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# Vocational Secondary Schools *can* be more Cost-effective than Academic Schools: the case of Israel

SHOSHANA NEUMAN & ADRIAN ZIDERMAN

## 1. Introduction

Since the publication of Foster's now classic works on the vocational schooling fallacy (Foster, 1965a, b), the appropriate role to be accorded to vocational education within both the schooling and the training systems has been an issue of serious, even intense, debate. The protagonists in this debate have been defined largely along disciplinary lines: educational economists have been in the forefront of those pressing the offensive, while educational policy-makers and administrators, particularly in developing countries, have continued to argue, often on the basis of perceived labour market needs, that vocational education should remain a central element in national educational policies.

Meanwhile, available evidence suggests that vocational schooling around the world is in retreat. Benavot (1983), on the basis of published UNESCO statistics, has pointed to a world-wide secular decline since the 1950s in the proportion of secondary school pupils attending vocational schools [1], while a recent survey of World Bank lending for vocationally-specific education and training has shown a clear and significant shift over the past two decades away from vocational secondary school projects towards various forms of non-formal training (Middleton, 1988). Moreover, a growing case-study literature has tended to argue that, in comparison with the traditional academic secondary school, vocational schools are simply not cost-effective [2]. Similarly, a number of studies have shown vocational schools to be a high-cost form of training for the skilled trades, in relation to alternative, more closely job-based training modes such as the traditional apprenticeship [3]. So the place of vocational schooling within both the schooling and training systems is under attack.

We present this case study appraising the economic outcomes of vocational secondary schools in Israel within this context. Our results go against the trend, in suggesting that vocational schooling can be a cost-effective alternative to traditional academic secondary education. It is felt that an examination of the Israeli experience, where so much relative importance has been accorded to vocational schooling, should be of interest, both in its own right and as adding to the roster of case studies on these issues around the world. In Israel well over half of all secondary school pupils (and over 40% of all youth of secondary-school age) attend vocational secondary schools. Outside of the East European countries, where national economic planning dictates that the educational system at the secondary level is dominated by vocational schools, only a handful of countries exhibit as large a vocational secondary school sector [4]. Moreover, the proportion of secondary school pupils attending vocational schools has shown a continuing rise over time, thus departing from comparative international norms (Benavot, 1983).

In this paper, we present an appraisal of the outcomes of secondary school vocational education in relation to educational alternatives in the more traditional academic secondary schools (henceforth 'academic' schools). Our approach is an economic one, adopting the now traditional human capital model to appraise outcomes, in terms of labour market success as measured by earnings. Yet in interpreting the results presented it will be important to adopt a broad perspective, since vocational education in Israel, as in many other countries, serves important social as well as manpower goals.

## 2. Size, Growth and Structure of the Vocational Schooling System

Although vocational schooling in Israel has a long history—the first vocational school was set up over a century ago—most secondary schooling in Israel at the time of independence in 1948 was of the traditional, academic kind, with less than one-fifth of all secondary school pupils enrolled in vocational schools; a similar ratio persisted for the next 15 years. Subsequently, the development of vocational schooling was rapid: it constituted some 38% of secondary school pupils by 1970, and by the end of that decade had exceeded the 50% mark. Table I reviews the main development of vocational schooling since 1948, in terms of numbers of schools and pupils [5].

TABLE I. General, vocational and agricultural secondary schooling in Israel: comparative statistics

Year	Number of schools			Number of students		
	General	Vocational	Agricultural	General	Vocational	Agricultural
1948/49	39	26	—	7168	2002	—
1959/60	113	60	30	32,894	10,167	5016
1969/70	219	258	30	63,731	49,556	7641
1979/80	231	310	27	61,581	70,681	5108
1980/81	246	313	27	63,990	73,785	4704
1981/82	246	304	27	66,155	76,361	4284
1982/83	267	301	26	70,310	76,636	4970
1983/84	278	305	26	74,704	79,957	4692
1984/85	292	305	26	73,213	84,631	4648
1985/86	306	306	26	83,933	89,385	5104
1986/87	305	308	26	86,813	91,720	4683

