DOCUMENT RESUME

ED 059 670 HE 002 833

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TITLE College Impact Studies: Hampden County and Amherst, Massachusetts.
INSTITUTION New England Board of Higher Education, Wellesley, Mass.
PUB DATE 71
NOTE 86p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Community Relations; Community Study; *Economic Climate; *Economic Education; *Higher Education; *School Community Relationship; *School Industry Relationship

ABSTRACT

This is the report of 2 separate studies, bound under 1 cover, to determine the economic impact of higher education institutions on the areas they serve. The first study takes into account the impact of the 5 colleges in Hampden County, Massachusetts. The second deals similarly with the impact of certain institutions on the Amherst, Massachusetts area. The studies take into account the amount of educational activities afforded to the areas, the local business volume, the number of jobs attributed to the presence of the colleges, the personal gross income of individuals attributed to the presence of the colleges, and the expansion of credit by local banks due to the presence of the colleges. (HS)

NEW ENGLAND BOARD OF HIGHER EDUCATION

STUDENT INTERNSHIPS IN ECONOMIC DEVELOPMENT PROGRAMS

1971

COLLEGE IMPACT STUDIES

Hampden County and Amherst, Massachusetts

Lower Pioneer Valley Regional
Planning Commission

SPONSORING AGENCY

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Foreword

This report represents the work of a student or students in the New England Board of Higher Education's (NEBHE) Student Internship in Economic Development (SIED) program. The objective of this program is to relate the resources of institutions of higher education to economic development organizations in such a way as to:

- o assist economic development organizations in the investigation and solution of selected, well-defined problems through the use of student manpower; and
- o permit students to enrich their formal learning through concrete service experience in economic development.

This program thus represents one component of NEBHE's continuing effort to assist the New England State governments and the public and private institutions of higher education in their effort to expand the quantity and quality of educational opportunity. The New England Board of Higher Education was created in 1955 by a six-state compact and ratified by Congress. It is thus the official regional agency of these states for this purpose and related functions.

Major financial support for the Student Internship in Economic Development program came from the New England Regional Commission (NERCOM).

The findings, conclusions and recommendations contained herein are those of the author(s) and do not necessarily represent those of the local organizations, participating universities, NERCOM, NEBHE or the SIED staff. They are in effect, the students' contribution to the continuing processes of economic and social growth in the New England region.

Major support for the Student Internship in Economic Development program was provided by the New England Regional Commission.

This report is in fact two separate studies, bound under one cover.

Part I is the work of Noemy Wachtel and is concerned with the impact of 5 selected colleges in Hampden County, Massachusetts.

Part II is the work of John S. Morehouse and deals similarly with the impact of certain institutions of higher education on the Amherst, Massachusetts area.

PART I

The Impact of Higher Education on Hampden County in 1970 and the Future

by

Noemy Wachtel

Sponsoring Agency

Lower Pioneer Valley Regional Planning Commission

September 1971

PREFACE

This report, The Impact of Higher Education on Hampden County, covers all the towns in Hampden county even though the colleges under consideration[1] -- American International College, Holyoke Community College, Springfield College, Springfield Technical Community College, and Western New England College -- are all located in the Springfield SMSA (Springfield-Chicopee-Holyoke), because the entire Hampden county is affected by the presence of the colleges.

The application and analysis of the impact model could not have been completed without the cooperation of the administrators of all the colleges involved. Their assistance in filling out my questionnaire is hereby acknowledged. Additionally, the staff of the Lower Pioneer Valley Planning Commission and the academic counselors provided valuable help throughout the project.

Finally, a special acknowledgement is accorded to Mr. George Boyle (LPVRPC planner) for his assistance and advice in the field of demography and in the use of the 1970 Census. In addition I would like to thank Prof. Robert Plattner for guiding me in the preparation of the final report.

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[1]Westfield State College was contacted and asked to participate in this study, but due to a very burdened calendar they were unable to take part in the study.

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Part I

INTRODUCTION

The purpose of this study is to calculate the impact of higher education on Hampden county, focusing primarily on the economic aspects. The area under consideration includes all those towns located in Hampden county, Massachusetts. Occasionally, it is necessary to limit descriptive analysis to several cities and towns located in the Springfield-Chicopee-Holyoke Standard Metropolitan Statistical Area (SMSA). The part of the Springfield-Chicopee-Holyoke SMSA under consideration is located in Hampden county. This area includes the following cities and towns all located in Hampden county: Springfield, Chicopee, Holyoke, West Springfield, Westfield, Agawam, Longmeadow, East Longmeadow, Wilbraham, Ludlow, Palmer, Monson, Southwick and Hampden.

