grunfeld and Y. Ben-Porath, *The Measurement of Human Capital in Israel*, FP, Jerusalem, 1961 (unpublished), p. 3.
Column (3)—CBS, *Language, Literacy and Educational Attainment—Part I*, Census Publication No. 15, Jerusalem, 1963, p. 53.

TABLE 3–2. *Annual Earned Income of Heads of Units, by Level[a] of Education: 1957[b]*

(IL)

	Heads of units receiving income				*All heads of units*	*Number of heads of units (per cent)*
	Employees (1)	*Self-employed* (2)	*Total* (3)	*Worked all year* (4)	(5)	(6)
Did not attend school (0)	1,581	1,317	1,527	1,764	1,151	9.9
Primary school						
Did not complete (1–4)	1,988	2,395	2,086	2,469	1,882	10.4
Completed (5–8)	2,595	2,672	2,622	2,866	2,437	31.0
Secondary school						
Did not complete (9–10)	2,928	4,241	3,161	3,437	2,795	13.0
Completed (11–12)	3,453	3,552	3,476	3,698	3,285	22.3
Post-secondary school						
Did not complete (13–14)[c]	..	..	..	..	..	4.7
Completed (15+)	4,760	6,247	5,028	5,362	4,787	8.7
Average[d]	2,897	3,227	2,974	3,333	2,690	100.0

[a] Figures in ( ) give the presumed duration of schooling in years.
[b] Fiscal year.
[c] The data for the 13–14 group do not effectively distinguish between those still at school and those who interrupted their studies.
[d] Includes those with 13–14 years' attendance.

SOURCE: *Family Savings Survey, 1957/58*, working papers. The survey covers the fiscal year.

market price of a man-year of work at educational level A as compared with educational level B? Column (5) shows the income of all heads of units, including those with no income. It answers the question of what average income a person with a certain level of education may expect, taking into account the possibility of his not being able to work. Column (5), therefore, is the important one for the calculation of profitability.

It is worth stressing again that all the figures refer to heads of units, who are practically all men. The inclusion of women would apparently decrease the average income at every educational level. We cannot tell what influence it would have on income differentials among those working [column (4)], but it may be assumed that their inclusion would widen differentials among persons working and not working taken together [Column (5)], since the influence of level of education on labor force participation is greater for women than for men.[7]

The following results are obtained from Table 3–2:

a. According to each of our concepts average income earned rises with educational level. Column (5), for example, shows that the income of heads of units who have completed primary school is 2.1 times that of persons with no education, that the income of persons with full secondary education is 1.3 times that of persons who have completed only primary school, and that the income of persons who have completed post-secondary school is 1.4 times that of persons who have completed only secondary school. The ratio of income of post-secondary school graduates to persons with no education is thus about 4:1.

b. For those who worked all year [column (4)], we get the same pattern of ratios narrowing as one goes up the educational scale. However, the differences are smaller than in column (5); this is because the income differentials in column (4) reflect mainly the market price of labor, while those in column (5) reflect also the greater employment prospects at higher educational levels.

c. The income of the self-employed is higher than that of employees at all levels of education, except for persons with no education at all.

These are the results obtained from a comparison of annual average income at every level of education without deducting the influence on income of other factors connected with level of education. Among these factors there are two which we consider important and measurable: continent-of-origin and length of residence in Israel. In order to deduct their influence

[7] A. Hovne, *The Labor Force in Israel*, FP, Jerusalem, 1961, pp. 43–47. See also Appendix C below.

we have resorted to the standardization method. It was assumed that the composition of the heads of units by continent and residence is identical at all levels of education and equal to that of the total population of heads of units. On this assumption, a new weight was assigned to each continent-residence cell within a given level of education and, in accordance with the new weights, standardized averages of income at each level of education were computed. The results are given in Table 3–3, which shows that the

TABLE 3–3. *Annual Earned Income of Heads of Units,*[a] *by Level of Education Crude and Standardized Averages: 1957*[b]
(*IL*)

	Crude average (1)	*Standardized average* (2)	*Standardized average ÷ crude average* (3)
Did not attend school	1,151	1,334	1.16
Primary school.			
Did not complete	1,882	2,115	1.12
Completed	2,437	2,544	1.04
Secondary school			
Did not complete	2,795	2,913	1.04
Completed	3,285	3,117	0.95
Post-secondary school			
Completed	4,787	4,453	0.93
Total[c]	2,690	2,690	

[a] Excluding 13–14 years of schooling (or uncompleted higher education). See note c in Table 3–2.
[b] Fiscal year.
[c] Includes 13–14 years of schooling.
SOURCES: Column (1): Table 3–2, Column (5).
Column (2): *Family Savings Survey, 1957/58*, working papers.

income ratios derived from the net influence of education are lower than those we found in Table 3–2. This is because at every level of education persons of Asian-African origin receive a lower income than persons of European origin, and newcomers receive lower incomes than persons who have been in Israel longer. Newcomers from Asia and Africa are concentrated among those who did not attend school at all and those who attended, but did not complete, primary school. The unstandardized average income for these stages of education was therefore low both because of

the level of education and the continent-residence factor; standardization for the latter increases average income at these stages. On the other hand, the unstandardized average income of secondary and post-secondary school graduates reflects not only the return on their education but also the fact that for the most part they have lived in the country a long time and are of European origin. Here, the standardized is lower than the unstandardized income. The result of the standardization is that the income ratio which can be attributed to the influence of education alone is narrowed. The ratios are:

	Unstandardized ratio	*Standardized ratio*
Primary school/no schooling	2.1	1.9
Secondary school/primary school	1.3	1.2
Post-secondary school/secondary school	1.5	1.4
Post-secondary school/no schooling	4.1	3.3

The standardization of income holds good only when we assume that there is no interaction between the effect of continent-residence on income and the effect of education, i.e., when the influence of every given continent-residence combination is equal at all levels of education. To what extent is this assumption warranted?

The basic equation used is $X_{ij} = X.. + A_i + B_j + U_{ij}$, where X_{ij} is the actual mean income in cell ij (i denoting level of education, and j denoting continent-residence); $X..$ is the average income in the total population, and A_i and B_j measure the influence of education and continent-residence, respectively; if there is no interaction among them, then U_{ij}, which is the deviation of the expected mean income in cell ij from the actual mean income (X_{ij}), should be random. We tested U_{ij} by a χ^2 test, which refuted the hypothesis of randomness. This means that the addition to or subtraction from income owing to continent-residence differs at every level of education. Therefore, the influence of education on income can only be assessed for each continent-residence group separately.

3. *The present value of income at age 21 and over, by educational level*

For the purpose of profitability calculations we now compute the present discounted value of income from employment at various levels of education.[8] We shall make the computation for each continent-residence group separately.

[8] I.e. the sum of a person's current incomes throughout his working-life, discounted at some interest rate, and cumulated to an arbitrary age. For a detailed discussion of the formulas used see pp. 58–60.

The point of time to which the present value is computed in all tables in this section is age 21, which is the earliest age for which there is reliable reporting of income in 1957/58 survey. In this section, income will be computed only for age 21 and over. An estimate of income at ages 14–17 will be made in the following section on the basis of other statistical sources. It is assumed throughout that no incomes are earned between 18 and 20, owing to military service.

The discount rates used for present-income calculations are 6, 8, and 10 per cent. The rate of 6–6.5 per cent was customary in 1957/58 for long-term loans linked to either the cost-of-living index or to the foreign exchange rate. A maximum of 6.5 per cent was fixed by the Minister of Finance towards the end of 1957 for all linked loans. Since at this rate demand for loans exceeded supply, and loans had to be rationed, it is in effect a lower limit to the actual long-term rate of interest.

A more appropriate rate would be that for loans from abroad, since practically all the country's investment in 1957/58 was financed from capital imports. This rate was estimated by the Ministry of Finance to be around 8 per cent and is considered here as the 'real' rate of interest to the economy. As an upper limit we use the short-term unlinked interest rate, which was at the time around 10 per cent. This rate is relevant for persons who can obtain funds for education only through a series of short-term loans.[9] Table 3–4 presents such results as there are; but owing to the paucity of data in the 21–24 and 55+ age groups, many cells of the table remain empty. Tables 3–5 and 3–6 which show the present value of incomes to age 21 for ages 25–54 fill only some of the gaps, and we shall discuss each educational level in turn.

Did not attend school: On the average, the present value of the income of the heads of units is IL 17,800, at a discount rate of 8 per cent. Among persons of European origin there are hardly any who did not attend school, and for this reason we cannot speak of differences in income due to continent. The influence of residence is clearly evident in Tables 3–5 and 3–6, in which it is seen that the income of persons without education rises with length of residence.

Primary Education: As stated, full primary education includes all persons who completed their studies at a primary school, including schools of less than eight grades. The difference in average present value, (age 21 and over) between this group and that without any education is IL 12,900 at 8 per cent interest (Table 3–4). However, this average is affected by the

[9] Since such loans are not value-linked, 10 per cent may overstate the real rate of interest.

TABLE 3–4. *Present Value at Age 21 of Earned Income*[a] *for Age 21+ :1957*[b]
(by educational level, continent of origin and length of residence,[c] *at alternative rates of interest: IL thousands)*

	Did not attend school	*Primary school*		*Secondary school*		*Completed post-secondary school (age 25+)*
		Did not complete	*Completed*	*Did not complete*	*Completed*	
A. At 8 per cent interest						
Israel-born	..	..	..	..	..	..
Europe-America						
Veterans	..	..	37.6	..	40.7	40.4
New immigrants	..	27.8	31.1	34.7	36.8	40.2
Asia-Africa						
Veterans	..	..	..	..	..	..
New immigrants	18.2	..	23.6	..	..	..
Heads of units receiving income	19.6	23.5	31.0	34.9	38.5	40.4
All heads of units	17.8	22.9	30.4	32.3	38.0	40.0
B. At 6 per cent interest						
Israel-born	..	..	..	..	..	..
Europe-America						
Veterans	..	..	48.8	..	53.8	57.6
New immigrants	..	35.8	39.8	44.1	47.0	56.1
Asia-Africa						
Veterans	..	..	..	..	..	..
New immigrants	23.1	..	30.3	..	..	..
Heads of units receiving income	25.1	31.0	40.4	46.0	50.5	57.2
All heads of units	22.6	29.8	39.3	42.7	49.5	56.1
C. At 10 per cent interest						
Israel-born	..	..	..	..	..	..
Europe-America						
Veterans	..	..	30.3	..	32.3	29.8
New immigrants	..	22.2	25.1	26.5	29.9	30.5
Asia-Africa						
Veterans	..	..	..	..	..	..
New immigrants	14.9	..	19.2	..	..	..
Heads of units receiving income	15.8	18.7	24.7	27.6	30.6	29.9
All heads of units	14.5	18.3	24.4	25.6	30.4	29.6

[a] Heads of units. The cells marked .., which had too few observations for the figures to be meaningful, are included in the averages.

[b] Fiscal year.

[c] Veterans—immigrated before 1948. New immigrants—immigrated from 1948 on.

SOURCE: *Family Savings Survey: 1957/58*, working papers.

TABLE 3–5. *Present Value at Age 21 of Earned Income*[a] *for Age 25-54: 1957*[b]
(by educational level, continent of origin and length of residence,[c]
at alternative rates of interest: IL thousands)

	Did not attend school	*Primary school*		*Secondary school*		*Completed post-secondary school*
		Did not complete	*Completed*	*Did not complete*	*Completed*	
A. At 8 per cent interest						
Israel-born	..	(26.2)	27.2	26.6	32.2	42.3
Europe-America						
Veterans	..	..	26.8	29.9	30.9	37.0
New immigrants	..	21.7	22.8	24.4	26.3	37.2
Asia-Africa						
Veterans	(19.2)	(18.0)	23.6	(23.8)	28.0	..
New immigrants	12.7	14.1	16.9	20.3	22.7	25.9
Heads of units receiving income	13.6	17.8	23.4	26.0	28.1	37.2
All heads of units	12.6	17.5	23.0	25.0	28.2	37.2
B. At 6 per cent interest						
Israel-born	..	(34.6)	35.8	35.9	42.6	56.9
Europe-America						
Veterans	..	..	35.6	40.3	40.0	50.4
New immigrants	..	28.5	30.0	32.0	34.5	49.4
Asia-Africa						
Veterans	(25.1)	(24.2)	31.4	(31.2)	38.7	..
New immigrants	16.6	18.7	21.9	26.6	30.2	35.9
Heads of units receiving income	18.0	23.6	30.8	34.9	37.7	50.2
All heads of units	16.6	23.1	30.3	33.6	37.5	50.2
C. At 10 per cent interest						
Israel-born	..	(20.3)	21.2	20.1	25.0	32.3
Europe-America						
Veterans	..	..	20.7	22.8	23.8	28.0
New immigrants	..	17.0	17.8	19.0	20.5	28.7
Asia-Africa						
Veterans	(15.1)	(13.8)	18.3	(18.7)	20.9	..
New immigrants	9.9	11.0	13.2	15.8	17.6	19.3
Heads of units receiving income	10.6	13.8	18.2	19.9	21.9	28.3
All heads of units	9.8	13.5	17.9	19.2	21.8	28.3

[a] Heads of units. The cells marked .., which had too few observations for the figures to be meaningful, are included in the averages; figures in ( ) indicate less than 4 cases in any one age-continent-residence cell entering the calculation.

[b] Fiscal year.

[c] See note c to Table 3–4.

SOURCE: *Family Savings Survey: 1957/58*, working papers.

TABLE 3–6. *Present Value at Age 21 of Earned Income*[a] *for Age 25–54: 1957*[b]
(by educational level, continent of origin and year of immigration,[c] *at 8 per cent interest: IL thousands)*

	Did not attend school	*Primary school*		*Secondary school*		*Completed post-secondary school*
		Did not complete	*Completed*	*Did not complete*	*Completed*	
Europe-America						
Up to end-1931	..	..	(26.2)	..	(29.4)	(39.8)
1932–38	..	(34.5)	31.5	30.5	31.9	36.1
1939–47	..	(19.3)	23.4	29.7	29.3	37.9
1948–49	..	21.7	23.7	24.1	27.9	36.3
1950–51	..	(24.4)	20.0	23.0	22.7	43.7
1952–58	..	(16.1)	(12.5)	..	(17.2)	(29.5)
Asia-Africa						
Up to end-1947	..	(18.0)	23.6	(23.8)	27.5	..
1948–49	14.5	(15.7)	18.1	(21.8)	..	..
1950–51	12.2	15.2	16.3	(20.0)	23.5	(27.6)
1952–58	11.8	(10.4)	15.0	..	(15.1)	..
Heads of units receiving income	13.6	17.8	23.4	26.7	28.1	38.2
All heads of units	12.6	17.7	23.0	25.0	28.0	37.6

[a] Heads of units; figures in ( ) indicate less than 4 cases in the cell.
[b] Fiscal year.
[c] The Israel-born are included only in the lines All heads of units' and 'Heads of units receiving income'.
SOURCE: *Family Savings Survey: 1957/58*, working papers.

differences in the continent-residence composition between the two groups: the group without education consists mainly of new immigrants from the Oriental countries, whereas all classes of the population are represented among those who completed primary education. For immigrants from the Oriental countries we have data only for ages 25–54. The difference in income at these ages is only IL 4,300, as against IL 10,400 for the total population (8 per cent interest, Table 3–5).

Incomplete secondary education: This group includes the drop-outs and some of the graduates of two-year or three-year schools (some probably defined themselves as having completed full secondary education). The increase in income over that of elementary school graduates is, for age 21+, IL 1,400 at a rate of 8 per cent (Table 3–4). The difference is negative among the Israel-born (Table 3–5).

Full secondary education: On the average, full secondary education increases income over that of elementary school graduates by IL 6,800 (8 per

cent interest, Table 3–4). The highest difference is found among immigrants from Oriental countries, and the difference among the Israel-born is equal to the average (Table 3–5).

Post-secondary education: On the average, there is no difference in income between higher and secondary education, at age 21+ and 8 per cent interest. At ages 25–54 there is a positive difference of IL 9,600, but at age 21–24 the average income of graduates of post-secondary schools is assumed to be zero compared with approximately IL 9,500 for secondary school graduates in this age group.

The most important conclusion from these data is, it seems to us, that at the secondary school level there are substantial differences in the additional income accruing to different continent-residence groups. The increment to Europeans and Israel-born is lower, reflecting a situation in which secondary education is the norm, and the distribution of students by 'natural ability' is roughly similar to that in primary schools. If this hypothesis is correct, the additional income reflects mainly returns to education, and returns to ability to only a limited extent. The additional income to secondary education among persons of Oriental origin, on the other hand, is a combined return to ability and education. If the secondary school system is expanded, with a concomitant lessening of selectivity for pupils of Oriental origin, we may expect them to have a lower income differential. The education of Israel-born pupils is particularly important, since this reflects mainly the return on education acquired in the local school system. Here we observe a difference close to zero in present value for incomplete secondary education, and a difference equal to the average for full secondary education (Table 3–5).

4. *The effect of continent of origin and duration of residence on incomes*

Up to now we have dealt with the return to education within continent-residence groups. It is also of interest to examine the difference between the various continent-residence groups within each level of education.

Length of residence influences income at all levels of education; moreover, this influence is not confined to a short period (e.g., residence of five or ten years), but goes back through the entire 25 years measured in the survey. A second point worth noting is that the influence of residence on income decreases as the level of education increases. Thus, the income of Asian-African new immigrants who did not attend school is 65 per cent of that of Asian-African veterans without schooling, whereas among secondary school graduates the income of the new immigrants is 71 per cent that of the veterans. The same holds good for the Europeans. This is because

the income component stemming from education rises as the level of education rises, and the importance of other components declines accordingly. Similarly, the influence of continent of origin also declines as education rises. Thus, among persons who completed primary education the income of Asian-African veterans is 84 per cent of that of European veterans, whereas among secondary school graduates the ratio is 88 per cent (Table 3–5).

It follows that in measuring profitability by a cross section of age-groups in a given continent-residence group, there is always (except for the Israel-born), a downward bias, since as age rises so does length of residence, and this itself will raise income. However, the importance of this factor decreases at the higher levels of education.