This rise in the relative importance of vocational schools in Israel, and (as will be shown) its changing structure, must be viewed against the background of the dilemma facing the authorities in the early years. The central issue was: how to integrate into the dominant framework of society the large numbers of youth of oriental origin (stemming from North Africa, the Middle East and Yemen) with low academic ability and socio-economic status, while at the same time both maintaining the academic standards of the general secondary school system and meeting the country's needs for high level technical manpower as dictated by imperatives of defence and the development of the economy. No major role was accorded to apprenticeship or education and training with a strong job market orientation. The need for a unifying, integrating framework as well as Jewish cultural norms established over the centuries required that the dilemma be resolved within the framework of the full-time school system itself [6]. Indeed, the educational system soon became the main framework for social and cultural integration.

Since the traditional academic curriculum of the general secondary schools, with its orientation towards entry to tertiary education, was inappropriate for the large numbers of youth of oriental and low socio-economic background, the more practically oriented vocational schools expanded at a faster pace, parallel with the growth in population and with the increasing proportion of 14- to 17-year-olds (especially of oriental origin) staying on at school. Impetus was added to the expansion of vocational schools by the enactment in 1969-70 of compulsory education for youth aged 14 and 15, and of free secondary schooling, and more directly with the transfer of control of the system from the Ministry of Labour to that of the Education Ministry (and its reorganisation within a vocational education department).

The transfer of vocational education to the Ministry of Education in the early 1960s had a serious impact on its content, as well as its quantity [7]. In the early years, the task of the vocational schools had been clearly defined as preparing youth for employment in the labour market in the manual trades, with emphasis in the curriculum on practical instruction. It represented more of a training than an educational system. With the transfer, more theoretical and academic subjects were introduced, and by the mid-1960s in response to the call emanating from industry and the army for a more technologically oriented labour force, such specialties as electronics and electricity were given a more central role. This process of broadening and upgrading the curriculum was facilitated by the introduction in 1969-70 of the vocational 'tracks', which now characterise the vocational schooling system.

Three main tracks were introduced, each leading to appropriate trade diplomas. The highest (*masmat*) track leads to matriculation (the *Bagrut* examination) and entry to higher education. There are two non-matriculation tracks, the regular and the practical (*masmam*); these more closely conform to the traditional training role. However, today nearly 60% of vocational school pupils study in the *masmat* track, compared with only one-third in the mid-1970s. It is normal practice for *masmat* students to present themselves for the *Bagrut* examinations, particularly for the technological specialisation introduced towards the end of the 1970s (over 70% now do so, a dramatic change from the situation in the early 1970s when this was rather exceptional). The regular track has shown a steady decline in enrolment, from about half of all vocational school pupils 15 years ago to less than one-third today, while the *masmam* track (comparable with training modes offered by the Ministry of Labour) accounts for some 15% of the total.

The foregoing discussion has argued that the vocational school system in Israel is far broader in scope and aim than is typically the case in many other countries. It is the country's main vehicle for technologically-oriented education and for the achievement of national policies of integration of diverse ethnic groups and equality of opportunity through universal secondary education. The training of skilled workers for the manual trades (historically its major role), while still significant today, does not now constitute its major focus.

### 3. Comparison of Labour Market Outcomes

Against this background, we now turn to the major concern of this paper: a comparison of the labour market (earnings) outcomes of the two major alternative forms of secondary schooling in Israel. Have those who attended vocational secondary schools achieved higher earnings than those attending academic secondary schools? Have any such earnings differences continued to hold over the longer term? We look at these issues using relevant data drawn from the 20% sub-sample of the 1983 Census of Population and Housing.

### Data

The Census of Population 20% sub-sample questionnaire collected information on the level and type of terminal schooling. This made it possible to identify two broad groups of individuals who are the focus of this paper: those who terminated education at a vocational secondary and at an academic secondary school, respectively [8]. For secondary-school completers who went on to post-secondary education, it was not possible to identify the type of secondary school attended; they are not included in the present analysis.

