

Fisher, Dennis U.

Working Paper

Highlights of the Economic Returns to BOCES Secondary School Occupational Education Investment

Staff Paper, No. SP 76-29

Provided in Cooperation with:

Charles H. Dyson School of Applied Economics and Management, Cornell University

Suggested Citation: Fisher, Dennis U. (1976) : Highlights of the Economic Returns to BOCES Secondary School Occupational Education Investment, Staff Paper, No. SP 76-29, Cornell University, Charles H. Dyson School of Applied Economics and Management, Ithaca, NY, <https://doi.org/10.22004/ag.econ.184814>

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<https://hdl.handle.net/10419/276485>

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HIGHLIGHTS OF THE ECONOMIC RETURNS
TO BOCES SECONDARY SCHOOL OCCUPATIONAL
EDUCATION INVESTMENT

by

Dennis U. Fisher

October 1976

No. 76-29

HIGHLIGHTS OF THE ECONOMIC RETURNS TO
BOCES SECONDARY SCHOOL OCCUPATIONAL EDUCATION INVESTMENT*^{1/}

by Dennis U. Fisher

The results indicated high positive returns to BOCES occupational education programs for both the individual and society when the training is viewed as a curricular option. In this short summary the purpose of the study is presented along with the more important empirical results and some additional facets of the study.

This research was initiated to develop a methodology for assessing the returns to occupational education (OE) and pilot test that methodology in a local BOCES. Only economic benefits were measured. Social and other benefits to OE were not included. Thus this study represents only a partial assessment of program returns. For benefits, the study measures the amount of average individual income attributable to OE. The sample of OE students (121) and non-OE students (121) was taken from the Broome-Tioga BOCES and six cooperating local high schools (classes of 1973 and 1974) and was designed to be representative of this area. However, the sample was not designed to be representative of the entire state system.

The returns are presented below using two different measures, "rate of return" and "net present value". Net present value is calculated by discounting the costs and returns at an annual rate of 10% over the indicated

* These highlights are taken from the report "The Economic Returns to BOCES Secondary Occupational Education Investment" by Dennis U. Fisher, Steven Klees, Douglas Pachico and Daniel Tobin, Cornell Institute for Research and Development in Occupational Education in Cooperation with Office of Occupational Education, New York State Education Department, 1976.

^{1/} Presented at a Public Hearing of the New York State Senate Standing Committee on Labor titled, "Occupational Education in New York State's Secondary Schools; Is It Meeting the Needs of Our Youth as Future Job Holders and of Our Businesses and Industries as Their Potential Employers?" October 15, 1976, Rochester, New York.

time period. A positive result indicates that economic benefits exceeded costs after discounting and the size of results indicates the value of those future net benefits today. The rate of return is the discount rate at which costs equal benefits. Or it can be viewed as the percentage return on the investment represented by the costs. Returns are presented below from three different perspectives: the individual student, society and New York State as a tax collecting body.

What was BOCES OE curriculum worth to individual students? The table shows that the net present values of the increased income estimated from our two years of data ranged from \$2,575 to \$11,250. Three different options regarding the duration of income benefits are presented - 1) constant benefits over the 47 year working life, 2) benefits declining linearly to zero after 9 years and 3) benefits declining linearly to zero after 5 years. Costs of supplies, transportation, etc. are assumed to be zero, i.e., no different than the costs for non-OE students.

What was the investment in BOCES OE worth to society? The table indicates returns on investment ranging from a low of 7.8% to a high of 48.5%. Returns are higher if one assumes that the local high school costs are 25% lower than would have been the case in the absence of BOCES. For case (a) the costs include local BOCES costs minus 25% of local HS costs assuming the existence of BOCES reduces local HS costs by this amount. Case (b) includes total BOCES costs assuming no effect on local HS costs. The returns for the 1973 class were greater because the costs of the program were lower. The lower costs resulted primarily from using an older, less expensive facility prior to the 1972-73 school year.