5. *Incomes at age 14–17*

No statistical source exists for the income of the 14–17 age group in general, and certainly not by level of education. From lack of choice we made an estimate of the salary rates at these ages in clerical jobs in the public services (Table 3–7).

TABLE 3–7. *Income of Youths Aged 14–17 from Clerical Jobs: 1957*[a]
(*IL*)

	Completed primary school	*Attended secondary school*	
		For one year	*For two years*
A. Monthly salary rates			
Age			
14	89.64	–	–
15	99.60	104.58	–
16	109.56	114.54	119.52
17	119.52	124.50	141.93
B. Present value to age 21 (annual income)			
Discount rate			
8 per cent	7,622	6,043	4,424
6 per cent	6,883	5,506	4,070
10 per cent	8,430	6,624	4,800

[a] December.
SOURCE: Association of Working Youth.

The present value of the income of primary school graduates aged 14–17, to age 21, capitalized at a rate of interest of 8 per cent, is IL 7,620, according to this estimate. This is an overstatement owing to the unemployment

prevalent in the age group. In 1959, 16 per cent of those belonging to the labor force aged 14–17 were unemployed, with a similar percentage in 1956. A further reason for an upward bias when we take the rate for full-time work is that some of those who are not attending school do not enter the labor force either. According to Hovne's study, about 20 per cent of the total age group neither attend school in the morning nor enter the labor force.[10] Our estimate of income therefore gives an upper limit. The true present value is probably 60–70 per cent of the IL 7,620 calculated above, i.e. around IL 4,500–5,300.

6. *Gross and net incomes by level of education*

The 1957/58 cross section is based on incomes before deduction of income tax. It is also important to measure income differentials by level of

TABLE 3–8. *Present Value*[a] *of Incomes by Level of Education, Gross and Net of Income Tax: 1957*[b]
(*IL thousands*)

	Gross income			*Net income*[c]
	Age 14–17	*Age 21+*	*Total*	
Did not attend school	(5.0)[d]	17.8	(22.8)	(22.3)
Primary school				
Did not complete	(5.0)[d]	23.2	(28.2)	(27.4)
Completed	5.3[e]	30.7	36.0	33.6
Secondary school				
Did not complete	3.1[f]	32.4	35.5	32.8
Completed	–	37.5	37.5	33.9
Completed post-secondary school	–	37.6	37.6	32.6

[a] At age 21, at 8 per cent discount rate.
[b] Fiscal year.
[c] Computed on the basis of income tax rates for a married male with two children in 1957/58. A zero income tax was assumed for the 14–17 age group.
[d] Arbitrary estimate.
[e] 70 per cent of the full-time income of primary school graduates, to take account of the high unemployment and low participation rates of this age group.
[f] 70 per cent of the full-time income of persons with two years of high school (see also note d).

SOURCES: Age 14–17 from Table 3–7.
Age 21+ from Table 3–4.
Income tax—Income tax tables for the tax year 1957.

[10] A. Hovne, *The Labor Force in Israel*, FP, Jerusalem, 1961.

education net of income tax. The comparison is in terms of present discounted values.

Table 3–8 shows that after the primary education stage the differences in present value of incomes by education are very small, and vanish for net incomes.[11] This result is so extreme as to raise doubts of its validity, but unfortunately there are no data by which one can check it. The income differences below complete primary education are actually higher than stated in the table since earnings in the 14–17 age group of those with less than primary education are probably overstated.

7. *The income cross section: Israel and the United States*

Data on the present value of income by level of education, beginning with age 14, are available only for the United States.

The comparison of absolute present values between the two countries involves assumptions as to the effective exchange rate prevalent at the time, and we therefore prefer ratios to absolute differences. The justification for using ratios is this: taking two adjacent levels of education within a country and assuming equilibrium (i.e. that costs and income are equal at any given level of education) would imply that direct expenditure and forgone income, measured by income at the lower level of education, will be equal to income at the higher level. If direct expenditure is zero, the equilibrium difference between the present values of income will be zero, or the ratio between them will be unity. If the ratio is greater than unity, people can make direct payments for education and still realize a profit, while if it is less than unity, even eliminating direct expenditures leaves education financially unprofitable.

Table 3–9 presents the absolute present values and the ratios. As can be seen, the ratios of present values of incomes at various levels of education are much higher in the United States than in Israel, and there is therefore room for higher tuition fees in the United States. Thus it is possible to charge secondary school and college students in the United States a tuition fee of up to about 20 per cent of their forgone income, while in Israel an equilibrium tuition fee is close to nil. As a matter of fact the ratios in the United States are even higher than shown, since the calculation of present values was made with an 8 per cent discount rate both for the United States

[11] Income tax is computed on the basis of current annual incomes and not on total present value, and it is progressive. Therefore, of two persons with the same gross present value of income the one with the steeper age-income profile will be more heavily taxed. This is obvious from the last two lines of Table 3–8.

TABLE 3–9. *Present Value of Gross Incomes by Level of Education, United States and Israel*[a]

Years of schooling	*Present value*[b]			*Ratio of present values*[c]	
	United States ($ thousands)	*Israel (IL thousand)*		*United States*	*Israel*
0	15.2	22.8			
1–4	20.9	28.2			
5–7	25.8				
8	32.0	36.0	(8) ÷ (0)	2.11	1.58
9–11	34.7	35.5			
12	39.0	37.5	(12) ÷ (8)	1.22	1.04
13–15	39.7	–			
16+	47.2	37.6	(16+)÷(12)	1.21	1.00

[a] United States—1950; Israel—1957 fiscal year.

[b] 8 per cent discount rate.

[c] Ratios for levels of education specified in ( ).

SOURCE: United States—H. S. Houthakker, "Education and Income," *The Review of Economics and Statistics*, XLI (February, 1959), 24–27.

The calculation is taken from p. 27 of the source, with one alteration. In the article, the present value of the income of graduates at a particular stage of education was also computed for ages lower than normal for the stage. Thus the income of secondary school graduates at ages 14–15 was included in the calculation, even though the usual age of graduation is 18. In the present computation we deducted the present value of the income of secondary school graduates at ages 14–17 from the total value of the income of secondary school graduates. Similarly, we deducted the income of post-secondary school graduates at ages 18–21.

Israel—Table 3–8.

and Israel; this is plausible for Israel, but much too high for the United States.

A later cross section of the United States has been made for 1958. It shows a rise in the profitability of secondary education in relation to primary education between 1950 and 1958, and this despite an increase in the percentage of secondary school graduates in the population, and a decline in the percentage of primary school graduates. The profitability of higher education also rose, despite the fact that the percentage of college graduates increased more rapidly than the percentage of secondary school graduates.

CHAPTER 4

CROSS SECTION OF INCOMES OF PERSONS IN THE LIBERAL PROFESSIONS: 1949–1957

1. *The income tax sample*

The results of the Savings Survey for incomes of persons with higher education are somewhat deficient since the category is so diversified. More detailed data on incomes are available for four specific professions: engineers and natural sciences graduates, physicians, lawyers, and auditors. The income data obtained cover the period 1949–57.[1]

Information about the income of members of these professions was gathered through a sample of income tax files which was taken in 1958. For each of the professions a list of names was compiled, as complete as possible, on the basis of license registers for physicians, lawyers, and certified public accountants, and of registers of graduates of post-secondary schools and members of professional societies for engineers and natural scientists. In order to determine the size of the sample required, a preliminary computation was made of the income dispersion in each of the professions according to the Taxpayers' Register (*Sefer Hanishomim*) for the 1954 tax year, and an estimate of the standard deviation of average income was obtained for each profession. The permissible limit of two standard errors was set at IL 500. The size of the sample for each profession was then computed as $2\sigma/500 = \sqrt{N}$, where σ is the standard deviation according to *Sefer Hanishomim* and N is the desirable number of cases in the sample.

For engineers and natural scientists a sample was fixed which would give a much lower standard error ($2\sigma/100 = \sqrt{N}$).

After the size of the sample was determined, a systematic sample was prepared from the population list in each profession. After deducting invalid cards (not found, error, etc.), we obtain the picture described in Table 4–1.

The valid cards were submitted to the Income Tax Division for the completion of a questionnaire on income.[2] The tables were prepared according

[1] Fiscal years.

[2] The questionnaires were anonymous, and the data on income were turned over to us in such a way that there was no possibility of finding the corresponding name on the original list.

to both the taxpayer's declaration and the final assessment for income from business and profession (for self-employed) and for salaries (employees). The tables presented here are according to final assessment. Employees were defined as persons who got at least 80 per cent of their income from salary, and self-employed as those who got at least 80 per cent of their income from a business or profession. All the others were put in an intermediate group which we eliminated because of the small number of cases it contained.

TABLE 4–1. *Sample Sizes of Persons in Liberal Profesions*

	Size of population	*Standard deviation from the average*[a]	*Desirable size of sample*	*Actual size of sample*	*Valid cards*
Engineers and natural scientists	6,000	2,237[b]	500	558	499
Physicians	4,000	2,082	70	96	75
Lawyers	1,700	3,343	170	176	155
Certified public accountants	300	4,263	290	258	228
Total	**12,000**		**1,030**	**1,088**	**957**

[a] According to Taxpayers' Register.

[b] The calculation was made after eliminating one engineer who earned IL 100,000, and who raised the standard deviation to 3,913.

2. *Comparison with the Savings Survey data*

It is practically impossible to test the reliability of the results of the sample by means of other independent statistical sources. The only comparison made was for 1957. For this purpose a special table was prepared from the Family Savings Survey 1957/58 for the income of engineers, physicians, and lawyers. Since self-employed and employees are differently defined in the two sources, the only comparison we can make is of the two groups together. The figures are shown in Table 4–2. The first thing worth noting is that in the savings survey incomes in these professions are much higher than the average of about IL 4,800 for the group as a whole. Second, the income tax sample data agree more or less with the results of the saving survey for engineers and physicians, while a large discrepancy exists for lawyers.

TABLE 4–2. *Average Annual Income of Engineers, Physicians and Lawyers: 1957*[a]
(*IL*)

	Family Savings Survey	*Income tax sample*
Engineers	6,600	6,800
Physicians	7,600	7,100
Lawyers	8,100	5,800
Average for higher education	4,800	..

[a] Fiscal year.

3. *The rise of incomes in the professions*

Table 4–3 shows that incomes in 1950–57 in the professions grew much more rapidly than both wages and income per member of the labor force. While average nominal wages and salaries rose about 3.6 times, the salary index of engineers and natural scientists rose 5.6 times, that of physicians 6.6 times, of certified public accountants 7.8 times, and that of lawyers 4.3 times. Average income per member of the labor force rose more than wages, increasing 4.3 times over the period. However, even this was less than the growth of incomes of both self-employed and salaried professionals.

This result is not surprising, for we know from other studies that in the period in question there was a general widening of wage differentials between persons in different occupations and between persons of different levels of education.[3]

Table 4–4 shows that the present value of the income of lawyers, certified public accountants, and engineers rose more rapidly than average annual income. There are two possible causes of this phenomenon. The first is the change in the age composition: in every profession income rises with age. If the average age in the profession declines, average annual income will be pushed down, while the present value of income will not be affected. A second possibility is that with a given age composition the income of younger workers may rise relative to that of older workers. Such a rise will be reflected more strongly in the present value of incomes, where a higher weight is given to the younger ages (via the discounting process), than in average current income. Although there are no data on the changes in age

[3] See Chapter 2, section 3.

TABLE 4–3. *Nominal Income—Liberal Professions and Total Labor Force: 1950–57*[a]

(*index, 1950 = 100*)

	Engineers		*Physicians*		*Lawyers*		*Certified public accountants*		*Nominal wages*[bc]	*National income per member of labor force*[b]
	Salaried	*Self-employed*	*Salaried*	*Self-employed*	*Salaried*	*Self-employed*	*Salaried*	*Self-employed*		
1950	100	100	100	100	100	100	100	100	100	100
1951	135	136	140	128	132	138	131	129	114	130
1952	204	174	234	180	185	290	202	168	177	177
1953	273	240	263	216	244	315	266	249	233	225
1954	335	284	346	267	296	304	438	348	266	289
1955	402	436	424	311	310	568	482	440	295	344
1956	513	448	583	369	405	714	575	465	333	391
1957	563	559	663	415	427	822	781	560	361	430

[a] Fiscal years.

[b] Calendar years.

[c] Average for whole economy; see explanation of this index in the source.

SOURCES: Professions—Income tax sample, working papers.
National income—CBS, *Abstract 1965*, No. 16, pp. 161–62.
Labor force—unpublished series compiled by A. L. Gaathon.
Average wage—A. L. Gaathon, *Capital Stock, Employment and Output in Israel: 1950–1959*, Bank of Israel Research Department Special Studies No. 1, Jerusalem, 1961, p. 129, Table H–2.

composition in the professions, we do have information on the differentials between incomes of young and old workers in the professions, as reflected in the several cross sections of income by age group.

TABLE 4–4. *Present Value at Age 21 of Nominal Income in Selected Liberal Professions, at 8 per cent Interest: 1952-57*[a]

	1952	*1953*	*1954*	*1955*	*1956*	*1957*
Present Value						
A. IL thousands						
Engineers	11.3	17.1	22.7	31.1	38.7	46.5
Lawyers	..	..	..	19.9	29.7	35.2
Certified public accountants	15.0	21.1	33.9	43.0	50.9	78.4
B. Index, 1955=100						
Engineers	37	55	73	100	124	149
Lawyers	..	..	..	100	149	177
Certified public accountants	35	49	79	100	118	182
Average annual income						
Index, 1955=100						
Engineers	51	68	83	100	128	140
Lawyers	..	..	..	100	130	138
Certified public accountants	42	55	91	100	120	162

[a] Fiscal years.

SOURCE: Average annual income—Tables A–15, A–17, and A–18.

The figures are presented in Table 4–5, which shows a trend of narrowing differentials during the period.

How can this trend be explained? It seems to us that there are two plausible explanations. The first is that of the obsolescence of scientific knowledge. If this took place at a uniform pace it would not affect the income differences by age, but apparently obsolescence accelerates with time because the tempo of scientific discoveries is steadily increasing. If this is correct, the income of younger men should rise relative to that of older men, and the inequality in income due to age should be reduced. This should in itself increase the present value of income, for in present value the income of the younger ages has, as stated, the greatest weight.

Another possible explanation of the change in the structure of income by age is peculiar to Israel, and is connected with immigration. New immigrants who enter the liberal professions must invest effort in adapting themselves to the conditions of the country. The older they are, the less worth

while is the investment, for both them and their employer. A substantial increase in immigration, even if equally divided among all ages, will therefore reduce the relative income of the older people.

TABLE 4–5. *Income*[a] *Differentials, by Age: 1952, 1954 and 1956*[b]
(income at 25–34 and 35–44 as per cent of income at 55–64)

	1952	*1954*	*1956*
Engineers			
Age: 25–34	28.1	46.0	64.3
35–44	73.1	80.1	88.8
Lawyers			
Age: 25–34	..	..	..
35–44	85.6	112.2	100.0
Certified public accountants			
Age: 25–34	58.6	72.4	82.5
35–44	79.1	73.3	92.2

[a] Excluding the self-employed.
[b] Fiscal years.
SOURCE: Income tax sample.

In order to check the statistical significance of the change in age-income profile an analysis of variance was made. The method is as follows. Let us assume that the income in a given profession in year i for age j is X_{ij}.

Then, $X_{ij} = X.. + t_i + b_j + U_{ij}$, where $X..$ is the average income of persons in this profession in all the years; t_i expresses the influence of the year, i.e., the joint rise of incomes of all ages from year to year; b_i expresses the separate influence of age and U_{ij} represents a random factor. We wish to test whether there is interaction between the year and age influences. If there is no interaction, the influence of age can be measured independently so that the age-pattern of incomes can be predicted from a cross-section for any year; if interaction exists, the observations of income differences by age will change according as different base years are selected, so that a prediction from a cross section can give a distorted picture. The test of interaction was made for salaried workers in three liberal professions (engineers, lawyers, and certified public accountants). The test shows an interaction at a significance level of 1 per cent for lawyers and accountants and at a 5 per cent significance level for engineers. It may thus be assumed that in the course of time a systematic change occurs in the age-income structure.

4. *Incomes of salaried and self-employed graduates*

During 1950–57 there was a marked shift from salaried to self-employed status in three of the professions, while in engineering, the fourth one examined, the percentage of employees remained more or less stable (Table 4–7). One would expect this trend if there had been a previous rise in the income of the self-employed relative to the employees or if the initial period was one in which there were obstacles to mobility into self-employment even if relative income did not change much. Data on income of the self-employed compared with employees are not always consistent with these assumptions. Thus incomes of self-employed physicians have been absolutely lower than those of the employees since 1952 (Table 4–6), and yet there seems to be a marked shift towards self-employment in this profession. It therefore seems to us that the income data on self-employed physicians are unreliable. In the other three professions, however, the income data do not contradict the data on movement into self-employment. The greatest

TABLE 4–6. *Average Annual Income in Liberal Professions: 1949–57*[a]
(IL)

	1949	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
A. Employees									
Engineers	898	1,063	1,440	2,166	2,907	3,560	4,276	5,453	5,982
	24	26	29	42	56	73	89	221	290
Physicians	825	1,227	1,717	2,870	3,227	4,249	5,201	7,154	8,137
	70	83	88	124	127	212	225	269	550
Lawyers	714	839	1,106	1,551	2,050	2,489	2,604	3,406	3,592
	46	45	55	93	117	191	210	284	788
C.P.A.	1,013	1,137	1,496	2,301	3,030	4,981	5,482	6,545	8,882
	40	49	52	75	119	236	293	336	928
B. Self-employed									
Engineers	1,369	1,603	2,178	2,784	3,849	4,549	6,998	7,178	8,963
	88	85	119	80	311	416	673	785	1,680
Physicians	1,235	1,488	1,910	2,675	3,222	3,975	4,626	5,488	6,181
	191	128	147	195	213	250	312	458	520
Lawyers	890	1,027	1,422	2,978	3,233	3,118	5,836	7,335	8,437
	120	133	175	358	347	313	578	719	926
C.P.A.	1,633	1,897	2,441	3,198	4,720	6,600	8,357	8,830	10,620
	82	97	127	167	280	439	573	573	795

[a] Fiscal years. For each profession, the first line gives average income, and the second gives the standard error of the average, as computed from the sample.