Only individuals in the 25–49 age-group at the time of the census are included in this research. The upper age-limit was set in order to exclude individuals who had attended secondary school before 1948, the year of statehood; the lower, to allow at least three years' possible labour market experience, following three years of compulsory military service at age 18. Since our concern is with the Israeli education system, we excluded (on the basis of age and year of migration) the large number of immigrants who had attended school abroad. Finally, the present study relates only to male, full-time workers (a worker is considered 'full-time' if he worked at least 35 hours in the week prior to the census). In all, some 16,000 individuals were included in the sample—nearly 11,000 vocational school completers and some 5000 individuals who had completed a general secondary school; the number of observations in the regressions that follow is somewhat smaller, however, because of missing values.

Table II presents characteristics of the sample of secondary-school completers as a whole, as well as of each group (completers of vocational and of academic schools) separately. It appears that personal characteristics (age, years of schooling, experience and ethnic origin) are quite similar for both groups. The two groups do differ by level of school certification attained, particularly with regard to matriculation (the *Bagrut*), which leads to entry into higher education: nearly 29% of general-school completers obtained the highest level of certification, compared with only 7% for the vocational-school group.

There are no significant differences between the two groups in the percentage not participating in the labour force (a little over 10%). There are, however, some differences between the two groups in terms of the distribution of employment by economic sector and by occupation. For both groups, industry is the leading sector, followed by the public sector; vocational-school completers are very much under-represented in the finance sector. Skilled work is the main occupation, followed by clerical work, for both groups; the former assumes greater relative importance for vocational-school completers, and the latter for those of academic schools. Relatively more academic school graduates enter managerial occupations.

### Methodology

Earnings functions of the traditional Mincer (1974) type are estimated for the sample of secondary-school completers [9]. The logarithm of monthly earnings is run against a dummy variable (VOC) describing type of school attended, either vocational (=1) or academic (=0). We hold constant a series of explanatory variables relating to other dimensions of education received, to various personal background characteristics, and to aspects of labour market involvement. A positive, and significant, coefficient on the VOC variable would indicate that completers of vocational secondary schools earned more, on average, than their academic secondary school counterparts.

TABLE II. Characteristics of sample by type of secondary school attended

List of variables	Whole sample		General schools		Vocational schools	
	Value	Standard deviation	Value	Standard deviation	Value	Standard deviation
Mean monthly income (Shekel)	38,188	30,175	37,396	27,129	40,083	36,376
Mean years of schooling	11.185	1.045	11.122	1.033	11.336	1.058
Mean years of experience	16.582	6.708	16.057	6.367	17.833	7.309
Mean age	33.767	6.584	33.179	6.245	35.169	7.138
Mean weeks worked last year	50.164	6.888	50.192	6.771	50.099	7.161
Mean hours worked last week	49.718	7.858	49.733	7.782	49.682	8.038
Percentage of oriental origin	56.850		58.277		53.455	
School certification attained (%)						
No certificate attained	6.264		6.205		6.404	
Primary or intermediate level completion	19.166		19.320		18.797	
Secondary level completion	61.222		67.606		45.995	
Matriculation ( <i>Bagrut</i> )	13.348		6.869		28.804	
Economic sector (%)						
Industry	35.340		38.926		26.784	
Electricity	2.841		3.297		1.753	
Commerce	11.392		10.757		12.905	
Finance	7.860		5.164		14.293	
Transportation	11.392		11.472		11.200	
Public services	17.361		15.911		20.818	
Private services	4.344		4.868		3.092	
Construction	6.336		6.573		5.771	
Agriculture	3.134		3.032		3.384	
Occupation (%)						
Scientific & academic workers	0.518		0.459		0.657	
Professional & technical workers	8.163		8.369		7.670	
Managers	8.508		6.879		12.393	
Clerical workers	16.260		12.166		26.029	
Sales workers	7.386		6.675		9.082	
Service workers	6.846		6.471		7.743	
Skilled workers	48.385		55.042		32.505	
Unskilled workers	2.459		2.480		2.411	
Agricultural workers	1.475		1.459		1.510	
Sample size	15,846		10,800		5046	

The full set of variables employed in the regressions is as follows:

Schooling variables: YRS.SCH: years of schooling (8–12 years)  
VOC: a dummy variable indicating type of school attended (vocational secondary school = 1, academic = 0)

A series of dummy variables, P.CERT, S.CERT and BAG, relating to the highest level of school certification attained—completed primary or intermediate level, completed

secondary schooling, and gained *Bagrut* (matriculation), respectively. The category, 'no certificate obtained' enters the constant term.