Does BOCES OE generate sufficient additional income to return the State's tax dollars spent on the program? No. In most cases the additional tax revenue generated by OE stimulated income was not sufficient to return the

tax dollars invested by the State. There was an exception; for the class of 1974 the increased taxes generated represent a 4% return on the State taxes invested assuming a 47 year duration of income benefits. Notice at a 10% rate of discount the net present value of the investment is negative for all cases presented. Caution should be exercised when interpreting these returns of the State's tax dollars. The benefits were limited to increased tax revenue ignoring other non-economic benefits and the benefits of increased economic activity.

In general these results are probably an underestimate of OE program benefits to society and the State because non-economic benefits are not considered and the additional economic activity generated by the increased income is ignored.

Returns and Present Value of BOCES
OE Program - Broome-Tioga BOCES

	<u>Duration of Income Benefits</u>					
	<u>----- 1974 Class -----</u>			<u>----- 1973 Class -----</u>		
	<u>5 Yrs.</u>	<u>9 Yrs.</u>	<u>47 Yrs.</u>	<u>5 Yrs.</u>	<u>9 Yrs.</u>	<u>47 Yrs.</u>
Net Present Value ^{1/} to Individual	\$2,575	\$3,972	\$11,250	Same		
Rate of Return ^{2/} (Case a)	21.0%	32.2%	42.9%	28.6%	38.8%	48.5%
to Society (Case b)	7.8%	20.2%	32.7%	12.7%	24.3%	35.9%
Rate of Return to State of NY	Neg.	Neg.	4.0%	Neg.	Neg.	Neg.
Net Present Value ^{1/} to State of NY	-\$826	-\$776	-\$514	-\$748	-\$698	-\$436

^{1/} Both costs and benefits were discounted at 10% annual rate.

^{2/} Case (a) assumes that the local high school costs are reduced by 25% per BOCES student because of the OE program. Thus the costs for Case (a) are full BOCES costs per student minus 25% of local HS costs. The costs for Case (b) are full BOCES costs per student.

There are some additional facets of the study which relate to the empirical results presented. First the costs of the OE program were computed from an economists perspective rather than on a cash flow basis. Those costs, which represent goods or services used within a year, were counted as a direct cost to OE. Other costs of equipment, building, etc. were converted to annual equivalent costs by amortizing the asset over its useful life at a 10% interest rate. General overhead costs were allocated on a per student basis.

Second, the empirical results presented here consider OE as a curricular option rather than as a deterrent to dropping out of school. For some students OE may be such a deterrent. Where this is the case the costs of staying in school and taking OE for the individual and society must be increased by the earnings the student is giving up while he is going to school. Foregone tax revenues from these earnings must be considered from the State's perspective. To the extent OE is a drop out deterrent, these added costs must be considered along with the non-economic benefits which may be generated by keeping the person in school.

Third, the benefits calculations involved a more comprehensive accounting of economic benefits than has been accomplished in previous studies.^{2/} The model was designed to account for the direct income benefit generated by OE and the added benefit of taking a job related to OE training. In addition account was taken of the benefits which would accrue from the effect of OE on other factors such as high school graduation, increased work experience and added post high school training. Only the added income from additional post high school training was statistically different from zero at the 10% level

^{2/} The benefits were estimated with a model based on human capital theory utilizing an earnings function equation within a simultaneous equations multiple regression system. For a complete description of the model, refer to the technical report.

of significance. Fourth, the comparison group was chosen to include non-OE students of academic ability similar to our OE group. Ideally one would like to know what OE students would have earned if they had not taken OE. We attempted to come as close to this ideal as possible. Using several standardized academic tests we attempted to choose students whose likely alternative was OE.

One final point has to do with the duration of income benefits. Other studies have found or hypothesized that income benefits from OE would decline to zero very quickly - 6 to 10 years. Informational obsolescence could cause a decline over time. However, one could argue that a student having found OE to be profitable would be more inclined to update his training than someone without this positive experience. Arguments can be generated on both sides of this question. Our empirical results exhibited an increasing income benefit over the two years studied. The first year the income benefits were \$356 and the second year, \$1480. These results cover too short a time span to prove increasing benefits over time or disprove decreasing benefits. However, the results do emphasize the need to study this question further. Increasing benefits from OE would certainly increase the attractiveness of such investments.

The material presented here has been a sketch of the findings described in the research report cited at the beginning of the summary. Consult the technical report for additional discussion of the methodology and findings.