The five colleges included in the study are all located in the Springfield SMSA. This is an urban setting for the colleges involved. See Appendix I for a map of the area indicating the location of the five colleges. The colleges included in the study fall into two categories: private and public colleges. The following is a description of the five colleges compiled from a questionnaire submitted to the colleges and returned on completion to me. See Appendix II for a copy of the questionnaire used.

American International College - This is a private college which identifies itself as a liberal arts, teacher education, and professional-vocational oriented. It is estimated that approximately three-quarters of the student body is from the

New England region. The campus is located in Springfield. Presently there are 1900 full-time students at A.I.C. The school offers a number of courses in the evening and has a limited graduate program in Education, Business Education, and Human Relations. About one thousand of the full-time students are from the immediate area. There are also 3,000 part-time students enrolled at A.I.C.

Holyoke Community College- This state-operated junior college is a two-year institution. The college is located in Holyoke. The school offers evening programs and full-time day programs. The present enrollment is 2250 full-time students and 230 part-time students. The college is planning a $23 million expansion in West Holyoke on a 134 acre site.

Springfield College- This is a private institution offering a four year program in liberal arts, education, and in physical education; in this field the Master's and Doctor's degree are offered. The college is located in Springfield. Evening and graduate courses are offered, the latter limited to specific subjects. There are 1950 full-time undergraduate students and 256 full-time graduate students enrolled at S.C.; in addition there are 435 part-time students enrolled. Only a small percent of the student body is from the surrounding area (probably no more than 400 of the full-time student body). In the past three years

the college has spent $6.7 million on new construction and the total project should be completed by 1972.

Springfield Technical Community College- This school became a state community college in 1967 and added liberal arts courses to what had been a technical institution. Presently there are 2,200 full-time students who are all local residents. The school plans a $25 million expansion of the campus over the next five years. As a result, the school will be better equipped for solving the problem of increasing demands for higher education. The school offers evening courses to about 1,630 students, aimed primarily to meet the educational demands of local residents.

Western New England College- It is a private coeducational institution located in Springfield. The emphasis in course offerings has been on Business Administration and Engineering; recently a limited program in the Arts and Sciences has been introduced. The evening division offers the M.B.A. and L.L.B. degrees. Western New England is unique because its evening school enrollment is larger than the full-time day school. Presently there are 1,300 full-time undergraduate students and 2,135 part-time evening students. Only approximately 350 of the full-time student body comes from the surrounding community; on the other hand about ninety percent of the part-time student body is from the area. This represents a significant contribution to the educational opportunities in

Hampden county which will not be reflected in the overall data used in the model which are concentrated on full-time studies. A similar situation occurs with respect to the two community colleges which also have a significant part-time student body of 1,860 students.

The above description of the five colleges gives some indication of the type of educational facilities available in Hampden county. At this point I shall briefly describe the economic setting in which these colleges are placed; this description is essential in order to see the economic impact of the colleges in perspective.

In total the colleges have 1,471 faculty and staff, 9,856 full-time students, and an additional 4,277 people in the faculty and staff households. As will be shown later, most of these are residents of Hampden county which has a population of 459,050 people. There are 1,069 college faculty and staff children and 88 married students' children attending public schools in Hampden county, which is about 1% of the total number of students enrolled in Hampden county public schools.

Hampden county covers 625.02 square miles and the colleges occupy 0.74 square miles; on the other hand Springfield and Holyoke where all the five colleges are located cover 52.12 square miles. The total annual volume of retail, wholesale, and manufacturing businesses in Hampden county is $3.745 billion while the college related local business volume is

$30.73 million. The colleges have a payroll of $12.2 million and they spend locally $5.31 million which generates $30.73 million business volume. This figure does not seem very significant for Hampden county as a whole, but it is very significant for the Springfield SMSA where the major part of the expenditures is concentrated. Table I elaborates on the economic situation of Hampden county as it relates to the colleges. The table will illustrate in outline form the output of the model and compare the figures with county-wide data.