A series of dummy variables relating to occupation: ACAD (scientific and academic workers), TECH (other professional and technical workers), MANAG (managers), CLER (clerical workers), SALES (sales workers), SERV (service workers), SKILL (skilled workers), UNSKIL (unskilled workers), with agricultural workers in the constant term.

Personal background  
variable:

ETHNIC: a dummy indicating ethnic origin  
(oriental=1, western=0)

Work-related  
variables:

EXP: years of work experience (defined as Age-SCH-6)  
WEEKS: logarithm of number of weeks worked in the past  
year  
HOURS: logarithm of hours worked in the past week [10]

A series of dummy variables relating to sector in which employed: industry (IND), electricity (ELECT), construction (CONST), commerce (COMM), transport (TRANS), public services (PUB), private services (PRIV), with agriculture in the constant term.

### *Regression Results*

Regression runs relating to the whole sample are provided in Table III. Regressions (1) and (2) follow closely the now classical formulation of Mincer (1974) with an additional interaction term EXP\*YRS.SCH which takes account of the possibility of increasing (or diminishing) returns to schooling as experience advances [11].

The regressions give results generally in line with those from similar earnings functions for other countries.

If we focus at first on regression (1), monthly earnings are seen to be strongly, and positively, related to years of schooling and of experience, though the negative coefficient on experience squared shows that earnings decline for additional higher levels of experience. The coefficient on YRS.SCH, under certain assumptions (see Mincer, 1974), can be interpreted as a measure of the annual rate of return accruing to individuals for each extra year attended at secondary school—in this case, a little over 4%. (The coefficient of EXP\*YRS.SCH is insignificant.) Individuals of western origin earn more, on average, than those of oriental background; the coefficients on the other control variables also do not occasion surprise. The significance on the VOC variable points to an earnings advantage accruing to those who chose to study at vocational, rather than academic secondary schools; the former earn, on average, some 2% more per month.

To the extent that those who complete a course of study and gain a certificate are more able than those who do not (given years of schooling), the lower level of certification amongst vocational-school completers (as indicated in Table II) could bias the results against vocational schools. To correct this we add dummy variables representing and thus holding constant the level of certification attained, and indirectly correcting for differential

TABLE III. Regressions of monthly earnings (ln) full-time, male, salaried workers—Israeli Census, 1983 ( $n=13,879$ )

	Regression (1)		Regression (2)		Regression (3)	
	Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic
YRS.SCH	0.041	3.18	0.020	1.53	0.003	0.22
EXP	0.036	3.77	0.036	3.69	0.029	2.93
EXP <sup>2</sup>	-0.0008	7.45	-0.0008	7.40	-0.0007	7.01
EXP*YRS.SCH	0.001	1.48	0.001	1.62	0.001	1.99
WEEKS (ln)	0.317	16.80	0.314	16.66	0.314	16.67
HOURS (ln)	0.297	9.13	0.301	9.25	0.300	9.24
ETHNIC	-0.135	14.09	-0.130	13.49	-0.128	13.23
Economic sector:						
IND	0.075	2.60	0.075	2.51	0.076	2.53
ELECT	0.267	6.73	0.267	6.73	0.268	6.75
COMM	-0.028	0.88	-0.026	0.82	-0.026	0.82
FINAN	0.137	4.07	0.131	3.88	0.132	3.91
TRANS	0.073	2.27	0.072	2.26	0.073	2.29
PUB	-0.029	0.92	-0.029	0.92	-0.028	0.90
PRIV	-0.055	1.54	-0.055	1.53	-0.054	1.50
CONST	-0.006	0.18	-0.003	0.08	0.001	0.05
Occupation:						
ACAD	0.255	3.32	0.253	3.30	0.253	3.30
TECH	0.372	8.24	0.369	8.18	0.368	8.16
MANAG	0.051	11.12	0.496	11.03	0.497	11.03
CLER	0.194	4.43	0.194	4.43	0.194	4.43
SALES	0.196	4.25	0.195	4.22	0.195	4.24
SERV	0.183	3.97	0.186	4.04	0.186	4.04
UNSKILL	0.099	1.92	0.102	1.98	0.102	1.99
SKILL	0.177	4.13	0.180	4.20	0.180	4.19
Certification:						
P.CERT	—	—	0.005	0.02	0.0003	0.01
S.CERT	—	—	0.071	3.55	0.071	3.57
BAG	—	—	0.122	5.01	0.122	5.01
VOC	0.020	1.93	0.026	2.42	-0.217	1.78
VOC*YRS.SCH	—	—	—	—	0.016	1.67
VOC*EXP	—	—	—	—	0.003	2.07
Intercept	6.794	30.97	6.949	31.46	7.183	29.13
R <sup>2</sup>	0.166		0.169		0.169	