SOURCE: Income tax sample.

increase both in relative income of self-employed and in mobility into self-employment took place among lawyers. There was little change in both relative income and the per cent of self-employed among engineers, while there was a large movement into self-employment by certified public accountants, accompanied by a decline in their relative income. In all the professions except medicine, absolute self-employed incomes were higher than salary incomes, probably reflecting returns to both tangible capital and natural ability.

TABLE 4–7. *Percentage of Salaried Persons in the Liberal Professions: 1950–55*[a]

	1950	*1951*	*1952*	*1953*	*1954*	*1955*
Engineers	77	80	82	81	81	81
Physicians	63	64	67	66	59	56
Lawyers	50	49	48	37	27	29
Certified public accountants	61	59	56	49	43	41

[a] Fiscal years.
SOURCE: Income tax sample.

5. *The present value of incomes: 1957*

We now summarize the present value of incomes in the professions, and as usual the base year is that of age 21. The present value of incomes consists of incomes earned during the period of study, and after graduation.

Incomes during the period of study were measured for students at the Hebrew University, Jerusalem. This measurement applies directly to only two of the professions: medicine and law. The income of natural science students was taken as representative of engineering students as well. The income of certified public accountants during the period of study was assumed to be equal to that of high-school graduates aged 21–24, since certified public accountants have no regular day-schooling.

The incomes while studying for various faculties of the Hebrew University are shown in Tables 4–8 and 4–9. These incomes are substantial, especially in law, where on the average a student works an equivalent of about five full-time months. In natural sciences and medicine students work less but there are still between 2 and 4 months of full-time work.

In Table 4–10 the total present value, comprising incomes before and after graduation, is summed up. The table does not include physicians, since no data on their incomes in the age group 25–34 are available. It also

TABLE 4–8. *Current Income of Hebrew University Students, by Faculty: 1957*[a]

	Law	*Medicine*	*Natural sciences*	*Humanities*	*Social sciences*
A. Current income (IL)					
First year	1,057	503	515	920	1,079
Second year	1,388	564	763	956	1,307
Third year	1,250	665	977	1,196	1,293
Fourth year		889	1,304	1,232	1,360
Fifth year		995	1,584	1,344	1,722
B. Months of work					
First year	4.4	2.1	2.4	3.8	4.5
Second year	5.9	2.4	3.2	3.9	5.5
Third year	5.3	2.6	3.9	4.9	5.3
Fourth year		3.4	5.2	6.1	5.3
Fifth year		3.8	6.0	5.4	6.5

[a] Fiscal years.

SOURCE: Processing of students' questionnaires. The questionnaires listed the occupation and the length of employment. The incomes were computed on the basis of the average incomes for different occupations according to the Savings Survey 1957/58 in the 18–24 age group.

TABLE 4–9. *Present Value at Age 21 of Income of Hebrew University Students, by Faculty: 1957*[a]
(*IL*)

	Discount rate (per cent)		
	6	8	10
Law—four years[b]	4,093	3,905	3,730
Medicine—six years[c]	3,288	3,065	2,865
Natural sciences			
Four years	2,359	2,242	2,134
Six years[c]		4,128	
Humanities			
Three years	2,589	2,400	2,330
Six years[c]		4,964	
Social sciences			
Three years	3,076	2,962	2,855
Six years[c]		5,923	

[a] Fiscal year.

[b] Fourth year assumed to be equal to the third year.

[c] Sixth year assumed to be equal to the fifth year.

SOURCE: See Table 4–8.

TABLE 4–10. *Present Value at Age 21*[a] *of Incomes of Employees in Three Professions: 1957*[b]
(*IL thousands*)

	Income after graduation		*Income during the period of study*	*Total income*	
	Gross	*Net*		*Gross*	*Net*
A. At 8 per cent discount rate					
Engineers	46.5	38.4	2.2	48.7	40.6
Lawyers	35.2	31.2	3.9	39.1	35.1
C.P.A.	78.4	53.4	7.8[c]	86.2	61.2
B. At 6 per cent discount rate					
Engineers	65.5	53.7	2.4	67.9	56.1
Lawyers	47.2	42.9	4.0	51.2	46.9
C.P.A.	87.7	73.7	8.3[c]	96.0	82.0
C. At 10 per cent discount rate					
Engineers	34.5	28.6	2.1	36.6	30.7
Lawyers	26.4	23.6	3.7	30.1	27.3
C.P.A.	59.0	40.3	7.5[c]	66.5	47.8

[a] Starting with age 25, which is the 'normal' age of graduation for a 4 years' course of study.

[b] Fiscal year.

[c] This is the present value of incomes of high school graduates 21–24 years old. See Table A–13, panel E.

SOURCES: Income tax sample, and income tax calculation tables for tax year 1957.

excludes the self-employed owing to the lack of data for some age groups. It shows that certified public accountants' incomes rank highest by far, with engineers second and lawyers third, at all three discount rates. As mentioned in section 2 of this chapter, the incomes of lawyers as measured by the income-tax sample are much lower than those measured by the savings survey. Also, the incomes of salaried lawyers are less than a half of those of self-employed lawyers (Table 4–6), which is very low indeed. Both these findings point to an underestimate of salaried lawyers' incomes.

CHAPTER 5

DIRECT EXPENDITURES ON EDUCATION: 1957

The purpose of this chapter is to establish estimates of both the individual's and society's direct expenditures on education.

Direct expenditures by society consist of current outlays on all factors of production entering the educational process. The main items are salaries and wages, books and materials, and depreciation on buildings. Private expenditure is that part of the outlay which is paid for directly by individuals (e.g., tuition fees). The bulk of the data is a cross section for 1957 and estimates for the expenditure of both individuals and society will be given for each level of education.

1. *Direct individual expenditures, by educational level*

Information on the direct expenditures of individuals is available from two sources: the Family Expenditure Survey of Urban Employees 1956/57 and the Consumers' Price Index (CPI).

A table was prepared from the survey results showing the annual family expenditure for each child at school. Only those families whose children were at the stage of education in question are therefore included. The survey results are presented in Table 5–1. On the average, the family of an urban employee spent IL 22 a year for a child attending primary school, about IL 250 for an academic secondary school and about IL 220 for a post-primary vocational or post-secondary school.

The Family Expenditure Survey was the basis for determining the weights of each type of education in the consumption basket. However, after the weights were fixed, the current reporting of the prices of education was done from a sample of educational institutions, and not from a sample of families. The hidden assumption is that the ratio of the full fee to the part paid by the family remains fixed. The CPI shows that in 1956 there was a jump in tuition fees in both academic secondary and vocational schools. The rise occurred in October and was thus taken into account in the survey itself. In 1957/58 full tuition fees did not rise. We can therefore take the 1956/57 figures as an estimate of payments by families in 1957/58.

TABLE 5–1. *Annual Family Expenditure per Child on Various Education Items: 1956/57*[a]
(*IL*)

	Annual expenditure
Kindergarten	121
Compulsory kindergarten	27
State primary school	22
Secondary school	251
Vocational school	219
Post-secondary school	219
Art school	77
Miscellaneous	62

[a] May 1956–April 1957.

SOURCE: CBS, *Family Expenditure Survey 1956/57*, Part 5, "Payments for Education, according to One-Time Questionnaire," (unpublished).

Expenditure for textbooks and educational materials comes to IL 62 a year, on the average for all stages of education. Actually, the amount is probably lower in the earlier and higher in later stages. In our calculations we arbitrarily assume an amount of IL 30 for primary school pupils, IL 60 for secondary school, and IL 100 for higher education.

Further information on individuals' expenditure is available for higher education from budgets of the Hebrew University and the Technion. Average tuition fees in 1957/58 were IL 218 at the Technion and IL 174 at the Hebrew University.[1] Full tuition is the same in all faculties but there seem to be differences (which cannot be measured) in the average size of scholarship (per student) in various faculties; in particular, the actual fee paid by medicine and science students appears to be less than IL 174, while for other faculties it is more.

Table 5–2 shows the present value of individual expenditures, starting with secondary school [expenditure on primary school is negligible (Table 5–1) owing to the Compulsory Free Education Law which covers ages 5–13]. It turns out that from the individual's viewpoint secondary education is more expensive than any course of higher education, except for medicine. The total present value of costs is IL 1,700 to IL 1,900 for vocational and academic secondary schools, and about IL 1,100 for B.A. and IL 1,400 for

[1] See Tables A–11 and A–12.

4-year courses. The results are substantially the same when using 6 per cent and 10 per cent discount rates.

TABLE 5–2. *Present Value at Age 21 of Students' Average Direct Expenditure: 1957*[a]
(*IL*)

	Current expenditure on fees	*Present value at 8 per cent discount*[b]
Academic secondary school (4 years)	250	1,900
Vocational secondary school (4 years)	220	1,720
Hebrew University		
B.A. (3 years)		1,130
Law (4 years)		
Natural Science (4 years)	170	1,360
Medicine (6 years)		1,760
Technion (4 years)	220	1,420

[a] Fiscal year.

[b] Includes, in addition to fees, the present value of estimated expenditure on books and materials: IL 60 at secondary school, and IL 100 in higher education, (per annum).

SOURCE: Tables 5–1, A–11 and A–12.

2. *Primary education—direct expenditures by society*

The primary school network in Israel includes four types of school: state primary, special, recognized, and schools for working youth. State primary schools are financed by the government and the local authorities. Special schools are likewise financed by the government and the local authorities, but are designed for problem and retarded children. The recognized schools are religious schools and do not belong to the state school system, but to the *Agudat Yisrael* Party, (although most religious schools are under complete government control).[2] They are financed partly by that party and partly by the government. Schools for working youth are designed for boys of 14–17 who have not completed primary school and who are completing their primary education in evening classes. These schools are financed almost entirely by the government. The distribution of pupils among these schools in 1956/57 is shown in Table 5–3, which shows that most of the pupils attend state primary or special schools, and the proportion in the recognized schools is quite small.

[2] Both recognized and public religious schools provide secular training with varying degrees of religious emphasis.

In order to make clear the estimates of expenditure presented below, we shall review briefly how the financing of primary and special schools is shared between government and local authorities.

TABLE 5–3. *Pupils in the Primary School Network, by Type of School: 1957*[a] (*thousands*)

	Number of pupils
Primary and special school	292.7
Recognized (supported) school	21.5
School for working youth	10.9
Other	2.1
Total	327.2

[a] School year.

SOURCE: CBS, *Schools and Kindergartens, 1956/57*, Special Series No. 72, Jerusalem, 1958, Table 20 (Hebrew education) and Table 51 (Arab education).

The Ministry of Education pays teachers' salaries and for part of the general administrative expenditure connected with the schools. The local authorities are responsible for the remaining current expenses, including building maintenance, purchases and maintenance of furniture and equipment, salaries of clerical staff and caretakers, auxiliary materials (water, lighting, cleaning) as well as all special expenses involved in non-academic studies, such as crafts and agriculture. Some local authorities, however, are unable to supply these services from their budgets, and payment for them is covered by the Ministry of Education. These are known as supported' authorities.

Some local authorities supply services over and above the required ones. The most important of these are: textbooks and writing materials, handicrafts materials, extra-curricular activities, medical and psychological care, and insurance. Authorities which supply such services are entitled to charge an education fee. Differences in the level of primary education expenditure between various forms of settlement thus stem, to a large degree, from the economic position of the local authority — whether it is supported (i.e. has most of its expenditure covered by the Ministry of Education), supplies only the required services, or also supplies, for a fee, additional services. Teachers' salaries, which vary according to qualifications, seniority and the size of the school, also lead to differences between authorities.

The estimate was made on the basis of a CBS survey of the Jewish local authorities in 1957/58. Not all authorities reported their expenditure. The response obtained covered 87.8 per cent of pupils in primary and special schools. In the calculation we made a rough estimate of the expenditures of non-reporting local authorities. Even after this adjustment the result will be biased downward in a number of respects:

a. Not all the expenditure of the recognized schools appears in the government budgets, but only the part covered by government support.

b. No estimate is included of depreciation of buildings and equipment, and even its order of magnitude is not known.

c. No estimate is made of the administrative expenditure by central government and local authorities on primary education. This estimate will be added at the end for the whole educational network.

Total expenditure on the primary education network amounts to about IL 52.4 millions (Table 5-4), the average annual expenditure per pupil

TABLE 5-4. *Government and Local Authorities Expenditures on Primary Education: 1957*[a]

A. Primary, recognized, and special schools (IL millions)	
Salaries in primary and special schools	35.4
Other current outlays in primary and special schools	11.6
Estimate of current expenditure by non-reporting local authorities[b]	3.5
Grants to recognized schools	1.9
Total	**52.4**
B. Schools for working youth—total (IL millions)	**1.0**
C. Number of pupils (thousands)[c]	
Primary, special and recognized schools	332.2
Schools for working youth	11.3
D. Average expenditure per pupil (IL)	
Primary, special and recognized schools	155
Schools for working youth	88
Books, materials, etc. bought by pupil	30
E. Present value at age 21 (8 per cent discount rate) in primary, special, and recognized schools (IL)	3,800

[a] Fiscal year.

[b] Non-reporting authorities were assumed to have the same rate of per pupil expenditure as reporting authorities.

[c] Calculated as 5/12 of pupils in 1956/57 school year *plus* 7/12 of pupils in 1957/58 school year (September–August).

SOURCES: CBS, *Schools and Kindergarten 1956/57*, Special Series No. 72, Jerusalem, 1958, Tables 20 and 51.
CBS, *Abstract 1958/59*, No. 10, p. 357; and unpublished CBS data.

being IL 155 in full-time schools and IL 88 in schools for working youth. Adding an estimated IL 30 for books and materials bought by pupils we arrive at about IL 3;800 present value of expenditure per full-time pupil. As stated, this estimate is probably somewhat downward biased. Only a small part of the outlay is financed directly by pupils or their families, in the form of registration fees and as purchases of books and materials.

3. *Secondary education—direct expenditure by society*

Secondary education in Israel falls into six main categories, and the distribution of pupils among these is shown in Table 5–5. The largest group of students attends academic secondary day schools, which provide four-year courses and whose leaving certificate is the university entrance qualification. To this category belong also the preparatory classes in teacher-training colleges. Together they comprise about half the students in post-primary education. In addition, about 7 per cent of students attend evening classes of academic schools.

TABLE 5–5. *Pupils in Post-Primary Schools (Jews and Non-Jews): 1957 and 1958*[a]
(*thousands*)

	1957	*1958*
Academic day schools	15.7	16.7
Academic evening schools	2.8	2.8
Continuation classes	5.8	6.2
Vocational schools	6.4	7.6
Agricultural schools[b]	3.7	3.6
Teacher and kindergarten teacher training	2.2	2.4
Total	**36.6**	**39.3**

[a] School years.
[b] Includes only pupils in grades 9–12 of these institutions.
SOURCES: CBS, *Schools and Kindergartens 1956/57*, Special Series No. 72, Jerusalem, 1958, Table 15 (Hebrew education) and Table 51 (Arab education); and CBS, *Abstract 1958/59*, No. 10, Jerusalem, 1959, p. 357.

The remaining students attend three types of school offering vocational training. Agricultural training is available in agricultural schools as well as in continuation classes. About 40 per cent of the agricultural schools provide a four-year course, about 25 per cent, three years, and the rest, either

one or two years. Continuation classes are located as a rule in agricultural settlements, and offer a three-year or four-year course without preparing their students for the high school leaving certificate.

Vocational schools offer training in various fields of manufacturing and services. Sixty per cent have four-year courses, and most of the rest have three-year courses.

Satisfactory information is available only for the academic secondary schools. The information was drawn from a CBS survey of private schools in the 1957 fiscal year, and from a local authorities survey of the expenditure on their schools. Table 5–6 shows the distribution of pupils among private and municipal schools while Table 5–7 summarizes their budgets in 1957.

TABLE 5–6. *Pupils in Post-Primary Schools, by School Ownership (Jews): 1957*[a]
(*thousands*)

	Total	*State-owned*	*Owned by local authorities*	*Other ownership*
Academic day schools	14.9	—	6.5	8.4
Academic evening schools	2.8	—	0.6	2.2
Continuation classes	5.8	—	5.7	0.1
Vocational schools[b]	6.4	0.3	0.9	5.2
Agricultural schools[b]	5.9	0.7	0.3	4.9

[a] School year.
[b] Including primary classes.
SOURCE: CBS, *Schools and Kindergartens 1956/57*, Special Series No. 72, Jerusalem, 1958, Table 21.

Table 5–7 shows that, on the average, a secondary school pupil costs about IL 400 a year. The present value of this sum to age 21 is about IL 2,400. About IL 60 a year expenditure on books and school supplies should be added to this, or about IL 360 in terms of present value.

The total direct annual expenditure of the economy on academic secondary day schools is approximately IL 6.5 million apart from books and school supplies, which come to about another IL 1 million.

The budgets of the secondary evening schools show that the average expenditure per pupil in 1957 was IL 213. Total annual direct expenditure was (for 2,800 pupils) approximately IL 600,000, apart from books and school supplies (about IL 170,000, at IL 60 per pupil).

TABLE 5–7. *Expenditure of Secondary Schools: 1957*[a]

	Private secondary schools	*Municipal secondary schools*	*Total*
A. Total expenditure (IL thousands)			
Current	2,216.6	..	..
Equipment and furniture	52.2	..	..
Total	*2,268.8*	*1,853.8*	
B. Number of pupils (thousands)	5.5	4.9	
C. Expenditure per pupil (IL)			
Current	403	..	..
Total	*412*	*377*	*397*[b]

[a] Fiscal year.

[b] According to average expenditure per pupil in municipal and private schools, weighted by the proportion of the total pupils in each category of school based on Table 5–6.

SOURCE: Unpublished CBS data on the budgets of individual schools.