The methodology used in calculating the impact of higher education was supplied by John Caffney and Herbert H. Isaacs from the American Council on Education. These two gentlemen created the model and applied it to the Claremont community in California. [See Appendix III for a detailed description of the model and the sources of data used for the model]

The model is not well suited for this particular study because Hampden county is a much larger area than Claremont and is much more diversified economically than this small community in California. Hence, certain changes had to be made. Many of the national multipliers had to be adjusted for local variations.

TABLE I

HIGHLIGHT OF THE MODEL'S OUTPUT ON

THE IMPACT OF HIGHER EDUCATION ON HAMPDEN COUNTY

Local business volume:		$3,744,955,000	
College related local business volume:		$30,736,212	
Number of jobs attributed to the presence of the colleges:		3,121	
Personal gross income of individuals attributed to the presence of the colleges:		$21,638,360	
Expansion of the local banks' credit base due to the presence of the colleges:		$6,877,000	
Hampden county population:		459,050	
College related population:		13,135	-- 2.8% of total population
Hampden c. operation budget 1970:		$138,939,400	
For education:	$67,939,400 $148 per capita		
All other services:	$71,000,000 $154 per capita		
Operating cost of public schools allocable to college related persons:		$726,952	-- 1.07%
Operating cost of all other municipal services due to the presence of colleges:		$1,846,000	--2.6%
Total costs:		$2,572,952	-- 1.85 of county costs
Total public school students:		108,391	
College related P.S. students:		1,157	-- 1.067%

The model provided did not allow for the inclusion of the part-time student body. The questionnaire submitted to the colleges had to specify that only the full-time students are under consideration. This meant that often it was impossible to estimate how much of the full-time faculty and staff is devoted to serving the part-time student body (which is very significant for this area) and many of the municipal costs associated with the presence of the colleges are overstated. This will be discussed further, later on in the report.

Obtaining data from the 23 different town governments was very difficult because the town reports did not have all the categories I was interested in: such as the value of government property, or the total value of business property. Furthermore, there was very sparse data on a county-wide basis which slowed down the project considerably. The five colleges posed similar problems because they do not all keep uniform records; some have no separate records of salaries paid but only interdepartmental flows of funds. Hence, extracting the data from different ballance sheets and aggregating the figures required a certain amount of judgement. Nevertheless, most of the data is original and is based on the 1969-1970 academic year. The government data is from the 1970 Census and the 1970 Town reports.

ANALYSIS OF THE QUANTITATIVE AND QUALITATIVE CONTRIBUTIONS OF THE COLLEGES

The usefullness of the model lies in its ability to indicate the volume of business associated with the presence of the colleges, the costs in municipal services incurred by the local government due to the presence of the colleges, the revenues collected by the local government allocable to the presence of the colleges, and several other useful figures listed in the previous tables. All these figures show the purely quantitative relationship of the colleges with the surrounding community.

The model is not designed to go beyond a quantitative analysis; hence, I came to the conclusion that relying solely on the model to assess the impact of the colleges was insufficient. This model cannot assess the qualitative contributions of the colleges. To get some indication of the qualitative contributions of the colleges a supplementary questionnaire was submitted to the five schools. The colleges were asked to list the type of cultural and athletic activities they provided and the number of people attending each of these activities. It was hoped that such a list could give some indication of the number of people from the community benefiting indirectly from the presence of the colleges. The figures obtained from the schools are all aggregated (at the request of the colleges), hence, one cannot see how some schools contribute more than others.

The private colleges offer more cultural and athletic programs than the community colleges. The situation is such because the community colleges are still relatively small and only recently have they begun expanding their facilities. The following is a partial list of the qualitative contribution of the colleges; it indicates the major categories of activities and the number of community members attending each activity.

Activities		Attendance per Year
Library used by non-students		1,700
Cultural facilities - number of outsiders using the facilities and/or participating		15,750
Campus museum	3,700	
Campus auditorium	6,500	
Campus square dancing	2,050	
Campus arts and music	3,500	
Lectures and Seminars - outsiders participating		8,100
Newsletter subscribers		18,150
Reunion and athletic events		23,760
Conferences - the use of college facilities		1,060

The above gives some numerical indication of the qualitative contribution of the colleges. In addition, one cannot overlook the prestige associated with the presence of the colleges. The value of this prestige cannot be measured in dollars, nor can one measure in dollars the aesthetic

value of the college buildings themselves. As campuses expand there is a potential for further innovative architectural designs. The model cannot account for any of these qualitative contributions, yet one cannot ignore the significance of such contributions.