ability [12]. The results are presented in regression (2). The variables S.CERT and BAG are positive and highly significant. As expected, the effect is to lower (by over a half) the coefficient on YRS.SCH (and thus to lower measured rates of return on years of schooling). The level of significance of VOC is raised, while the coefficient on YRS.SCH is now insignificant.

It is possible that the effect of certification may differ according to type of schooling. A *Bagrut* (matriculation) certificate obtained from a traditional academic secondary school may be regarded as of more value than one from a vocational school; similarly, a secondary-school completion certificate from vocational school is, supposedly, more job-oriented and may have greater market value than one from an academic school. To test this, we may introduce the interaction terms: VOC\*P.CERT, VOC\*S.CERT and VOC\*BAG. The

interpretation of a negative coefficient on the latter term, for example, is that the holder of a *Bagrut* certificate, on average, earns less if he attended a vocational school. However, since all these interaction terms were non-significant in some earlier regression runs, indicating that there is no differential effect of certification according to type of school attended, it was decided not to include them in the reported regression results.

Interaction terms were added to examine for any differential effects on earnings according to type of school attended, within the various economic sectors and occupational groups. Again, since all of these additional interaction terms proved to be insignificant, and the other coefficients were in line with those shown in regression (2), we do not include these regression results in Table III.

In regression (3) we take account of the possibility that both human capital variables—YRS.SCH and EXP—may exert a differential effect according to type of schooling. As vocational secondary schools are more job-oriented, it is possible that each year of vocational schooling (where more technical skills were received) and each additional year of experience (during which these skills are put to use) may have more impact on productivity and hence on earnings. To test for this, we introduce in regression (3) two additional interaction terms: VOC\*YRS.SCH and VOC\*EXP. The regression (3) results suggest that the effect of years of experience on earnings is stronger for vocational-school completers, although by only an additional 0.3% above the return of 2.9% on a year of experience for academic-school completers. The impact of schooling is significantly stronger for vocational-school completers only at a significance level of 0.10%. The overall conclusion is that for those who attended vocational schools human capital traits do have additional, though limited, market value [13].

### *Training Costs*

Overall, the foregoing regression results suggest that the earnings of individuals terminating formal education at a vocational secondary school do not differ from (and clearly do not fall short of) the earnings of academic secondary-school completers. This result, indicating similar economic outcomes for the two types of schooling, does not necessarily imply a clean bill of health for vocational schools. At issue is not the comparative economic outcomes of vocational and academic schools as such, but rather these outcomes in relation to costs.

While reliable information on the costs of secondary vocational and academic schooling in Israel is lacking, a preliminary attempt at measuring comparative costs is made in Table IV. Based upon official estimates of national expenditure on academic secondary schools and on vocational and agricultural schools, respectively, the table shows the ratio between national expenditure per pupil in vocational and academic schools (column 5). Only for the first two budget years of available data (1969–70 and 1970–71) is the ratio larger than unity; henceforth it is generally less than one. This indicates that vocational education (on average, though not necessarily in particular subjects, such as electronics) is the less expensive—for recent years, by over 10% and for the most recent year (1984–85) by about one-quarter.