We know little about the agricultural schools. These schools often have boarding departments whose expenses should not be included in the economy's expenditure on education. For teaching and vocational training alone (excluding services and food), we have the estimate for government agricultural schools, which are only a small part of the total, and even this only for the fiscal year 1956, when annual expenditure per pupil was IL 1,190.[3] From this the schools' income from agricultural produce should be deducted, if the inputs used are directly connected with the school's teaching activities; for example, if pupils work as part of their training, the receipts from the resulting produce should be deducted from total costs In practice, a considerable part of the expenditure consists of outside purchases. Therefore, not all sales proceeds should be deducted; since we have no precise information on this subject, we also show the net figure to give the range: sales income per pupil was IL 620, so that the lower limit of the expenditure per pupil was about IL 570.

For vocational schools, information is available only regarding those owned by the local authorities. Total expenditure of local authorities on the vocational schools operated by them was about IL 542,000 in 1957. The

[3] See Ministry of Finance, *Explanatory Remarks to the Draft Budget, 1956/57*, Jerusalem, February 1956, p. 223 (Hebrew). A Bank of Israel estimate for 1960/61 (which covers also non-government agricultural schools), gives IL 832 per pupil (IL 770 at 1957/58 prices).

total number of pupils was about 1,000, so that expenditure per pupil was about IL 540. Here too, this result must be qualified, both because it is not based on detailed reports by the schools, and because it covers only one seventh of the pupils in vocational schools (Table 5–6).[4]

TABLE 5–8. *Direct Expenditure of the Economy on Post-Primary Education: 1957*[a]

	Average expenditure per pupil (IL)	*Number of pupils*[b] *(thousands)*	*Total expenditure (IL millions)*
Academic day schools	400	16.3	6.5
Teacher and kindergarten teacher training schools[c]	400	2.3	0.9
Academic evening schools	210	2.8	0.6
Vocational schools	540	7.1	3.8
Agricultural schools[d]	570	3.6	2.1
Continuation classes[e]	210	6.0	1.3
Books and school supplies	60		2.1
Total		**38.1**	**17.3**

[a] Fiscal year.

[b] Based on 5/12 of the 1956/57 school year and 7/12 of the 1957/58 school year.

[c] According to the expenditure in academic secondary day schools.

[d] 1956/57 fiscal year.

[e] According to the expenditure in academic secondary evening schools. The Bank of Israel's 1960/61 estimate of IL 492 per pupil (IL 457 at 1957/58 prices) is based on direct information from the institutions and is therefore more reliable than ours.

SOURCE: Tables 5–1 to 5–5. See also p. 50, note 3, and note 4 on this page.

Table 5–8 summarizes the direct expenditure on post-primary education in 1957. Altogether, the economy spends directly about IL 17 million annually on post-primary education, compared with IL 50 million on primary education. How much of this is paid by individuals? According to the Family Expenditure Survey 1956/57, expenditure of the individual in academic secondary schools is about IL 250 a year, and in vocational secondary schools about IL 220 a year (Table 5–2). In addition, all expenditure

[4] CBS files. A Bank of Israel estimate for 1960/61 (which does *not* include government or municipal schools), gives IL 1,077 per pupil (IL 1,000 at 1957/58 prices). These considerably higher figures are probably more reliable than ours because of their wider coverage.

on books and school supplies is borne by the families. The balance was covered by the government, the Jewish Agency, municipalities, and other institutions.

In 1957 there was still a variety of subsidies granted by various institutions. Since that year, however, subsidies for tuition fees have gradually become concentrated in the graded fees system.[5]

4. *The Hebrew University*

Table 5–9 shows the average expenditure per student at the Hebrew University. Direct expenditure per student (present value) is lowest in the Law Faculty, where it comes to about IL 2,600. In the Humanities and the Social Sciences (B.A.), the expenditure comes to IL 3,200, in the Natural Sciences to IL 10,500, and in Medicine to IL 32,900.

The total annual expenditure of the Hebrew University in 1957/58 was IL 10.5 million.[6] This total includes expenditure not directly connected with regular teaching activities (e.g. publications and adult extension courses), to the amount of IL 342,000, and allocations for research, which could not be completely segregated. On the other hand, the total does not include depreciation for buildings, which is estimated at IL 350,000 for that year.[7]

We have seen (section 1), that the annual outlay of the individual was IL 174. The number of students, adjusted to the fiscal year, was 3,550. Thus, the aggregate direct expenditure of individuals was IL 0.62 million, or about 16 per cent of direct University expenditures.

5. *Other institutions of higher education*[8]

Of the other institutions of higher education, the Israel Institute of Technology (Technion) is the most important. Its budget in 1958 totalled IL 5.6

[5] In 1959/60 it was found that after the introduction of graded tuition fees the families covered 56 per cent of the tuition expenses in academic secondary schools, while the government and the local authorities covered 44 per cent. If we add the expenditure on books and school supplies bought by the families, it would seem that the share of the total expenditure borne by the families did not change much from the time of the introduction of graded tuition fees (1957/58) to 1960/61. See State Comptroller *Report No. 241/61*, Efficiency Control Service, Jerusalem, 1961, p. 3 (Hebrew mimeograph).

[6] See Hebrew University, *Comparative Analysis of Expenditure Budgets of the Hebrew University during the year 1953/54–1958/59*, Jerusalem, February 1959, Table A (mimeographed).

[7] Based on 2 per cent of the historical value of the buildings on the new campus on March 31, 1958. See *Explanatory Remarks to the Draft Budget 1959/60*, Jerusalem, December 1958, Vol. II, p. 743.

[8] I.e., institutions requiring a high school leaving certificate for admission.

million.[9] This includes amortization of buildings and equipment, and does not include expenditure for research and for purposes not connected with tuition. Expenditure per student amounted to IL 3,000 in 1957/58. Of this each student paid about IL 220, or about 7 per cent. The present value of expenditure per student to age 21, at 8 per cent interest, was about IL 9,900.

TABLE 5–9. *Current Expenditure per Student at the Hebrew University, by Faculty: 1957*[a]

	Annual expenditure (IL)	*Number of years of study*	*Present value at age 21, at 8 per cent interest (IL thousands)*
Humanities and Social Sciences			
B.A.	1,260	3	3.2
M.A.	1,260	5	5.0
Law	790	4	2.6
Medicine[b]		6	30.9
First year	3,210	*1*	*3.0*
Second year	5,310	*1*	*4.5*
Years 3–6	10,000	*4*	*23.4*
Natural Sciences	3,210	4	10.5

[a] Fiscal year.

[b] An adjustment has been made for medicine, since in the first year medical students study in the Faculty of Natural Sciences, and in the second year partly in the Faculty of Medicine and partly in the Faculty of Natural Sciences. Also, in the source, expenditure was not computed for medical students in years when there is clinical work. In a calculation made by the management of the Hadassah Hospital, where the students study in the clinical years, expenditure involved in training students was estimated in 1957/58 at IL 1.8 million. Dividing this sum by the number of students in the clinical years gives IL 10,000 per student.

SOURCE: Hebrew University, *Comparative Analysis of Expenditure Budgets of the Hebrew University During the Years 1953/54–1958/59*, Jerusalem, 1959, Table G–1 (mimeograph).

The other important institutions of higher learning in existence at the time were the School of Law and Economics in Tel Aviv and Bar-Ilan University.

In addition to these four institutions there are schools which come between the secondary and higher levels. These include art schools (Bezalel,

[9] Information (for academic year) from Financial Secretariat of the Technion.

music academies) and schools in which practical work occupies an important part (e.g. nursing schools). For none of these do we have information on expenditure, either to the individual or to the economy. Likewise, we have no information on the expenditure for the training of primary school and kindergarten teachers in teacher-training schools.

Table 5–10 summarizes the direct expenditure to the economy for those institutions of higher learning on which we have data.

TABLE 5–10. *Direct Expenditure in Institutions of Higher Learning: 1957*[a]

	Total annual budget (*IL millions*)	*Number of students*	*Total annual budget per student* (*IL thousands*)	*Present value to age 21, at discount rate of 8 per cent* (*IL thousands*)
Hebrew University	10.5	4,153	2.5	8.3[b]
Technion	5.6	1,869	3.0	9.9[b]
School of Law and Economics[c]	0.2	117	1.7	5.8[d]
Bar-Ilan University[c]	0.4	172	2.3	6.4[d]
Total	**16.7**	**6,311**	2.6	8.6

[a] Fiscal year.
[b] Based on four years of study.
[c] Budget for the period October 1, 1956–September 31, 1957.
[d] Based on three years of study.

SOURCE: Hebrew University—*Comparative Analysis. . . ., op.cit.*, Table G–1.
Technion—Table A–9.
School of Law and Economics and Bar-Ilan University—CBS, files of the National Accounts Division.

6. *Total direct educational expenditures by society*

Table 5–11 summarizes the total direct expenditure of the economy for the various types of education.

In 1957 the economy spent altogether IL 98 million for education in those institutions for which estimates are available. About 2,500 students[10] attended training schools for teachers, the most important type of institution for which we have no information.[11] It is safe to assume that average expenditure per student in these schools was somewhere between that in an

[10] See CBS, *Schools and Kindergartens 1956/57*, Special Series No. 72, Jerusalem, 1958, Table 20; and CBS, *Abstract 1958/59*, No. 10, p. 357.

[11] The expenditure of the government alone was IL 1,858,000. See Ministry of Finance, *Draft Budget for Fiscal Year 1959/60*, Jerusalem, December 1958, p. 127.

TABLE 5–11. *Current Expenditure of the Economy on Formal Education: 1957*[a]

	Number of pupils (thousands) (1)	*Current outlay, excluding books and materials* (2)	*Outlay on books etc.*[b] *(IL millions)* (3)	*Total current outlay* (2)+(3) (4)	*Average current outlay per pupil (IL)* (5)
Primary education					
Primary schools	332.2	52.4	10.0	62.4	185
Schools for working youth	11.3	1.0	0.3	1.3	120
Total	*343.5*	*53.4*	*10.3*	*63.7*	
Post-primary education					
Academic day schools	16.3	6.5	1.0	7.5	460
Academic evening schools	2.8	0.6	0.2	0.8	270
Continuation classes	6.0	1.3	0.4	1.7	270
Vocational post-primary schools	7.1	3.8	0.4	4.2	600
Agricultural post-primary schools	3.6	2.1	0.2	2.3	630
Teacher training[c]	2.3	0.9	0.1	1.0	460
Total	*38.1*	*15.2*	*2.3*	*17.5*	
Higher education					
Hebrew University	4.1	10.5	0.4	10.9	2,600
Humanities—B.A.[d]					1,320
Law					•850
Natural Sciences—M.Sc.					3,270
Technion	1.9	5.6	0.2	5.8	3,100
School of Law and Economics	0.1	0.2	—	0.2	1,700
Bar-Ilan University	0.2	0.4	—	0.4	2,300
Total	*6.3*	*16.7*	*0.6*	*17.3*	2,700
Grand total	**387.9**	**85.3**	**13.2**	**98.5**	

[a] Fiscal year.

[b] Assuming IL 30 in primary schools and schools for working youth; IL 60 for secondary education; and IL 100 for higher education.

[c] Including kindergarten teachers.

[d] Including Social Sciences.

SOURCE: Tables 5–1 to 5–10.

academic secondary school (IL 460) and that for a B.A. candidate in the Humanities and the Social Sciences (IL 1,320). If we make a crude assumption of IL 1,000 a year, we obtain additional expenditure by the economy of about IL 2.5 million, which will raise the total direct expenditure on education to about IL 100 million. This does not include expenditure on educational administration by the government and the local authorities. We cannot isolate the sum spent on educational administration by the local authorities, but the Ministry of Education and Culture spent only IL 2.9 million on administration[12] in 1957. The total expenditure of the Ministry from the ordinary budget that year was IL 61.8 million, but that includes grants to schools and pupils which we have already listed as the expenditure of the economy, as well as activities which do not come under the scope of this study. An estimate of direct expenditure by the economy of about IL 103 million on formal education will thus be close to the truth.

[12] *Ibid.* pp. 120 ff. We have included the following items in this sum (IL thousands):

Head office — salaries and organizational expenses	1,321
Administrative expenses of the school system	1,101
Elementary education — salaries	348
Secondary education — salaries	103
Teacher training — salaries	33
Total	2,906

CHAPTER 6

PROFITABILITY ESTIMATES OF INVESTMENT IN EDUCATION

In this chapter the estimates of incomes and expenditure at various levels of education are brought together for the purpose of profitability calculation. The calculation is explained in the first section and the empirical results are summarized in the others.

1. *The formulation of the profitability account*[1]

Let us first specify the items entering the cost side and those entering the income side. On the cost side we have, from the individual's viewpoint, first his direct outlays, such as school fees, books, and materials; and second, the sacrifice of income that he would earn were he working instead of studying (the sacrifice of leisure is ignored throughout). The income side consists of the difference between net earnings received by a person with a certain amount of schooling and what he would earn without it. The comparison between income and cost is made at a point of time, and therefore accumulation of both income and cost to that point is needed. The accumulation is done by using a discount rate and calculating present values of both income and cost at the point of time chosen. Subtraction of the present discounted value of cost from that of income shows whether the individual gains or loses from studying.

The definition of both income and cost is a little different from the viewpoint of society; income, both earned and forgone, is gross instead of net of income tax, and direct expenditure includes subsidies granted to the educational system in addition to private outlays. Again profitability is measured by deducting the present discounted value of cost from that of income.

[1] The discussion is based mainly on:
M. Friedman and S. Kuznets, *Income from Independent Professional Practice*, NBER, New York, 1945.
J. Mincer, "Investment in Human Capital and Personal Income Distribution," *Journal of Political Economy*, LXVI (August 1958), 281–302.
Gary S. Becker, "Investment in Human Capital: A Theoretical Analysis," *Journal of Political Economy*, LXX (supplement, October 1962).

Making a profitability account at a point of time also requires an evaluation of uncertainty, both on the income and on the expenditure side. Of the various elements of uncertainty only one has been introduced here—the probability of dropping out of school.

Correcting for the chances of dropping out, the present discounted value of expenditures is deducted from that of incomes, and the result is the measure of profitability.

Another widely-used measure of profitability is the internal rate, i.e., the rate of discount which will equalize the income and expenditure flows. An investment is considered profitable if the internal rate is higher than the market interest rate. This is equivalent to the present-value measure when investments are independent of each other, but this is not necessarily so when the various investment possibilities are interdependent.[2] Investments in education are interdependent from the individual's viewpoint. At a given level (e.g. high school) an individual can invest in one form of education only (e.g. academic) and his decision will eliminate the possibility of other investments in education at the same level (e.g. vocational). This is a negative dependence, but there is also positive dependence; for example, investment in college is dependent upon previous investment in high school. Because of these interdependences the criterion of present value has been preferred throughout this study.

Another conceptual problem requiring solution is the choice of discount rate. The appropriate rate will vary among individuals if there is no uniform market rate for unlimited borrowing and lending. Specifically, the higher the preference for immediate consumption, the higher the relevant discount rate, and the lower the profits from the investment.[3] Since the capital market for investment in education is far from perfect, the time-preference pattern of investors is especially important. It may well be that the lower the social class the higher its preference for immediate consumption, and therefore the higher its relevant discount rate. Thus it is possible that the same educational investment is more worth while the higher the social class.

[2] A. A. Alchian, "The Rate of Interest, Fisher's Rate of Return Over Cost, and Keynes' Internal Rate of Return," *American Economic Review*, XLV (December 1955), 938–43.
M. J. Bailey, "Formal Criteria for Investment Decisions," *Journal of Political Economy*, LXVII (October 1959), 476–88.
J. Hirshleifer, "On the Theory of Optimal Investment Decision," *Journal of Political Economy*, LXVI (August 1958), 329–52.

[3] Hirshleifer, *op. cit.*

THE PROFITABILITY ESTIMATES

To present the complete form of the profitability account used here, we use the following symbols which refer to the decision to study n years in addition to m years already studied:

m = number of years of completed education.

n = number of years of additional education.

t = number of years elapsing since the completion of m years of education.

A_{mt} = expected income from work in year t by a person with m years of education.

$A_{\substack{m+i,\ t \\ (i=1\ldots n)}}$ = expected income in year t by a person with $m+i$ years of education.

A'_{mt} = expected income while studying in year t of a student with m years of completed education.

d_t = probability, at the beginning of the course, of continuing studies in year t.

C_t = direct expenditures in year t for course of study n.

r = discount rate, assumed to be equal at all periods.

L = life expectancy.

Expected income in any year takes account of life expectancy and the probability of receiving part-time or zero income because of leaving the labor force. The total present value for year $t = 1$ of the expenditures on n years of education, without taking dropping out into account, will be

$$(1) \qquad \sum_{t=1}^{n} C_t(1+r)^{-t} + \sum_{t=1}^{L} A_{mt}(1+r)^{-t}$$

which is the sum of direct costs and forgone income.

The total present value of incomes, disregarding dropping out, will be:

$$(2) \qquad \sum_{t=1}^{n} A'_{mt}\,(1+r)^{-t} + \sum_{t=n+1}^{L} A_{m+n,t}(1+r)^{-t}$$

The first term represents earnings during the period of study, and is the product of full time incomes of m years graduates multiplied by the fraction of time actually worked by students. $A'_{mt} < A_{mt}$ since students work less than non-students.

A minor point is that the income while studying of some students rises owing to previous investment in their course of study. Since this increase is already accounted for by the discounting procedure, the relevant full-time income should be that of m years graduates, and not that of $m+1$, $m+2$ years etc.

The second term of equation (2) is the present value of the lifetime earnings of a person with $m+n$ years of education.

The probability of dropping out of school after the first year of study is, according to our notation, d_1-d_2; after the second year d_2-d_3; the probability of finishing the whole course of n years is thus d_n.