ANALYSIS OF COLLEGE RELATED MUNICIPAL COSTS

The model used to calculate the impact of higher education is a static model; it cannot be used for forecasting. Since it is a static model only one set of conclusions follow from a particular set of inputs. In this case, data from 1970 was used. No general ratios or relationships can be derived which might be applicable at some time in the future. As the colleges expand, a whole new set of data must be supplied to calculate the municipal costs, and the economic effects associated with the colleges. Furthermore, education may become more capital intensive in the future which means that fewer faculty and staff would be needed per student. This could mean an increase in the college-related business volume and a decrease in college-related municipal costs (provided the same percentage of the college budget is spent locally).

The output of the model indicated that municipal costs per capita are lower for college-related persons, that is $140 per capita, compared to the $154 per capita for the rest of the county population. (See appendix IV.) This difference in municipal costs might exist because a part of the college population only resides in the community for eight months. Also, the non-resident student body does not take advantage of several welfare benefits.

Besides the municipal costs associated with the presence of the colleges, there are public school operating costs associated with college-related families. It should be noted that the cost of providing public school services is not

peculiar to college-ralated persons. Any other enterprise in the community would make use of the school system to the same degree. That is, the employees of any industry send a proportional number of children to the public schools. The model indicates that the cost of operating public schools associated with college-related persons is the same as for the rest of the population, $148 per capita and an average of $627 per student. This figure indicates that the college faculty and staff children do not exert a greater per capita burden than the rest of the children.

In Hampden County there is a total of 1157 children attending public schools from households of faculty, staff and married students associated with the colleges; this represents 1.067% of the total public school enrollment. This small proportion does not place undue burden on the schools. These additional students do not precipitate overcrowding and a need for expansion of school facilities. Furthermore, they are well distributed in the Springfield SMSA.

College-related persons contribute considerably to the funds needed to run the schools. A very high percentage of the faculty and staff are homeowners (72%) which means they pay real estate taxes; (See Table II) these taxes are largely spent by the local governments on the public school expenses. In addition to financial contributions, college faculty members and their spouses often contribute to the public schools through counseling and teaching, much of which is uncompensated.

The presence of colleges in this area attracts a highly educated labor force in the capacity of faculty and staff. This is a very important contribution of the colleges. I am stressing this point because the mean school years completed by area residents is below the state and national level. The 1960 U.S. Census of General Social and Economic Characteristics indicated that the Springfield SMSA population had 10.9 school year completed, the Massachusetts population had 11.6 school years completed, and the U.S. population had 11.1 school years completed (these figures indicate the median school years completed - see Appendix V). Since 1960, the community colleges have greatly expanded which means that the median school years for the population probably increased due to the expansion of the educational facilities. (1970 Census data were not available when the report was completed.)

TABLE II

CALCULATING THE MUNICIPAL COSTS ASSOCIATED WITH THE FIVE SELECTED COLLEGES

Value of total government property:	$30,000,000
Value of public schools:	$100,000,000
Total:	$130,000,000
Value of local governments' properties allocable to college-related portion of services provided:	$1,880,000 -- 1.4% of total
Area of Hampden county:	625.02 sq. mi.
Area of Springfield and Holyoke: (excluding bodies of water)	52.86 sq. mi.
Area of the five colleges:	.74 sq. mi.
Total real estate taxes collected in Springfield and Holyoke:	$48,067,029
Total real estate taxes foregone through the tax-exempt status of the colleges:	$652,658
Value of municipal type services self-provided by the colleges:	$422,286
Actual cost to the county of the tax-exempt status of the colleges:	$230,372
College-related revenues recovered by local governments:	$895,357
Real estate taxes paid by colleges, faculty, and students:	$492,015
Other taxes payed by college, faculty and students:	$163,802
State aid allocable to the presence of the colleges:	$239,540

In an advanced technological society, the need for educational training is constantly rising. Despite the recent increase in college enrollment in the area, there is still a need for an increase in higher educational facilities to enable the area to catch up with the rest of the nation. The model fails to consider the community's need for the colleges in order to upgrade the population. In assessing the impact of higher education one cannot overlook that factor.