These results may occasion some surprise. Available international evidence shows a cost advantage to academic schools. In Israel, too, the view is widely held that such factors as higher equipment costs and smaller class size in vocational schools (23.4 pupils per class compared with 31.9 in general schools in 1986–87) place such schools at a cost disadvantage (per pupil) of up to one-third, in comparison with general schools. Against this, the national expenditure estimates include the costs of boarding (thought to be more prevalent for general-school pupils) and the teaching staff in the vocational school sector is formally less qualified, leading to lower (salary-related) costs in these schools; again, vocational schools are

TABLE IV. National expenditure per student (vocational and academic secondary schools)

Year	National expenditure		National expenditure per student		
	Academic schools	Vocational schools	Academic schools	Vocational schools	Ratio (4)/(3)
	(1)	(2)	(3)	(4)	(5)
1969/70	115	114	1.80	2.51	1.39
1970/71	125	164	2.10	2.67	1.27
1971/72	201	208	3.67	3.09	0.84
1972/73	268	236	4.88	3.35	0.69
1973/74	365	357	6.75	5.06	0.75
1974/75	466	477	8.12	6.76	0.82
1975/76	588	678	10.46	9.50	0.91
1976/77	861	1007	15.16	14.05	0.93
1977/78	136	166	2.38	2.30	0.97
1978/79	224	289	3.89	3.95	1.015
1979/80	474	563	7.70	7.43	0.96
1980/81	1143	1325	17.86	16.88	0.915
1981/82	2862	3108	43.26	38.54	0.89
1982/83	6447	6853	91.69	83.98	0.92
1983/84	18,892	18,892	253	223	0.88
1984/85	117,172	102,882	1518	1152	0.78
1984/85*	129,758	116,080	1772	1300	0.73

Expenditures on education are expressed in current prices:

1969/70 to 1976/77 in millions of Lirot,  
1977/78 to 1982/83 in millions of Shekel,  
from 1983/84 in thousands of new Shekel.

Expenditures per student:

1969/70 to 1976/77 thousands of Lirot,  
1977/78 to 1982/83 thousands of Shekel;  
from 1983/84 new Shekel.

\* New series.

Source: Statistical Abstract of Israel.

of larger average size than general schools. These factors may underlie the relatively low vocational schooling costs recorded in Table IV. Finally, the exclusion of depreciation on buildings and equipment from official educational expenditure estimates may have biased the estimates presented in the table in favour of vocational schools; however, the new series introduced in 1984-85, which includes depreciation, has resulted in a *widening* of the gap between measured vocational and general school costs.

However, the lack of detailed cost figures represents a serious gap in our knowledge. Much work is needed on the estimation of unit costs in Israeli secondary schools, based on detailed expenditure of a sample of academic and vocational schools (including both one-track and comprehensive schools). The findings from such research, when available, may necessitate reconsideration of the results in Table IV. Meanwhile, taken at face value the relative cost estimates, together with the regression results reported earlier, do suggest that vocational education in Israel is at least as cost-effective as academic education at the secondary level of schooling. This conclusion is strengthened when account is taken of additional outcome factors, to which we turn.

The two groups of individuals on whom this study focusses, academic and vocational secondary-school completers, are drawn from very different populations. Vocational school

pupils differ from their academic secondary school counterparts in a number of ways. They tend to be of lesser academic ability, to come from a lower socio-economic background, to be more probably of oriental origin and to have parents who are less educationally qualified [14].

Since it was not possible to control for all of these factors in the regressions, our finding of equal earnings for the two groups may not imply equal secondary-schooling outcomes. In the absence of secondary schooling, those who attended a vocational school would be expected to earn less than their academic school peers: attendance at a secondary school will have resulted in a closing of the earnings gap between the two groups. In this case, the 'value added' factor of vocational schooling is greater than that of academic schooling, given the heterogeneity of the two groups.