• On the expenditure side [equation (1)] the drop-out probability will affect only direct costs, and not forgone income, since anyone who studies beyond m years will each year sacrifice the income of an m years graduate. The correct form of direct costs will be

$$\sum_{t=1}^{n} C_t d_t (1+r)^{-t} \tag{3}$$

On the income side incomes earned both during studies and afterwards will be affected by the introduction of dropping out prospects. The corrected income estimate will be for income during studies

$$\sum_{t=1}^{n} A'_{mt} d_t (1+r)^{-t} \tag{4}$$

and for incomes after leaving school

$$\begin{aligned}(d_1-d_2)\sum_{t=2}^{L} A_{m+1,t}(1+r)^{-t}+(d_2-d_3)\sum_{t=3}^{L} A_{m+2,t}(1+r)^{-t}+\ldots \\ +\, dn \sum_{t=n+1}^{L} A_{m+n,t}(1+r)^{-t}\end{aligned} \tag{5}$$

The profitability account will thus have the following form:

$$\begin{aligned}&\sum_{t=1}^{n} A'_{mt} d_t (1+r)^{-t}+(d_1-d_2)\sum_{t=1}^{L} A_{m+1,t}(1+r)^{-t}+ \\ &+(d_2-d_3)\sum_{t=3}^{L} A_{m+2,t}(1+r)^{-t}+\ldots+d_n \sum_{t=n+1}^{L} A_{m+n,t}(1+r)^{-t}- \\ &-\sum_{t=1}^{n} C_t d_t (1+r)^{-t}-\sum_{t=1}^{L} A_{mt}(1+r)^{-t}\end{aligned} \tag{6}$$

If the outcome of equation (6) is positive, the investment is considered profitable, and vice versa.

The point of time to which all income and expenditure streams are discounted is arbitrary. Choosing any other point, e.g. $t = -10$, will multiply the result by $(1+r)^{10}$ and so will affect the absolute magnitude of profit but not its sign. In order to make the comparison of absolute amounts of profit from various courses of study meaningful, the same reference point of time will be kept for all calculations. This was fixed at age 21. It must, however, be remembered, that for some purposes it may be preferable to use some calendar year as a reference point of time. For government bodies planning education in a certain year the age composition of the population

is given, and it is with regard to this given composition that the decision on investment in education must be taken. In this case the base point may well be the calendar year and not age.

These equations can be used when introducing social costs and benefits, by including subsidies in direct costs and using gross instead of net incomes on the income side. The estimates of both income and cost are those of averages for groups in the 1957/58 cross-section year. The data used for estimates of income, both earned and forgone, are those of Chapters 3 and 4. The estimates of direct expenditures are derived from Chapter 5, while estimates of drop-out are added in this chapter. As was pointed out in Chapter 1, using group-averages of income, cost and drop-out, instead of their values as expected by individuals, may introduce biases, some of which we have tried to correct and some of which remain. The discount rate used most is 8 per cent which represents, as has been explained (Chapter 3, section 3), an estimate of the real interest rate to the economy, as well as an intermediate rate from individual's viewpoint.

TABLE 6–1. *Present Value at Age 21 of Average Income and Expenditure for Persons with Primary Education: 1957*[a]
(IL thousands; 8 per cent discount rate)

1. Total gross income	36.0
age 14–17	*5.3*
age 21+	*30.7*
2. Total net income	33.6
age 14–17	*5.3*
age 21+	*28.3*
3. Gross income forgone[b]	22.8
4. Net income forgone[b]	22.3
5. Direct expenditure gross of subsidies	—
6. Direct expenditure net of subsidies	3.8
Profit per individual [1.–(3.+6.)]	9.4
Profit to the individual [2.–(4.+5.)]	11.3

[a] Fiscal year.
[b] As measured by average income of people with no schooling.
SOURCE: Tables 3–8 and 5–4.

2. *Primary education*

Table 6–1 summarizes incomes and expenditures for primary schooling. The table shows a substantial profit from elementary schooling from the viewpoint of both the individual and society. No adjustments were made for

drop-out, since education is compulsory for ages 5–13 (i.e., until the fourteenth birthday).

The large profit realized through investment in elementary education led us to examine whether it is financially worth while to give primary education to those adults who lack it, most of whom immigrated to Israel as adults from Middle-Eastern and North African countries.

Table 6–2 shows the range of ages in which such an investment could be profitable, ignoring direct costs for the moment. For this purpose a calculation is made of the present value of the income of persons with and without primary education at ages 25–54, 35–54, and 45–54.

Between the ages of 25 and 34 it is profitable for a person with no schooling to invest at least IL 4,000 in order to acquire elementary education, and for a person with partial elementary education to invest at least IL 2,500. This sum, for persons without schooling, is equal to the value of two full years of employment, and for persons with partial primary education, about a year and a half of employment. From age 35 on, it is not profitable to invest even one full year of employment. Consequently, if it were possible to devise a course of study for adults under 35 that will enable them to acquire an elementary education in two years at the most, such a course might be profitable. These calculations hold good at 6 and 8 per cent interest, but not at 10 per cent, and do not take into account direct costs.

TABLE 6–2. *Present Value at Age 21 of Income of Persons With and Without Primary Education (Immigrants from Asia and Africa): 1957*[a]
(IL thousands; 8 per cent discount rate)

	Age		
	25–54	*35–54*	*45–54*
1. Completed primary school	16.9	6.3	1.6
2. Did not complete primary school	14.1	5.6	1.5
3. Did not attend school	12.6	4.9	1.2
4. Complete *less* incomplete primary school (1.–2.)	2.8	0.7	0.1
5. Complete primary school *less* did not attend (1.–3.)	4.3	1.4	0.4

[a] Fiscal year.
SOURCE: Table A–14.

How important is this problem? In Table 3–1 we saw that persons who had never attended school constituted 8 per cent of all males aged 14 and over in the 1961 population, and those who had not completed primary

school an additional 7 per cent. Of these, about 20,000 are in the 14–29 age range. There are no separate data for ages 30–35, so that all we can say is that there are about 25,000 men with less than four years of education.

3. *Secondary education*

Table 6–3 summarizes income and expenditure resulting from secondary schooling. It emerges from the table that partial study in secondary school causes the average individual a financial loss at an 8 per cent discount rate. Making the same calculations for 6 per cent and 10 per cent rates shows that at 6 per cent the profit, both for the individual and the economy, is about zero, and that at 10 per cent the loss amounts to about IL 4,000.

TABLE 6–3. *Present Value at Age 21 of Average Income and Expenditure of Persons with Secondary Education: 1957*[a]
(*IL thousands; 8 per cent discount rate*)

	Did not complete secondary school	*Completed secondary school*
1. Total gross income	35.5	37.5
age 14–17	*3.1*	—
age 21+	*32.4*	*37.5*
2. Total net income	32.8	33.9
age 14–17	*3.1*	—
age 21+	*29.7*	*33.9*
3. Gross income forgone[b]	36.0	35.5
age 14–17	*5.3*	*3.1*
age 21+	*30.7*	*32.4*
4. Net income forgone[b]	33.6	32.8
age 14–17	*5.3*	*3.1*
age 21+	*28.3*	*29.7*
5. Direct expenditure gross of subsidies	1.0	1.9
6. Direct expenditure net of subsidies	1.6	2.8
Profit per individual [1.–(3.+6.)]	–2.1	–0.8
Profit to the individual [2.–(4.+5.)]	–1.8	–0.8

[a] Fiscal year.
[b] As measured by average income of primary-school graduates.
SOURCE: Tables 3–8, 5–2, and 5–7.

The calculation of income and expenditure was made as an average for the whole population. For classes within the population, we have information only about income and income forgone at ages 25–54 (Tables 3–5 and 3–6). From these tables it transpires that the difference in the current value

of gross income between persons with partial secondary education and persons with only primary education is approximately IL 2,000 on the average for the total population in this age range, whereas among new immigrants from Asia and Africa the difference is approximately IL 3,500. It may likewise be assumed that the direct expenditure of these immigrants is low since they receive a relatively large share of subsidies. Thus, it may be that for this class the loss in partial secondary education is small and perhaps there is even a profit. However, the relatively high difference in income may be due to stricter selection for ability among new immigrants from Asia and Africa than among other classes of population; if this is so, the income differential may narrow if partial secondary education is expanded.

It is worth adding that the loss in partial secondary education exceeds total direct expenditure. Even the introduction of free education in the first two grades of post-primary school would therefore not completely offset the loss.

Roughly the same trends are discernible for complete secondary education: there is a loss at the 8 per cent discount rate of about the same size for the individual and for society. Again, the loss increases from about zero at 6 per cent to about IL 4000 at 10 per cent and is probably lower for new immigrants from Asia-Africa.

TABLE 6–4. *Number of Pupils Remaining at Secondary Schools out of a Beginning Class of 100*[a]

Starting	100
Second year	86
Third year	67
Fourth year	51
Graduates[b]	48

[a] Average for classes beginning in four school years 1952–55.

[b] I.e., fourth-year pupils permitted to sit for the school-leaving certificate.

SOURCE: H. V. Muhsam and others, *The Supply of Professional Manpower from Israel's Educational System*, FP, Jerusalem, 1959, pp. 16–17 (Hebrew).

The rate of drop-out in secondary schools is quite high, as seen from Table 6–4, and an attempt was made to assess its effect on profitability, along the lines explained in section 1.

The figures on secondary school drop-out are based on the study of H. V. Muhsam.[4] According to this study, 48 pupils out of a beginning

[4] H. V. Muhsam, G. Hanoch and R. Klinov-Malul, *The Supply of Professional Manpower from Israel's Educational System*, FP, Jerusalem, 1959 (Hebrew), p. 16.

class of 100 graduate from academic secondary schools. The study is based on average drop-out for 1952–58, and it should be noted that in those years there is a clear trend towards a rise in the percentage of drop-out from the academic secondary schools, and that drop-out from evening and vocational schools is greater than in academic secondary schools. The greatest drop-out occurs in the transition from the second to the third year.

A drop-out rate of more than half of the pupils in academic secondary schools seems very high. Comparison with the United States and England shows that there too drop-out rates are high, although less so. Among scholarship recipients, 34 per cent of the boys and 33.4 per cent of the girls in England and Wales dropped out of academic secondary school in the period 1951–53; there are no data for pupils who did not have scholarships.[5]

In the United States, 94.8 per cent of all 14-year-olds and 68.2 per cent of all 17-year-olds were registered in schools of all types in 1950.[6] This cross-section gives (on the usual assumptions regarding the application of cross section results to movements over time) a general drop-out rate of about 29 per cent. A cross section of pupils registered in various grades of secondary school indicates a similar percentage.[7]

Adjustment for the rates of drop-out shows that incomes and direct expenditures are both reduced by about the same amount, so that profitability is not significantly affected.

4. *Higher education*

a. *Engineers*

Column (1) of Table 6–5 shows a positive average profit from the study of engineering, both from the individual's and from society's viewpoint. Drop-out rates, however, reduce profits substantially.

Drop-outs from the Technion have been traced for the classes beginning in 1955/56 and in 1956/57, as is shown in Table 6–6, which shows a drop-out rate of about 20 per cent. Alternatively if we count the number of first-year students since 1948 and the number of graduates, we get an estimate of 70 per cent graduates. Our estimate of graduates thus ranges from 70 to 80 per cent. Since we do not know the distribution of dropping out over the years, we assume it is equal for each year. On this assumption, the 30 per

[5] J. E. Floud (ed.), *Social Class and Educational Opportunity*, London, 1956, p. 128.

[6] United States Bureau of the Census, *Statistical Abstract of the United States 1958*, Washington D.C., 1958, p. 105.

[7] *Ibid.*, p. 107.

TABLE 6–5. *Present Value at Age 21 of Average Income and Expenditure in Higher Education: 1957*[a]
(IL thousands; 8 per cent discount rate)

	Engineers	*Lawyers*	*Certified public accountants*	*Average higher education*
1. Total gross income	48.7	39.1	86.2	40.0
age 21–24	*2.2*	*3.9*	*7.8*	*2.4*
age 25+	*46.5*	*35.2*	*78.4*	*37.6*
2. Total net income	40.6	35.1	61.2	35.0
age 21–25	*2.2*	*3.9*	*7.8*	*2.4*
age 25+	*38.4*	*31.2*	*53.4*	*32.6*
3. Gross income forgone	37.5	37.5	37.5	37.5
4. Net income forgone	33.9	33.9	33.9	33.9
5. Direct expenditure gross of subsidies	1.4	1.4	1.4	1.1
6. Direct expenditure net of subsidies	9.9	2.6	5.8	8.6
Profit per individual [1.–(3.+6.)]	+1.3	–1.0	+42.9	–6.1
Profit to the individual [2.–(4.+5.)]	+5.3	–0.2	+25.9	—

[a] Fiscal year.
SOURCE: Tables 3–8; 4–8; 4–9; 5–2; 5–9; 5–10.

TABLE 6–6. *Drop-out Rates from the Technion*
(per cent)

	1956[a] *entrants*	*1957*[a] *entrants*
Starting at first year	**100.0**	**100.0**
Graduated after 4 years	61.5	72.3
Fell behind 1 year	16.5	5.9
Fell behind 2 years	2.2	2.1
Dropped out	19.8	19.7

[a] Academic years.
SOURCE: Israel Institute of Technology (Technion), *Statistical Survey of the 1959/60 Academic Year*, Academic Office, Haifa, 1960 (Hebrew mimeograph), pp. 7–9.

cent drop-out after four years gives an annual rate of 8.5 per cent (i.e., $1-\sqrt[4]{0.70}=0.085$), so that after one year, 91.5 per cent of entrants are left, and after two and three years, 83.7 and 76.6 per cent, respectively.

The effect of a 30 per cent drop-out is to reduce incomes much more than direct expenditures. Since direct expenditure by the individual is but a small

part of his total expenditure, and since forgone income is not changed by introducing drop-out, his total cost is very little affected. On the other hand, there is a substantial loss of income by drop-outs. The net effect, at 8 per cent discount rate, is to bring profits to the individual to about IL 2,000, and per individual to about zero.

b. *Certified public accountants*

The income of certified public accountants is the highest of the four professions examined. On the average, salaried accountants in 1957 received about IL 8,900, as compared with IL 6,000 for engineers. Accountants are also better off with respect to income forgone, since there is no regular daytime course in accountancy. Most accountancy students work during the day, and their studying is thus mainly at the expense of leisure rather than of employment. In our measurements we did not attribute any financial value to leisure, so that our results do not show any sacrifice of income during the period of study. The only factor that lowers the high profitability of accountancy is the high drop-out rate. While it is true that the drop-outs also reduce the expenditure during the period of study, such expenditure is small in any case so that the main influence of drop-outs is to reduce anticipated income.

The extent of drop-out is very difficult to measure, owing to the irregularity of the studies. Some students study entirely on their own, and some also attend evening courses. The most important regular course in 1957 was that given by the School of Law and Economics in Tel Aviv. The examinations are not conducted by the school itself, but by the Association of Certified Public Accountants (a public body) so that successful completion of the course does not guarantee success in the licensing examinations. The data on this course are also the only ones we were able to use for the purpose of measuring drop-out. Table 6–7 shows, for each year from 1952/53 to 1956/57, the total number of students in the first year of the course and the number of those who obtained a license by December 31, 1961. In addition, a subdivision was made between those who regularly attended a course and those who dropped out, in order to give some idea of the prospects of obtaining a license of those who study by themselves. Of a starting class of 100, between 20 and 30 per cent completed the regular course of study; of these regular students 56 per cent of the 1952/53 and 1953/54 entrants passed the licensing examinations. In the later years the percentage of licenciates declines since some of the students had not yet sat for the examinations by 1961, but would probably do so later on.

The average lapse of time from the beginning of studies to the passing of

the examinations (for successful candidates) is about six years, but there are some candidates who pass the examinations eight or nine years after beginning to study. For this reason the figures for 1952/53 and 1953/54 entrants are the only meaningful ones.

TABLE 6–7. *Completion of Accountancy Course at the School of Law and Economics: 1953–57*[a]

	1953	*1954*	*1955*	*1956*	*1957*
A. Absolute numbers					
1. First-year students[b]	69	84	115	82	88
2. License-holders[c]	14	22	22	13	8
3. Regular students[d]					
a. Total	14	25	23	24	30
b. License-holders[c]	8	14	11	10	7
4. Non-regular students[e]					
a. Total	55	59	92	58	58
b. License-holders[c]	6	8	11	3	1
B. Per cent of license-holders					
5. All first-year students (2.÷1.)	20.3	26.2	19.1	15.9	9.1
6. Regular students (3b.÷3a.)	57.1	56.0	47.8	41.7	23.3
7. Non-regular students (4b.÷4a.)	10.9	13.6	12.0	5.2	1.7

[a] Academic years.

[b] Includes students who entered the second or third year of the course without having attended the previous one or two years. Thus, second-year students in 1953/54 who did not attend in 1952/53 are included with the 1952/53 class.

[c] On December 31st, 1961.

[d] Completed all four years of the course, except for the 1952/53 entrants who did only a three-year course.

[e] Completed only part of the course.

SOURCE: Records of the School of Law and Economics and the Association of Certified Public Accountants in Israel.

Among students who did not attend a regular course, a much smaller proportion were licensed than among the regular students, amounting to 11 to 13 per cent for 1952/53 and 1953/54 entrants. For regular and non-regular students together, 20 to 26 per cent of those who began their studies in these two years were successful.

There is a very substantial profit in accountancy before taking into

account the chance of dropping out (Table 6–5). The profit to the individual is about IL 43,000, and that per individual IL 26,000. Taking a drop-out chance of 75 per cent reduces profits to about IL 9,000 to the individual and IL 5,000 per individual. This is still a very substantial profit, and a much higher one than in any other profession or level of education surveyed. However, it must again be pointed out that the high profit is partly due to the fact that students study in their leisure time, which was given no price.

Introducing day-courses in auditing will probably reduce drop-out as well as raise income forgone. Since these work in opposing directions there is no way to tell whether profits will decline or rise.

c. *Lawyers*

As noted, incomes of salaried lawyers are probably underestimated. Indeed Table 6–5 shows a near-zero profit to the individual. However, there would be a substantial loss were it not for earnings during the period of studying, and this may help to explain why law students work more while studying than students in any other faculty. Also, when the chance of dropping out (about 30 per cent)[8] is taken into account the loss is greater. The loss may explain why the Law faculty was the only one in the Hebrew University in which the absolute number of students declined in the fifties.

The profit per individual is negative even without taking drop-out into account.

d. *Physicians*

The average income of salaried physicians in 1957 was quite high, amounting to IL 8,100 a year. This is more than the income of engineers and lawyers, and only slightly less than that of auditors. However, physicians begin to receive their income at a later age than the other groups. The course of study takes six years, and if a medical student begins at 21 he will start earning at 28. The income tax sample shows physicians' income only from age 35, owing to the lack of observations at lower ages. We therefore cannot make a full account of profitability. The lack of observations for ages 28–35 apparently stems in part from the special conditions that prevailed until 1957 and which have since changed. The Medical School of the Hebrew University was opened only in 1951, and then only for students in the higher classes. In 1957 there were thus no students who had completed

[8] The estimate is based on an enumeration of those entering the first year, and those graduating after 4 years. The figure is the average for the 1954–1958 entrants. See Hebrew University, *An Enumeration of Regular Students*, Academic Secretariat, Jerusalem, issued annually (Hebrew mimeograph).

six years of regular study at the Hebrew University. The physicians then employed had arrived in the country as immigrants, many of them well over 35 years old, or had studied partly abroad and partly in Israel, thus perhaps losing one or more years of study.

In order to evaluate the profitability of investment we therefore have to make some assumption about physicians' incomes between the ages 28–34. In Table 6–8 it is assumed arbitrarily that the annual income is equal to that of engineers at these ages, i.e. about IL 4,500.

TABLE 6–8. *Present Value at Age 21 of Average Income and Expenditure in Medicine: 1957*[a]
(IL thousands; 8 per cent discount rate)

1. Total gross income	45.5
age 21–27	*3.1*
age 28–34	*15.0*
age 35–	*27.4*
2. Total net income	36.3
age 21–27	*3.1*
age 28–34	*12.7*
age 35+	*20.5*
3. Gross income forgone	37.5
4. Net income forgone	33.9
5. Direct expenditure gross of subsidies	1.8
6. Direct expenditure net of subsidies	32.9
Profit per individual [1.–(3.+6.)]	–24.9
Profit to the individual [2.–(4.+5.)]	0.6

[a] Fiscal year.
SOURCE: Tables 5–2, 5–9 and A–16, and income tax tables for tax year 1957.

On this assumption the loss is considerable, and amounts to about IL 25 thousand, per individual. Since the loss is so great, it is presumably not affected by any errors in the measurement of incomes. The profitability to the individual is just positive, though, on our assumption about earnings until the age of 35, not very great.

e. *Higher education—average*

The present value of income of graduates of higher education as a group is much lower than that of any specific profession examined, except lawyers whose income is probably underestimated. Since the most important other group included in the average is teachers, average expenditure is also lower

than in any of the professions examined separately. An upper limit of the expenditures was taken which gave zero profit to the individual, and a small loss per individual (last column of Table 6–5). However, this seems meaningless owing to the diversity of the higher education category.

5. *The profitability accounts corrected for future growth in GNP*

Our calculations have so far excluded any adjustments for possible changes in income and expenditures in the future. One way of incorporating future trends is to take into account the growth in per capita GNP.

We do not try to predict how the additions to GNP will be distributed. Thus, if per capita GNP grows mainly because of the growth of tangible capital, it is probable that the more educated strata of the population will gain more than proportionately, because presumably education and capital are complementary. On the other hand, if GNP grows mainly because of the rising level of education itself, it is probable that the gain will be less than proportionate at the higher levels of education, because of diminishing returns. Assuming, for simplicity, that all incomes will rise in the same proportion, it follows that the profitability of education will rise, because it is (according to our definitions) measured by absolute rather than relative income differentials: a proportionate growth in incomes means a rise in absolute differentials.

Technically, a correction for GNP growth is introduced as follows: if X_t denotes income net of all expenditures (including forgone income) in the year t, its present value will be $X_t(1+r)^{-t}$. When an annual rate of

TABLE 6–9. *Profits per Individual at Various Levels of Education Corrected for a 3 per cent Annual Growth in GNP: 1957*[a]
(*IL thousands; 8 per cent discount rate*)

	Corrected estimate	*Uncorrected estimate*
Partial secondary	+ 2.1	−2.1
Full secondary	+ 5.6	−0.8
Higher—average	+ 2.7	−6.1
Engineering	+16.4	+ 1.3
Accountancy	+82.7	+42.9
Law	+ 3.1	−1.0
Medicine	−13.6	−24.9

[a] Fiscal year.

SOURCE: Tables 6–2 to 6–5; A–13 to A–18; 5–11.

growth g is introduced, the corrected estimate will be $X_t(1+r)^{-t}\ (1+g)^t$, thus raising profits $(1+g)^t$ times.

The steeper the age-income profile, the higher the corrected present value of income as compared with the uncorrected value. Since age-income profiles become steeper as one goes up the educational scale, this means that introducing the growth factor raises the profitability of higher levels of education more than that of the lower levels.

The comparison between corrected and uncorrected profits is shown in Table 6–9. Both incomes and expenditures were recalculated on the assumption of an annual rate of growth of 3 per cent per employed person.

As can be seen, the corrected estimate of profits is positive at all levels of education. Only in medicine is the corrected estimate still negative, although less so than the uncorrected estimate.

CHAPTER 7

SUMMARY AND CONCLUSIONS

The study of income, expenditure, and profitability of formal education is based mainly on a cross-section for 1957, and its results may be better evaluated against the background of the late forties and the fifties. When the State of Israel was established, it had the benefit of a very large proportion of people with secondary and higher education, both relative to other countries and to the amount of tangible capital in the country. This was one factor which kept income differentials low. Another possibility is that since most people had received their secondary and higher education before immigration, while the contribution of the local educational system was more or less marginal, pecuniary incentives to study were not important, and probably did not affect the supply very much. In 1949 there began an influx of immigrants with a very large proportion of people with less than elementary education, and this substantially reduced the proportion of secondary and post-secondary school graduates. Thus pressure arose on the labor market to increase income differentials. At the same time this meant an increase in the importance of the local educational system as a supplier of skilled and professional manpower and the profitability of investment in education became a more important factor affecting the supply of educated manpower. It therefore became meaningful to ask whether the increase in income differentials taking place during the period was sufficiently large to be an incentive to study. Another, and more difficult question is to what extent is it worth while for the economy to invest in education at a particular level, and at which levels is there too much or too little investment. The cross section for 1957 is an attempt to answer these question tentatively.

From the individual's viewpoint (i.e. taking his income net of taxes and his expenditure gross of subsidies), it was found that investment in education entails a profit at the primary and some of the professional levels, but not at the secondary level. The lack of profit at this level is partly due to the higher tuition fees, but more important is the low income differential between graduates of secondary and of primary schools. Another possible explanation is that the structure of secondary education in the country is

such that it serves mainly as a preparatory school for higher education. This is supported by the unusually high proportion of secondary school graduates who continue their studies (about 90 per cent of the male graduates). Unfortunately there are no data for incomes of vocational school graduates, which makes it impossible to judge whether such schools are more profitable to individuals who do not continue their studies. The profitability of academic education to individuals varies among professions, but is generally positive. Two factors beside income differentials are important here: the low tuition fees and the substantial income earned while studying. Unlike in many developed countries, tuition fees in higher education are equal to or lower than secondary school fees, and form a much lower percentage of total expenditure per pupil. These low tuition fees may be consistent with the public sector interest as an employer. As was pointed out, most professional persons have graduated abroad before immigration, their supply is inelastic and their salaries can therefore be kept quite low without substantially reducing the supply. For locally educated professional manpower investment in education can be made profitable by granting very high subsidies on direct costs and still keeping salaries low Since the public sector is a very important employer of professional manpower, this will result in a net profit for the sector. Also, owing to the system of linking salaries, a rise in professional salaries entails a rise in the salaries of other occupations as well, while direct subsidies have no such effect. So long as local supply is only a small part of the total, subsidization rather than raising salary differentials is a rational policy for the public sector, although it is not clear whether it was followed deliberately for this reason.

Working while studying is another important factor making for positive profits. There is no question that it is undesirable if academic standards are to be high. In several professions, particularly accountancy and engineering, the practice could be stopped without entailing a net loss, provided that there is a loan market in which students can borrow during the period of study at not more than about 8 per cent interest.

The very high profit realized by individuals on primary education suggested to us the possibility that from the individual's viewpoint adult primary education until the age of 35 may be profitable.

We turn now to the estimate of social profitability, found by deducting expenditure net of subsidies from gross income. While for primary and secondary schools, both the signs and the magnitudes of profits are about the same as those in the individual calculation, the picture is entirely different in higher education: there is a substantial loss to society in medicine and a smaller one in law; engineering was found to have a small profit, and

only accountancy shows a substantial one. On the average, higher education entails a loss. This finding contrasts with what is found in the United States, where higher education shows high profits, and it contradicts the general belief held in this country, as in others, that there is underinvestment in higher education.

One explanation for our findings may be that the external effects of higher education, which we have not measured, are a more important part of the total economic contribution of professional manpower in Israel than in other countries, so that the underestimate of true social profit is greater in Israel. Unfortunately there is no possibility of checking this.

Another argument is that the liberal professions are paid less than their marginal productivity, because they are much weaker as a pressure group than less-skilled manpower within the Histadrut, and also because their employment is largely concentrated in the public and Histadrut sectors, which thus have monopsonistic power. This argument is sometimes also applied to secondary school graduates. Although both factors may have influenced the wage structure, they were probably less important in 1957/58 than at the beginning of the period. A stronger pressure group has crystallized through a series of strikes by professional employees in the public sector, starting in 1952. Also, the transition to self-employment among physicians and lawyers has reduced the public sector's monopsonistic power. Nevertheless, the higher educated strata might still have been underpaid in 1957/58.

Two further possible explanations occur to us, neither of which can be checked here. The first is simply that professional manpower was still in oversupply relative to other factors of production in 1957/58, and that the loss computed shows that at that point of time there was overinvestment in some fields of higher education, particularly medicine.

A second explanation concerns on-the-job training. Profitability as here measured includes the contribution to income of on-the-job training. In other countries this element probably forms a higher component of income than in Israel, where many people have lost their training through immigration. If on-the-job training is positively related to the level of education, the main effect of immigration will be to reduce the profitability of higher education.

Suppose we accept the results of the cross section at their face value for the moment and argue from the findings that in 1957/58 there was overinvestment in both secondary and higher education. This statement holds at a point of time, and has no application to future trends. One way of incorporating future trends is to take into account future increases in GNP.

It was found that, assuming a 3 per cent rate of growth of per capita GNP, and assuming this rate to be uniform at all levels of education, both secondary and higher education show a positive profit. Therefore, even if from a static viewpoint it is accepted that there is overinvestment at these levels, investment in secondary and higher education is worth while from a dynamic viewpoint.

Appendix A

EDUCATION AND OCCUPATION

Up to now, our discussion has been in terms of educational levels. Similar analyses are frequently made on the basis of an occupational classification of the population. The question is how far one can speak of the influence of education on income separately from the influence of occupation, and how does such a separation influence our conclusion on profitability. Let us assume that persons with secondary education are suitable only for clerical work, and that persons with primary education are suitable only for manual work. An expansion of secondary education could thus cause a surplus of clerks and a shortage of laborers. The marginal product of secondary school graduates would decline, while their transfer to manual work would not pay the economy, since they would earn no more than primary school graduates. On the other hand, if secondary education results in higher product in all occupations, the product of secondary school graduates need not decline at all. If we assume that the whole population has at least a secondary education, and that educational capital is complementary to physical capital, then whenever the supply of physical capital increases, the output of persons with secondary education will rise.

The problem can also be regarded as one of allocation of a specific factor of production, and one that has an alternative use. From the viewpoint of the economy, the less specific the training, the greater the worker's value.

Table A–1 shows the distribution of income from employment of wage-earning heads of units by education and occupation in 1957/58. The table is based on unweighted results of the Family Savings Survey. The survey gave a higher weight to persons living in more affluent areas. In order to arrive at correct results it was therefore necessary to give lower weights to richer persons, and higher weights to poorer persons. Indeed, all the results given so far are based on this weighting. Table A–1 is an unweighted table, and incomes are therefore biased upward, the bias increasing steadily with the rise in education or in occupational level. With this reservation, we present the results.

Let us first take a general look at the occupation-educational level cells

TABLE A–1. *Average Annual Income of Employees by Level of Education and Occupation:*[a] *1957*[b]
(IL thousands)

	Did not attend school	Primary school		Secondary school		Post-secondary school		All education levels	Effect of occupation–difference from average income	
		Did not complete	Completed	Did not complete	Completed	Did not complete	Completed		gross	net
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Professional and technical	..	..	3.8	3.7	4.0	4.8	6.5	5.3	+1.5	+1.0
2. Managerial, administrative and clerical	..	..	6.6	5.8	7.6	6.3	8.2	7.4	+2.6	+3.5
3. Merchants and salesmen	..	2.6	3.7	3.7	4.2	4.3	4.9	4.1	+0.3	+0.5
4. Agricultural	2.3	..	2.7	3.8	3.0	..	..	2.9	−0.8	−0.3
5. Transport and communications	1.6	1.5	2.0	2.0	3.1	..	..	1.9	−1.9	−1.0
6. Craftsmen, production workers and laborers n.e.c.[c]	..	2.6	3.7	4.7	4.8	..	..	4.0	+0.2	+0.9
7. Craftsmen, production workers and laborers n.e.c.[c]	2.1	2.5	3.1	3.3	4.0	3.7	3.5	3.2	−0.6	+0.1
8. Craftsmen, production workers and laborers n.e.c.[c]	1.7	2.0	2.6	2.8	3.3	3.1	..	2.5	−1.2	−0.6
9. Services	1.6	2.5	2.3	2.9	2.9	5.7	3.9	2.5	−1.3	−0.7
10. All employees	1.8	2.2	3.0	3.6	4.4	4.4	6.3	3.8	—	—
11. Gross effect of educational level–difference from average income	−2.0	−1.6	−0.8	−0.2	+0.6	+0.6	+2.5	—		
12. Net effect of educational level–difference from average income	−0.9	−0.6	−0.1	0	+0.4	+0.6	+2.0	—		

[a] Excluding cells with less than three observations; also excluding Post secondary-still studying,' others' and 'unknown.' All these categories are included in the general average.

[b] Fiscal year.

[c] These are orders 6–8 of the CBS Classification of Occupations (Census Publication No. 3).

SOURCE: *Family Savings Survey 1957/58*, working papers.

[columns (1) to (7) and lines 1 to 9]. We shall divide the influence of education on income into two main groups: occupations in which a rise in the level of education raises income, including occupations open only to persons at a certain level of education; and occupations in which a rise in the level of education does not raise income, or leads to its decline, or leads to leaving the occupation.

Comparison of columns (1) and (2) shows that primary education raises the level of income in all occupations that the uneducated are also engaged in, and that it opens up occupations closed to the uneducated. Without for the moment looking at the absolute size of the rise in income, it can be seen that primary education exerts a general, rather than a specific, influence.

The same is true of full secondary education in relation to primary education: here too a rise in education leads to a rise in income in all occupations. In contrast to this, higher education raises income over that for secondary education only in the professions, in managerial and clerical and sales jobs, and in personal services. It makes employment in manual labor less profitable. Higher education is thus more specific, as might have been expected, and its value to the economy at a time of changing occupational composition is therefore more limited. A considerable degree of specificity also exists for partial secondary education. Persons with such education have no advantage over primary school graduates in technical or clerical work. Only in manual labor do they have an advantage.

In order to isolate as much as possible the net influence of education from that of occupation, we have used an estimate of coefficients according to the least squares method. Since we had no data on the dispersion of income within each education-occupation cell, it was not possible to examine whether there is a significant interaction between these two variables. We therefore employed the least squares method, which is suited to the case of lack of interaction.[1] The results of the computations appear in terms of the difference between the income deriving from the net influence of a given occupation (or level of education) and the average income. The results of the computations of the net influence of occupation on income appear in column (10), and those of the net influence of education, in line 12.

Let us take an example of the meaning of the computations. Secondary school graduates who are administrative workers received an income of IL 7,600. This income is based on an average per capita income of IL 3,800

[1] The formulas suitable for the computation of coefficients on the assumption of lack of interaction and by the least squares method will be found in, *inter alia*, F. A. Graybill, *An Introduction to Linear Statistical Models*, Vol. I, New York, 1961, pp. 266–79.

plus an additional income of secondary education graduates of IL 400 above the general average. The sum of these is IL 7,700: unmeasured residual factors bring the actual income to IL 7,600.

In column (9) and line 11 we have given, for purposes of comparison, the differences from the average income for the various occupations without deducting the influence of education and for the various levels of education without deducting the influence of occupation.

Comparison between the net and gross differences shows that the net influence of education is consistently lower than the gross influence, whereas the net influence of occupation is generally higher than the gross influence. Therefore, the measurement of the return to education which we have used in this work on the basis of the gross differences between incomes at various levels of education was liable to lead to an exaggeration of the profitability of education. Thus, the gross difference between primary school graduates and persons without education is about IL 1,200, while the net difference is only IL 800 [column (3) *less* column (1) in lines 11 and 12]. The gross difference between secondary and primary school graduates is IL 1,400, while the net difference is only IL 500 [column (5) *less* column 3]; the gross difference between graduates of post-secondary schools and secondary school graduates is IL 1,900, while the net difference is only IL 1,600 [column (7) *less* column (5)].

These conclusions apply if the assumption of a lack of interaction between education and occupation is reasonable. In the absence of a numerical analysis we bring the available data merely to indicate an additional direction of thought.

APPENDIX B

THE TRANSITORY ELEMENT IN ENGINEERS' INCOME: 1950–57

In the description of income differentials we relied on horizontal cross sections. In these cross sections the true size of income is distorted owing to transitory factors which characterize isolated years, but which are not connected with the trend of permanent income. One possible test of the importance of these factors is to compute the correlation coefficient between the income of a given group of persons in year 1 and their income in year 2.[1] The correlation coefficient shows the percentage of variance stemming from permanent income out of the total variance of incomes in a given year, on the assumption that the percentage remains constant over the two years, or on the assumption that there is no correlation between the transitory factors in the two years. This interpretation is, of course, correct only if the population of the two years remains constant. In such a case, if σ_1^2 and σ_2^2 indicate the variance of incomes of an identical group of persons in year 1 and year 2, then r_{12}, when computed by a follow-up of the income of each individual, shows that part of σ_1^2 and σ_2^2 which derives from the variance of permanent incomes.