Not only may the full earnings impact of vocational schools (which we are not able to measure in this study) exceed that of academic schools, but external effects, too, may be greater. In Section 1 we noted that the objectives of the vocational schooling system in Israel extend considerably beyond that of supplying skilled workers in the economy. These wider, equity aims include the provision of a *schooling* framework for less advantaged and lower-ability youngsters ('to keep them off the streets'), and also their integration into work and, at the age of 18, into compulsory military service. While again we are not able to put a price-tag on these social benefits, it is clear, particularly in the Israeli context, that they are real and tend to raise the underlying social rates of return to vocational education.

#### 4. Summary and Conclusions

This paper examines, for the case of Israel, the efficacy (in terms of labour market outcomes) of vocational school education in relation to that of the academic secondary school, for those not attending post-secondary schooling. Given the relatively small fraction of youth who attend, and complete, tertiary education in developing countries, the secondary-school-completer population not continuing into tertiary education plays an important role in economic development. Since vocational schooling in Israel is sizeable—with over half of Israeli secondary school pupils attending vocational schools or vocational streams in comprehensive schools—it is quantitatively far more important than in most other countries. Thus the Israeli setting seems to be a fitting one for a case study comparing the outcomes of academic and vocational schooling. It is hoped that this study contributes to a firmer basis for policy decisions concerning the appropriate role to be accorded to vocational education within the school system as a whole.

Using data from the 1983 population census, the study shows vocational schooling to be more cost-effective than general academic education. Since these results seem to be at odds with the predominantly held view (of economists) that vocational schooling is a socially inefficient form of education, particularly in relation to traditional academic schools, it seems appropriate to probe further this apparent discrepancy.

In the standard text on the economics of education, Mark Blaug discusses the usual distinction drawn between academic and vocational education in this way:

This distinction, which is actually grounded in the nature of the two curricula, is allowed to carry the implication that some education prepares students for the 'world of work' and some does not. All too frequently, however, those who have taken courses of study generally called 'academic'... reap substantial financial returns from their education, thus producing the paradoxical conclusion that academic education has a greater 'vocational' value than vocational education. The traditional distinction was developed by educators but the labour market has its own way of appraising qualifications. (Blaug, 1970, p. 247)

Indeed, a large number of cost-benefit analyses, based on labour-market earnings follow-up studies of vocational and academic secondary school completers, have shown that the higher costs of vocational-school education (as measured in these studies) are not offset usually by any positive or sizeable earnings differential accruing to vocational-school completers. The main thrust of all this research is to reveal general secondary schools as the superior social investment, thus giving some underpinning to the conventional wisdom referred to above.

However, these results must be interpreted with care. Particularly when the secondary-school enrolment ratio is sizeable, pupils in the two types of schools differ in background characteristics which in turn are correlated with earnings. Thus it is argued that in many countries academic secondary schooling provides access to tertiary education and more attractive life-chances than vocational schools. Competition for entry into academic schools leads to rationing of places on the basis of students' academic ability; social class and parental background also play a role. Unless these factors are controlled for in comparing the earnings of general- and vocational-school completers, biased estimates of the differential earnings effect will result. Studies reporting equal post-schooling earnings for the two groups may be masking very real differences in labour market outcomes favouring vocational-school completers. Differing ability-levels of vocational and traditional academic schools pupils raise serious problems in interpreting the results of many available studies evaluating vocational schooling, particularly in cases such as Israel, where the secondary-school enrolment ratio is relatively high.

This paper has reached conclusions with regard to the efficacy of vocational schooling (in comparison to academic) that are far more favourable than is the general thrust of the case-study literature on this issue. But before giving vocational schooling in Israel a clean bill of health, a note of caution should be sounded. While vocational secondary schools may be cost-effective in comparison with other forms of secondary schooling, they are *not* so in relation to alternative training modes for the skilled trades. In a recent study, one of the authors compared vocational schools in Israel with alternative non-formal training modes (notably the traditional apprenticeship and factory-based vocational schools). In this context, vocational schools were found not to be cost-effective. They constitute the most expensive skill-training mode, without offering any earnings (or productivity) advantage to vocational school completers over those from alternative training institutions (Ziderman, 1989). It was concluded that greater efficiency in the national training effort could be attained by a shift in the training effort away from vocational schooling, in the direction of more closely job-related training modes outside the formal education system.