TABLE A–2. *Coefficient of Correlation for Engineers' Incomes: 1950–57*[a]

	Coefficient of correlation	*Number of cases*
1950, 1951	0.768	161
1951, 1952	0.717	163
1952, 1953	0.782	168
1953, 1954	0.854	162
1954, 1955	0.860	160
1955, 1956	0.993	84
1956, 1957	0.785	68

[a] Fiscal years. The stub indicates the pair of years in each correlation.

SOURCE: Income tax sample.

[1] See M. Friedman, *The Theory of the Consumption Function*, NBER, New York, 1957, p. 185.

Table A–2 shows this correlation coefficient for the income of engineers in 1951–57, based on income tax samples. It shows a systematic rise in the percentage of variance explained by the permanent income, from 72 per cent at the beginning of the period to 99 per cent at its maximum. In the last year there is indeed a decline in the coefficient, but this may be due to the small number of observations in 1957.

The reason for the rise in the percentage of variance explained by the permanent income may lie in changes in the methods of reporting to the income tax authorities, whose files served as the basis for the data.

The change may have occurred in one of two ways: either the assessments made for persons whose actual income is similar varied less (in which case the variance was reduced), or the reporting of the income of each person became more consistent (in which case the covariance increased). The data on the variance and the covariance do not clearly indicate which one of these processes occurred. It is also probable that in the first years of the State income was subject to greater annual fluctuations than in recent years.

One reservation should be kept in mind: the population of engineers did not remain constant, so that the computations, both for the general variation and for the transitory part within it, cover only that part of the population which appears in both years.

The more we expand the span of years for which the measurement is made, the lower the coefficient of correlation will be. The presumably temporary factor in income will then also include income changes resulting from structural changes in demand and supply which occurred during the years measured. Thus, the coefficient of correlation between incomes in 1950 and 1953 was only 0.450. These were the years in which the structural changes were very great. Between 1953 and 1956 we find a slightly higher coefficient: 0.540.

Appendix C

WOMEN'S INCOME BY EDUCATIONAL LEVEL: 1957

The data of the Family Savings Survey which we cited (p. 17) for the purpose of the profitability calculations are based on the income of heads of units, 95 per cent of whom are men; the data thus disregard almost completely the relation between expenditure on education and income among women.

There may be justification for this disregard, particularly from the aspect of the calculation of profitability to the economy. Wages are not as satisfactory a measure of the contribution of women to the national product as is the case with men, for in addition to the contribution of women in the labor force there is the contribution of women as mothers bringing up the new generation. Our measurements cannot take this factor into account.

In this Appendix, we shall present the data on the money income of women, and examine how the profitability computations would be affected by its inclusion. Table A–3 shows the average income of women by level of education in 1957, and compares this to the income of men. Total heads of units are first compared with total women, including those who did not work, and then heads of units who received income with women who received income.

On the average, women who worked received about half the annual income of men. Since there are too few cases to allow us to distinguish between full-time and part-time working women, it was not possible to determine how much of the difference in pay stems from smaller input of labor and how much from a different evaluation on the labor market of women's labor compared with men's. Nor was it possible to determine to what extent a different market evaluation stems from the fact that there are typical women's occupations and how far it also exists within each occupation.

If we compare total women with total men, the ratio of women's average income to that of men drops to 11 per cent.

To what extent is the inclusion of women likely to cause changes in the direction of the profitability of investment in education? To answer this, we shall use the income of total women and not of working women alone. As

TABLE A–3. *Annual Income from Employment—Women and Heads of Units, by Level of Education: 1957*[a]
(*IL*)

	Heads of units		*Women*		*Women's income as per cent of men's*	
	Total	*Receiving income*	*Total*	*Receiving income*	*Total* (3)÷(1)	*Receiving income* (4)÷(2)
	(1)	(2)	(3)	(4)	(5)	(6)
Did not attend school	1,160	1,525	..	609	..	40
Primary school						
Did not complete	1,888	2,090	53	784	3	38
Completed	2,437	2,630	149	1,368	6	52
Secondary school						
Did not complete	2,801	3,168	288	1,623	10	51
Completed	3,281	3,473	516	2,116	16	61
Completed post-secondary school	4,788	5,024	1,377	2,379	29	47
Total	2,690	2,974	297	1,504	11	51

[a] Fiscal year.

SOURCE: *Family Savings Survey 1957/58*, working papers.

mentioned, the inclusion of women will reduce absolute income at every level of education. However, the income differentials between various levels of education are likely to increase, for two reasons. The first is that the percentage of women decreases with a rise in the level of education.[1] The second reason is that the percentage of women's participation in the labor force increases with level of education.[2]

The inclusion of women in the calculation may therefore increase the profitability of investment in education, as measured by income differentials, although it would reduce the absolute level of income at every stage of education.

[1] According to the 1961 Population Census, women constituted about 70 per cent of all persons with 0 years of schooling, 49 per cent of those with 5–8 years of school, and so on in descending order to 39 per cent of those with 13 or more years of education. See CBS, *Abstract 1963*, No. 14, p. 658.

[2] See A. Hovne, *The Labor Force in Israel*, FP, Jerusalem, 1961, p. 43.

APPENDIX D

INCOMES OF ENGINEERS AND SCIENTISTS: 1960

In 1960 the National Council for Research and Development took a census of engineers and natural scientists. Those in full-time salaried positions were asked to state their gross salary in June 1960 from their jobs alone. This is the only statistical source that enables us to obtain a picture of changes in income among university graduates by detailed level of education. Table A–4 shows the median income in each age group, by level of academic degree. Two interesting features stand out:

TABLE A–4. *Median Gross Monthly Salary of Engineers and Scientists, by Academic Degree and Age: June 1960*
(*IL*[a])

	No degree	*B.Sc.*	*M.Sc.*	*Engineer*[b]	*Diplomaed engineer*[c]	*Ph.D.*
25–29	320	370	370	410	450	490
30–34	340	430	440	530	530	530
35–39	480	540	550	540	590	680
40–44	560	580	560	580	620	750
45–49	540	670	580	630	630	750
50–54	590	580	580	600	610	670
55–59	580	630	630	640	630	710
60–64	580	700	650	580	620	680

[a] Rounded to nearest IL 10.
[b] At B.Sc. level.
[c] Additional year's study.
SOURCE: Census of engineers and scientists, 1960.

a. There is a considerable difference between the income of persons in the lower categories (finished with no degree, B.Sc., engineer) and that of persons in the highest category (Ph.D.). On the other hand, there is no systematic difference in the intermediate categories. Thus, the salary differences between a B.Sc. and an M.Sc. are negligible.

b. In general, it appears that the salary differences between the holders of the various degrees become smaller with age. Thus the ratio of the income of a Ph.D. to that of a B.Sc. is 1.5:1 at ages 25–29, 1.2:1 at ages 35–44, 1.1:1 at ages 45–59, and 1:1 over age 60. This may perhaps be explained by the same factors that cause a reduction of income differences between various ages over time (see pp. 35–37), particularly the obsolescence of knowledge.

TABLE A–5. *Median Gross Monthly Salary of Engineers and Scientists, by Academic Degree, by Date and Place of Graduation: June 1960*
(*IL*[a])

Degree and place of study	*Degree received in*					
	1931–35	*1936–40*	*1941–45*	*1946–50*	*1951–55*	*1956–60*
B.Sc.						
Hebrew University						330
Technion	680	670	650	500	540	370
Abroad	580	500	570	550	520	380
M.Sc.						
Hebrew University	..	580	530	530	460	380
Technion						490
Abroad	580	660	470	560	560	530
Engineer						
Technion	680	660	670	710	580	420
Abroad	640	590	580	550	470	430
Diplomaed engineer						
Technion	800	760	690	670	570	440
Abroad	620	590	580	570	480	420
Ph.D.						
Hebrew University	..	820	840	820	700	560
Technion						610
Abroad	650	650	650	730	670	600

[a] Rounded to nearest IL 10.

SOURCE: Census of engineers and scientists, 1960.

Table A–5 shows the median salary by date and place of graduation and level of the degree. Because length of residence in the country was not isolated, it is difficult to judge to what extent the income differences between those who studied in Israel and those who studied abroad reflect this factor, and to what extent they stem from the unsuitability of the studies abroad for conditions in Israel. In any case, it appears from the table that for all

degrees except M.Sc. the salary of persons who studied abroad is less than that of those who studied in Israel (most of the M.Sc. included here are chemists and biologists).

From the data for 1956–60 graduates, it appears that the salaries of Technion graduates are considerably higher than those of Hebrew University graduates with the same academic degree.

APPENDIX E

TUITION FEES IN SCHOOLS

The available data on expenditure of individuals for schooling between 1951 and 1962 cover only tuition fees. They are from the calculations of the Price Section of the Central Bureau of Statistics made for the Consumers' Price Index. The data are obtained from schools and not from families.

The data show that during the period mentioned tuition fees in secondary academic and vocational schools rose more than the Consumers' Price Index (Table A–6). On the other hand, kindergarten and primary school fees became relatively cheaper.

TABLE A–6. *Index of School Fees: 1951–62*[a]
(IX 1951 = 100)

	Nursery school	*Primary school*[b]	*Academic secondary school*	*Vocational secondary school*	*Textbooks*	*Consumers' Price Index*
1951	99	100	100	108	113	103
1952	159	150	118	135	318	173
1953	191	150	280	152	300	207
1954	227	150	298	180	300	227
1955	230	150	326	180	300	238
1956	238	150	463	261	300	259
1957	249	156	463	268	300	268
1958	257	165	463	334	300	280
1959[c]	266	166	477	421	324	281
1960	294	168	481	491	354	292
1961	315	168	537	554	396	309
1962	320	181	569	635	426	326

[a] October of each year, except for 1962 where the figures are for July.
[b] Registration and additional service fees.
[c] From 1959 a new index was used, with a different basket of schools, here linked onto the old index.

SOURCE: Unpublished CBS data.

We also have data on the ratio between actual payments and the official tuition fees in academic secondary schools in October 1959–July 1962. These are presented in Table A–7. They show that the percentage of the fees actually paid was more or less constant, for the first two grades of secondary schools, at a level of 74–78 per cent. On the other hand, there was a considerable reduction in tuition fees actually paid in the last two grades of secondary schools.

TABLE A–7. *Secondary School Fees—Full Fees and Actual Payments: 1959–62*[a]
(*IL*)

	1959	*1960*	*1961*	*1962*
A. Full fees				
Grade: Ninth	420	433	483	506
Tenth	446	462	523	561
Eleventh	503	510	553	596
Twelfth	560	561	586	630
B. Actual payments				
Grade: Ninth	328	338	359	374
Tenth	332	343	391	427
Eleventh	472	428	420	452
Twelfth	560	561	345	373
C. Actual payments as per cent of full fee				
Grade: Ninth	78	78	74	74
Tenth	74	74	75	76
Eleventh	94	84	76	76
Twelfth	100	100	59	59

[a] October of 1959 to 1961, and July 1962.
SOURCE: Unpublished CBS data.

Appendix F

EXPENDITURE PER STUDENT AT THE TECHNION: 1949–1960

Table A–8 shows the current average per student expenditure of the Technion in 1949–60 (academic years). In order to arrive at a constant price estimate we used the price index of public consumption instead of a (non-existent) index of the prices of inputs in education, on the assumption that the structure of inputs in education is more similar to that of public consumption than to any other aggregate for which a price index is available.

Two series of expenditure appear in the table: there are data on expenditure, including that not connected with undergraduate tuition (research, extension courses, etc.), for the entire period; and for the last six years we have constructed a series net of such types of expenditure.

In real terms both net and gross expenditure per student more than doubled from 1954 to 1960. Additional evidence of the increase in per student expenditure is that the number of students per teacher declined from 8 in 1949 to 4.7 in 1955 and to 3.6 in 1959.[1]

We tried to derive the real marginal expenditure of the economy from the data on total expenditure, and on the number of students, by dividing the additional expenditure each year by the additional students that year. The results obtained showed no regularity, except in one sense: as a rule, marginal expenditure computed in this manner was higher than average expenditure. This leads us to believe that the true price the economy pays to educate an engineer is higher than the average price we have used.

[1] See CBS, *Abstract 1959/60*, No. 11, 1960, p. 390.

TABLE A–8. *Average Annual Expenditure per Technion Student: 1949–60*[a]

	Number of students[b]	*Aggregate current expenditure (IL thousands)*						*Total expenditure per student (IL)*		*Price index of public consumption (1952=100)*	*Total expenditure per student (1952 IL)*	
		Excluding depreciation		*Depreciation*		*Total*						
		Gross[c]	*Net*[d]	*on buildings*[e]	*on equipment*[f]	*Gross (2)+(4)+(5)*	*Net (3)+(4)+(5)*	*Gross (6)÷(1)*	*Net (7)÷(1)*		*Gross (8)÷(10)*	*Net (9)÷(10)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
1949	676	124.7	..	..	0.2	124.9	..	185	..	..	..	..
1950	793	255.5	..	..	1.1	256.6	..	324	..	52.3	620	..
1951	931	319.4	..	..	2.8	322.2	..	346	..	62.7	552	..
1952	1,023	655.5	..	..	16.6	672.1	..	657	..	100.0	657	..
1953	1,178	1,164.8	..	4.6	35.7	1,205.1	..	1.023	..	120.9	846	..
1954	1,336	1,601.0	..	16.1	62.8	1,679.9	..	1,257	..	132.9	946	..
1955	1,456	2,067.6	1,866.7	50.8	99.8	2,218.2	2,017.3	1,523	1,386	156.0	976	888
1956	1,659	3,613.6	3,185.9	73.5	188.5	3,875.6	3,447.9	2,336	2,078	170.8	1,368	1,217
1957	1,714	4,578.5	3,692.0	153.6	322.4	5,054.5	4,168.0	2,949	2,432	184.4	1,599	1,319
1958	1,869	6,211.1	5,002.1	201.1	427.1	6,839.3	5,630.3	3,659	3,012	194.9	1,877	1,545
1959	1,936	7,937.0	6,765.0	226.5	493.0	8,656.5	7,484.5	4,471	3,866	209.5	2,134	1,845
1960	1,913	8,568.5	7,105.0	272.0	570.4	9,410.9	7,947.4	4,919	4,154	216.5	2,272	1,919

Footnotes on next page.

APPENDIX F

Notes to Table A–8

[a] Academic years.

[b] Does not include students in the Department of Graduate Studies. The figures have been weighted by giving each evening student a weight of ½, since a year of day study is equivalent to two years of evening study.

[c] Total current budget of the Technion.

[d] Total current budget *less* expenditure on research, vocational training, and external and graduate studies.

[e] Computed as 2 per cent of value of buildings in the new campus, cumulated from 1953.

[f] Computed as 10 per cent of value of equipment, cumulated from 1949.

SOURCES: Financial Department of the Technion for 1949–58 [columns (2)–(5)].
Ministry of Finance, *Explanatory Remarks to the Draft Budget*, annual volumes (Hebrew): *1958/59* (p.227); *1960/61* (p. 231); *1961/62* (p.233); *1962/63* (p. 277), for 1952–60 [column (1)], and 1959–60 [columns (2)–(5)].
CBS, *Abstract 1957/58*, No. 9, p. 361, for 1950 in column (1); and *Abstract 1958/59*, No. 10, p. 369, for 1949 and 1951 in column (1).

APPENDIX G

EXPENDITURE PER STUDENT AT THE HEBREW UNIVERSITY: 1953–1958

Calculation of the expenditure in the various faculties of the Hebrew University is complicated for two main reasons. In the first place, since 1953, the academic year has not coincided with the university's accounting year. Secondly, computation of the expenditure in every faculty requires dividing the general overheads among all faculties according to some arbitrary key. General overheads sometimes constitute 50 per cent of a faculty's total expenditure according to our method of allocation, so that changing the method of allocating overheads would give quite different results. With these qualifications we bring the results in Table A–9.

TABLE A–9. *Average Annual Expenditure per Hebrew University Student: 1953–58*[a]
(*IL thousands*)

	1953	*1954*	*1955*	*1956*	*1957*	*1958*
At current prices						
Humanities and social sciences	0.8	1.0	1.0	1.3	1.3	1.4
Law	0.2	0.3	0.4	0.6	0.8	1.2
Natural sciences	1.9	2.1	2.5	2.8	3.2	3.3
Medicine	4.3	6.5	7.3	9.1	9.5	9.8
At 1952 prices[b]						
Humanities and social sciences	0.7	0.7	0.6	0.7	0.7	0.7
Law	0.1	0.2	0.2	0.4	0.4	0.6
Natural sciences	1.6	1.6	1.6	1.6	1.7	1.7
Medicine	3.5	4.9	4.7	5.3	5.2	5.0
Index of public consumption prices	121	133	156	171	184	195

[a] Fiscal years.
[b] Calculated from less rounded figures.
SOURCE: Nominal expenditure—Hebrew University, *Comparative Analysis . . . , op. cit.*, Table G–1.
Price index for public consumption—CBS, *Abstract 1964*, No. 15, pp. 136–39.

The average real expenditure per student in the Humanities and Social Sciences did not change much throughout the period, while the number of students increased from 1,200 in 1953 to 2,240 in 1958. This result is confirmed by the fact that in the same period the student-teacher ratio did not change.[1]

The average real expenditure for a law student rose approximately fourfold during the period. At the same time the number of students dropped from 700 to about 350. The increase in average real expenditure is probably a result of the high proportion of fixed costs in the Law Faculty (both because the academic staff was not elastic downward, and because the costs of maintaining the library and the building were fixed), so that a decline in the number of students raised average expenditure per student.

Medical studies are conducted in three stages. In the first five trimesters, the medical students study in the framework of the Faculty of Natural Sciences, and the expenditure for them is thus that of this faculty. The next seven trimesters they study in the Faculty of Medicine ('pre-clinical medicine'), and in the last two years they study in the framework of the Hadassah Hospital, whose budget is not included in the table. During the period, average real expenditure rose moderately in the Faculty of Natural Sciences, and substantially in the Faculty of Medicine.

To summarize, average real expenditure rose in the Faculties of Natural Sciences and Medicine, and was more or less constant in the Humanities and Social Sciences. In the Faculty of Law the decline in the number of students was accompanied by a rise in real expenditure per student.

[1] Hebrew University, *Comparative Analysis. . ., op. cit.*, Table F.