Yet the national consensus in Israel on the importance of providing a *schooling* framework to undertake the role of social and cultural integration, referred to above, acts as a major constraint on the development of those training alternatives for youth that are the norm in other countries. Vocational secondary education remains the dominant provider of skilled workers for the skilled trades in Israel, issues of economic efficiency notwithstanding. The cost-effectiveness of vocational secondary schools in relation to academic ones, then, must be seen against this backdrop, as a very much 'second best' situation when the full range of educational and training programmes for youth are taken into account.

#### NOTES

- [1] These conclusions may need to be modified in the light of a World Bank study which is near completion and is based on more recent UNESCO data than those employed by Benavot. This shows, for more recent years, stability or a slight tendency for the vocational school enrolment to increase.
- [2] This literature has been reviewed in Zymelman (1976), Psacharopoulos (1987) and Tilak (1988). Two recent World Bank studies of vocational education in Peru (Moock & Bellew, 1988) and the Ivory Coast (Grootaert, 1988) confirm these results.

- [3] For a discussion, see Metcalf (1985).
- [4] This small group of countries includes Belgium and The Netherlands, Argentina and El Salvador: see UNESCO year book.
- [5] The first two columns in Table I contain some double-counting in the case of comprehensive schools, containing both general and vocational streams; each stream is entered as a separate school, to indicate the extent of the two forms of study. In 1986–87, there was a total of 516 schools, of which 173 (one-third) were comprehensive (multi-stream) schools. With the aim of facilitating social integration as well as building parity of esteem between the more élitist general and the lower-status vocational sub-sectors, comprehensive schools along the lines of the British model have become an increasingly prominent feature of the secondary-school system in Israel, with over 43% of secondary school pupils now attending comprehensive schools.
- [6] For a fuller discussion of these issues, the reader is referred to Kahane & Starr (1976). There is, however, a social cost involved in these policies. Non-formal training, though of limited scope in Israel, has been shown to be extremely cost-effective (see Borus, 1977; Ziderman, 1989).
- [7] The Ministry of Labour was left with residual responsibility only for disadvantaged youth on the margin who, unable to be absorbed within existing secondary schools, were accommodated in non-formal training systems carrying low social status; these included formal apprenticeships and factory-based industrial schools.
- [8] In fact, individuals who had concluded other forms of vocational training for youth, notably the formal apprenticeship and industrial schools, were also included within the category of vocational school completers; also included were those who attended agricultural secondary schools. However, these groups constitute a small and declining proportion of vocationally educated students.
- [9] On specification and estimation of earning functions see Dougherty & Jimenez (1987).
- [10] The reason for taking the natural logarithm of the weeks and hours variables is that they are highly skewed to the left (most workers working 45 hours a week and 52 weeks a year). By taking the logarithm, the distribution becomes more symmetric.
- [11] If this variable appears to be significant, we should add up its coefficient multiplied by the average number of years of experience to the schooling coefficient in order to receive the whole effect of schooling. Similarly—in order to have the effect of experience we should add its coefficient, multiplied by the average number of years of schooling, to the experience coefficient (the results would be valid for the mean points).
- [12] A positive coefficient on the certification variables could also be interpreted as an indicator of credentialism, whereby educational certificates, as such, confer earnings benefits additional to those stemming from years of education.
- [13] There is another empirical result worth noting: when introducing VOC\*YRS.SCH and VOC\*EXP, in regression (3), VOC loses its significance. This means that the whole positive effect of vocational schools on earnings runs through the differential effects of the human capital dimensions.
- [14] The median number of years of parental schooling of boys in academic secondary schools is 10.6. Comparable figures for vocational-schooling tracks are as follows: metalwork, 7.8; automobile, 7.3; electricity and electronics, 10.0; fashion and tailoring, 7.4; hotel and tourism, 8.0 (see Bar, 1984).

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