APPENDIX H

TESTS OF 'INNATE ABILITY' BY EDUCATIONAL LEVEL

There are no satisfactory data on the connection between innate ability and level of education. Two sets of fragmentary data are available. One deals with the continuation of studies from primary to secondary school, by IQ groups. The group examined was that of primary school graduates in the 1955 school year, and a follow-up was made in 1958, i.e., in the third year of secondary school. The results are presented in Table A–10, which shows a clear weeding-out by ability by the third year of secondary school.

TABLE A–10. *Pupils in Secondary School in 1958[a] as Percentage of Primary School Graduates in 1955[a], by IQ Group*

IQ	*Per cent of IQ group continuing*
Up to 75	18.6
76–85	24.5
86–92	33.3
93–97	46.6
98–102	59.4
103–107	68.8
108–112	80.2
113–119	91.3
120–127	92.5
128+	94.8
All levels	59.6

[a] School years.

SOURCE: M. Smilansky and T. Parnas, "Educational and Vocational Guidance in Israel: A Follow-Up Study," *Megamot*, X (No. 3, January 1960), 248 (Hebrew).

A second source, from which it was not possible to cite data in the present study, is the Army's intellectual aptitude tests for new recruits. The tests we examined were for 1956 and 1957. Since most youths are enlisted

before beginning post-secondary studies, the data for higher levels of education are based on a small number of cases. The Army tests show that the level of intellectual aptitude rises distinctly with level of education to secondary school graduation, but between secondary school graduates and persons with higher education (for which, as noted, the data are not reliable) there is no recognizable difference in intellectual aptitude.

APPENDIX I

AVERAGE TUITION FEES AT THE HEBREW UNIVERSITY AND THE TECHNION

TABLE A–11. *Average Tuition Fees paid by Hebrew University Students: 1953–59*[a]
(*IL*)

	Number of students	*Average payment by the individual*		
		Nominal	*At 1952 prices*	
			Deflated by investment price index	*Deflated by Consumers' Price Index*
1953	2,728	103	76	80
1954	2,919	112	72	78
1955	3,145	141	81	93
1956	3,301	152	79	94
1957	3,749	174	86	101
1958	4,355	218	105	122
1959	5,655	221	105	122

[a] Fiscal years.

SOURCES: Number of students—*Draft Budget of the University for 1960/61*, adjusted to fiscal years.
Income from tuition fees from Mr. A. Shertz of the Hebrew University, and aid to students from Hebrew University, *Comparative Analysis . . . , op. cit.*, Table A.
Price indexes—CBS, *Abstract 1965*, No. 16, p. 277 (CPI) and pp. 172–73 (investment). The indexes have not been adjusted to fiscal years.

TABLE A–12. *Average Tuition Fee paid by Technion Students: 1949–60*[a]
(*IL*)

	Day tuition fee[b]	*Actual fee paid*[c]		
		Nominal	*At 1952 prices, deflated by:*	
			Index of investment prices	*Consumers' Price Index*
1949	75	75	..	126
1950	75	75	184	135
1951	75	72	129	114
1952	100	97	97	97
1953	150	143	106	112
1954	200	189	121	131
1955	200	175	101	115
1956	240	216	112	133
1957	260	232	115	134
1958	260	217	104	122
1959	270	213	101	118
1960	400	314	144	170

[a] Academic years.

[b] Does not include registration and examination fees etc. Evening tuition fees are about 60 per cent of day fees. The weighted fee differs from the day fee by only IL 2–3.

[c] The day fee [column (1)] *less* prizes and grants per student. Total prizes and grants were divided by the weighted number of undergraduates (shown in Table A–8). Since graduate students may also have received awards, the amount deducted may be somewhat too high.

SOURCE: See sources to Table A–8.

APPENDIX J

APPENDIX TABLES TO CHAPTER 3

TABLE A–13. *Discount Coefficients for Annual Income and Expenditure at Age 21, by Age-Group*

	Interest rate		
	6 per cent	*8 per cent*	*10 per cent*
14–17	5.52286	6.13051	6.79489
21–24	3.46511	3.31213	3.16986
25–34	5.82988	4.93210	4.19681
35–44	3.25538	2.28453	1.61806
46–54	1.81779	1.05819	0.62384
55–64	1.01505	0.49012	0.24050
65+	0.37869	0.15642	0.06573

SOURCE: *Inwood's Tables of Interest and Mortality*, London, 1939, pp. 142–43, 150–51, 1958–59.

TABLE A–14. *Annual Average Earned Income*[a] *by Continent of Origin,*

	Age-group					
	21–24	*25–34*	*35–44*	*45–54*	*55–64*	*65+*
A. Did not attend school						
Israel-born	..	..	..	..	(1,666)	..
Europe-America						
Veterans	..	..	..	(2,246)	(2,199)	..
New immigrants	..	..	..	(2,036)	1,260	(1,398)
Asia-Africa						
Veterans	..	..	(2,043)	2,283	1,508	1,551
New immigrants	1,456	1,564	1,628	1,203	1,151	(740)
Total income recipients	1,535	1,586	1,842	1,501	1,346	1,277
Total including those with no income	1,424	1,502	1,675	1,311	861	512
B. Did not complete primary school						
Israel-born	..	(3,150)	..	(3,452)	..	..
Europe-America						
Veterans	..	2,698	(4,640)	2,425	2,819	(3,706)
New immigrants	(1,479)	2,677	2,750	2,165	2,045	(474)
Asia-Africa						
Veterans	..	1,894	..	2,507	..	..
New immigrants	1,361	1,721	1,595	1,896	(1,148)	..
Total income recipients	1,356	2,059	2,285	2,283	2,061	1,635
Total including those with no income	1,356	2,059	2,185	2,193	1,699	647
C. Completed primary school						
Israel-born	1,866	3,209	3,653	2,861	4,092	..
Europe-America						
Veterans	(2,751)	3,082	3,500	3,453	2,542	2,854
New immigrants	2,152	2,776	2,867	2,461	1,861	1,349
Asia-Africa						
Veterans	..	2,663	3,313	2,782	..	..
New immigrants	1,698	2,140	2,063	1,518	1,737	..
Total income recipients	1,884	2,760	3,019	2,699	2,245	1,962
Total including those with no income	1,884	2,708	3,000	2,621	2,011	1,015

[a] Heads of units. The cells marked .., which had too few observations for the figures to be meaningful, are included in the averages; figures in ( ) indicate 3–5 cases in the cell.

Length of Residence, Educational Level, and Age: 1957[b] *(IL)*

	Age-group					
	21–24	*25–34*	*35–44*	*45–54*	*55–64*	*65+*
D. Did not complete secondary school						
Israel-born	2,157	2,508	4,558	(3,563)	..	..
Europe-America						
Veterans	..	3,185	3,968	4,879	3,267	(1,841)
New immigrants	2,743	2,974	3,041	2,606	2,037	1,545
Asia-Africa						
Veterans	..	(3,213)	..	..	..	..
New immigrants	1,983	2,492	2,476	(2,183)	..	..
Total income recipients	2,181	2,839	3,408	3,991	2,880	1,730
Total including those with no income	1,812	2,701	3,408	3,681	2,464	654
E. Completed secondary school						
Israel-born	2,354	3,664	4,630	3,391	..	..
Europe-America						
Veterans	(2,265)	3,545	3,975	4,050	3,824	2,978
New immigrants	2,783	3,154	3,402	2,792	2,361	1,041
Asia-Africa						
Veterans	..	(2,517)	4,179	5,711	..	..
New immigrants	..	2,595	3,035	2,839	(1,044)	..
Total income recipients	2,455	3,220	3,781	3,670	3,308	2,276
Total including those with no income	2,455	3,220	3,736	3,594	2,991	1,218
F. Post-secondary education						
Israel-born		4,420	6,087	6,206	(5,587)	..
Europe-America						
Veterans		3,593	5,559	6,239	5,845	3,280
New immigrants		4,232	4,899	4,826	4,541	(5,438)
Asia-Africa						
Veterans		..	..	..	..	..
New immigrants		2,161	4,406	(4,904)	..	..
Total income recipients		3,830	5,302	5,815	5,529	3,659
Total including those with no income		3,830	5,302	5,815	5,066	2,193

[b] Fiscal year.

SOURCE: *Family Savings Survey: 1957/58*, working papers.

APPENDIX K

APPENDIX TABLES TO CHAPTER 4

TABLE A–15. *Average Annual Income of Salaried Engineers, by Age: 1950–57*[a]
(*IL*)

	1950	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
25–34	..	..	(688)	(1,262)	(1,835)	2,869	3,601	(4,720)
35–44	691	1,403	1,789	2,453	3,196	4,057	4,937	5,349
45–54	1,105	1,506	2,206	3,014	3,683	4,446	5,591	6,513
55–64	1,179	1,599	2,446	3,291	3,988	4,669	5,601	6,542
65+	1,157	1,497	2,299	2,955	3,486	4,333	5,636	5,606
Average	1,063	1,440	2,166	2,907	3,560	4,276	5,453	5,982
Standard error of the average	26	29	42	56	73	89	221	290
Number of observations	278	309	334	329	290	337	309	117
Standard deviation	438	514	765	1,018	1,244	1,244	3,892	3,141

[a] Fiscal years. There are less than 4 observations in the cells marked .., figures in ( ) indicate 4–10 observations in the cell.

SOURCE: Income tax sample.

TABLE A–16. *Average Annual Income of Salaried Physicians, by Age: 1950–57*[a]
(*IL*)

	1950	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
35–44	(123)	(918)	(1,408)	(2,015)	(2,972)	(3,306)	(4,969)	(5,397)
45–54	1,191	1,817	3,246	3,259	4,122	5,596	6,993	9,269
55–64	1,566	1,835	2,954	3,461	3,363	5,430	7,702	8,257
65+	1,287	2,022	3,201	3,611	4,560	5,210	(7,438)	7,507
Average	1,227	1,717	2,870	3,227	4,249	5,201	7,154	8,137
Standard error of the average	83	88	124	127	212	225	269	550
Number of observations	40	46	49	50	43	40	31	19
Standard deviation	522	600	870	897	1,389	1,423	1,500	2,399

[a] Fiscal years. Figures in ( ) indicate 4–10 observations in the cell.

SOURCE: Income tax sample.

TABLE A–17. *Average Annual Income of Salaried Lawyers, by Age: 1950–57*[a]

(*IL*)

	1950	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
25–34	..	..	..	..	..	(1,808)	(3,135)	(4,120)
35–44	810	1,038	1,430	2,060	2,518	2,735	3,687	3,086
45–54	927	1,259	1,897	2,293	2,602	2,858	3,267	5,225
55–64	832	982	1,670	1,836	2,244	2,970	3,687	(3,567)
65+	690	969	1,176	(1,502)	(1,949)	(1,822)	(4,217)	..
Average	839	1,106	1,551	2,050	2,489	2,604	3,406	3,592
Standard error of the average	45	55	93	117	191	210	284	788
Number of observations	60	64	64	52	37	41	30	11
Standard deviation	349	439	746	840	1,163	1,346	1,556	2,616

[a] Fiscal years. There are less than 4 observations in the cells marked ..; figures in () indicate 4–10 observations in the cell.

SOURCE: Income tax sample.

TABLE A–18. *Average Annual Income of Salaried Certified Public Accountants, by Age: 1950–57*[a]

(*IL*)

	1950	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
25–34	408	754	1,302	2,116	3,381	4,349	5,018	(8,800)
35–44	802	1,122	1,980	2,662	3,822	5,022	6,104	7,190
45–54	1,275	1,510	2,345	3,141	4,800	5,944	7,481	12,956
55–64	1,302	1,745	2,503	3,467	5,216	6,004	6,623	7,676
65+	1,218	1,584	2,531	3,274	4,982	5,132	6,861	7,175
Average	1,137	1,497	2,301	3,030	4,981	5,482	6,545	8,882
Standard error of the average	49	52	75	119	236	293	336	928
Number of observations	129	126	124	106	86	83	73	29
Standard deviation	461	578	836	1,226	2,192	2,673	2,868	5,000

[a] Fiscal years. Figures in () indicate 4–10 observations in the cell.

SOURCE: Income tax sample.

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INDEX

Accountants, 33, 35, 38, 40, 42, 69, 74–75; drop-out rate, 67, 69; length of studies, 67–68
Age-composition, 60–61; and continent-residence, 29; and income, 24, 27–29, 35, 37–38, 62, 72, 86
Association of Certified Public Accountants, licensing examinations, 67–68

Bank of Israel estimates, 50n, 51n
Bar Ilan University, 53

Capital, tangible, 4, 40, 73; complementary to education, 14, 71, 77; and educational level, 4; and labor, 1, 2, 14
Census of engineers and scientists, 85
Census of population, 10, 18, 84n
Consumers' Price Index, 24, 43, 88
Continent of origin, see continent-residence
Continent-residence, 5n, 86; and educational level, 5–6, 8–11, 13, 21–24, 27–28; and income, 5–6, 21–24, 27–28, 64, 86
Cost-of-living index, see Consumers' Price index

Depreciation, 43, 47, 52–53
Discount rate, 24, 29, 31, 45, 57–59, 61–63 67, 74; see also income, present value
Drop-out, 58, 60–62, 66–67, 69; from secondary schools, 27, 64–65; in US and England, 65; from Technion, 65

Education: abroad, 70, 74, 86–87; adult primary, 62–63, 74; complementary to capital, 14, 71, 77; costs and returns, 2–7, 43–59; law for compulsory, 11, 44; obsolescence of, 37, 86
Educational institutions: art, nursing, etc., 53–54; of higher learning, 43–44, 52–53, 74–76; local network, 3, 5, 9, 11, 13, 28, 73; ownership of, 45, 49–50; see also primary, secondary schools, teacher-training colleges, and educational level
Educational level: classification of defined, 17–18; complementarity of adjacent levels, 9, 13; and continent-residence, 5–6, 8–11, 13, 21–24, 27–28; distribution of, 4, 9, 11–13, 18, 32, 73; and natural ability, 5–6, 95–96; see also income
Employees, 33, 77; income of, 17–18, 21; see also salaried graduates
Engineers, 33–35, 38–40, 42, 65, 67, 69, 74, 81–82, 85–87, 90; see also liberal professions
External economies, 3–4, 75

Family Expenditure Survey, 43, 51
Family Savings Survey, 17–18, 24, 33, 77, 83

Government, see public sector
Grants, see subsidies

Hebrew University, 40, 44, 52, 69–70, 87, 93–94, 97–98
Histadrut, 3, 75

Immigrants, see continent-residence and immigration
Immigration, 11–13, 37–38, 73, 75
Income: and age-composition, 24, 27–29, 35, 37–38, 62, 72, 86; and continent-resi-

dence, 5–6, 21–24, 27–29, 64, 86, differentials, 4, 7, 9, 14–16, 18, 21, 71, 73; distribution, 1–2, 16; and educational level, 4, 9, 13, 16–32, 35, 64, 69, 73; of employees and self-employed, 17–18, 21; forgone, 31, 57, 59, 61, 63, 67, 69, 71; net of income tax, 30–31, 57, 61, 73; and occupation, 14–16, 35; permanent, 81–82; present value; 23n, 24–27, 40–42, 57–61; while studying, 40, 59–60, 69, 74
Income tax, 3–4, 17, 30, 31n, 57; sample, 34, 42, 82
Innate ability, see natural ability
IQ, see natural ability
Interest, see discount rate

Jewish Agency, see public sector

Labor force participation, 21, 30, 84
Labor Force Survey, 8, 18
Lawyers, 33–35, 38, 40, 42, 69–70, 74–75, 94; see also liberal professions
Leisure, 57, 67, 69
Length of residence, see continent-residence
Liberal professions, 15–16, 33–42, 75, 85
Loans, 24, 74
Local authorities, see public sector

Ministry of Education, see public sector

Natural ability, 5–6, 28, 40, 64, 95–96
Natural scientists, 33, 40, 85–87; see also liberal professions

Occupation: and income, 14–16, 35, 77–80; of women, 83
On-the-job-training, 75

Physicians, 33–34, 39–40, 44, 72, 74–75, 94; study abroad of, 70; length of studies, 69–70; see also liberal professions
Price index: of private consumption, see Consumers' Price Index; of public consumption, 90
Primary schools, 43–44, 61–63, 74, 88; recognized, 47; types of, 45; for working youth, 48
Product, growth of national, 1–2, 4, 6–7, 71–72, 75–76
Professional manpower, supply of, 7, 14, 73–75
Public sector, 60, 74–75; educational expenditure of, 46–57, 56; finance of education by, 45–46, 52; ownership of schools, 45, 50

Salaried graduates, 38–39, 42, 67, 69; see also employees
Salaries, see wages
School fees, see tuition fees
School of Law and Economics, 53, 67
Secondary schools, 44, 63–65, 74–76; academic, 43–44, 48–49, 51, 52n, 56, 65, 74, 88–89; agricultural, 48, 50; drop-out from, 27, 64–65; length of studies, 48–49; vocational, 43–44, 48–51, 65, 74, 88
Self-employed, 33, 40, 75; incomes of, 17–18, 21, 39–40
Standardization method, 6, 22–23
Students per teacher, 90, 94
Subsidies, 3–4, 52, 56–57, 61, 64, 73–74

Teachers, 3, 70; salaries of, 43, 46
Teacher-training colleges, 54
Technion, 44, 52, 87, 90–92, 97–98; drop-out from, 65
Textbooks and materials, 43–44, 46, 48–49, 52, 57
Tuition fees, 2, 31, 43–44, 57, 73–74, 88–89, 97–98; graded, 52

Unemployment, 29–30
United States, 6, 14; compared with Israel, 12, 15, 31–32, 75; growth of product in, 1–2

Veterans, see continent-residence

Wages: changes in structure, 4, 75; collective bargaining, 3–4, 75; differentials, see income differentials; and productivity, 3–4; system of linking, 74
Women: income of, 17–18, 21, 83–84; labor force participation of, 21, 84; occupation of, 83

ABOUT THE BOOK

The book, which is based on the author's doctoral thesis, discusses income differentials due to education, and the investment required for the various stages of formal education. An attempt is made to measure the profitability of this investment: from the viewpoint of the individual, who is faced with the choice of studying, as well as from the viewpoint of the economy as a whole.

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