As discussed above, the presence of several colleges provides the population with educational opportunities. The presence of colleges also makes the area attractive as a potential site for highly technical industries. In this decade retraining is necessary for almost all technical skills, therefore, companies are highly sensitive to the presence of educational facilities. Recently, the Raytheon Company was planning to locate a plant in a small town in Maine, then dropped the plan because there were no educational facilities in the area for their employees. In this country the large and small companies alike take advantage of available educational facilities. This can be seen when one examines the evening school enrollment at the colleges. Approximately 85% of the evening students are either sent by their companies or are financed by them.

THE DEMAND FOR HIGHER EDUCATION

The demand for higher education in this area falls into two major categories: full-time and part time students. The private colleges try to meet full-time, out-of-state students' needs as well as the needs of local students. The curriculum offered by the private colleges is not diversified enough to satisfy the local demand. This is an area where the role of the community colleges should be enlarged. Community colleges should try to enlarge their evening programs in order to accommodate working students. Also, private colleges should attempt to expand their evening programs. In general the only advanced degrees given by the area schools are an M.B.A., LL.B., and Master's in Education. In view of today's educational needs, this selection should be expanded.

The paradox of education is that it is both a luxury and a necessity. When the municipal governments try to assess the financial burden of the colleges they are faced with a paradox. The cost of providing education has increased and the demand for educational facilities has increased even faster. In Hampden county, the demand for education has not been met. In 1970 there were 4,000 students who were turned away from local schools because of insufficient places. By 1975, after the colleges complete their expansion, 2,250 students will be turned away because of shortage of space. This might be remedied if the community colleges receive more financial assistance. By assistance, I mean they should not be taxed as long as they self-provide many municipal-type

services. This would require a small but significant contribution by the local government.

In the previous sections of the report I tried to point out the need for higher education by the area residents. I also indicated that there is a shortage of space for full-time students and that the evening division is too limited in curriculum. The colleges themselves are attempting to remedy this situation; the community colleges plan to expand by $48 million in new construction and the private schools are finishing a $4.1 million expansion plan. Will this expansion place an additional financial burden on the local government? The model used to calculate the impact of higher education cannot answer this question completely. The answer must consider factors beyond the scope of this model.

At present, the colleges comprise 2.8% of the total population and require 1.8% of municipal expenditures. The increase in size of any college leads to a slight increase in municipal costs because college-related persons will use the present level of capital and infrastructure more intensively. Few new municipal facilities will be needed because the present supply will be sufficient to accommodate the evening school students who are residents of the county. Hence, their college attendance does not present an additional burden on the municipal budget as out-of-county, full-time students might. Hence, the colleges that expand their daytime facilities can simultaneously enlarge their evening division without placing an additional burden on the local government. The colleges could use staggered hours and thus use their

facilities to a fuller extent without precipitating additional municipal costs.

The development of human resources is as important as the preservation of the environment or any other income-elastic program. Educational attainments and requirements are rising nationally; Hampden county cannot ignore these trends if it wants to be a competitive area for the computer industry and other technical enterprises. When the population is not well educated, the attractiveness of a region decreases and fewer growing industries locate in the area. Professor Robert Plattner points out in a report that this area's industries are in a time of change; there is a shift from low capital/labor intensive industries to high capital/labor intensive industries. For this trend to sustain itself, the local labor force must be well trained and there must be educational facilities for periodic retraining. This means that the schools should expand as suggested in this report in order to satisfy an increasing demand for education.

The output from the model indicated that the municipalities forego $230,372 due to the tax exempt status of the colleges. It seems to me that this is a very insignificant sum when one looks at the list of the qualitative contributions provided by the colleges. The municipal governments could not provide the same activities and aesthetic contributions for the $230,372 foregone in revenues. It is in this area that the colleges need local support to preserve their tax exempt status as long as they contribute by providing qualitative contributions.

The demand for education and for environmental amenities is a function of income and educational attainment. For example, there is little point in investing in open space if the area residents are not affluent enough to take advantage of open space. But they can be affluent only if they are trained for the future demands of the employment market. This leads back to the need for colleges in order to attain a high living standard which in turn leads to a demand for environmental amenities. Hence, the contribution of colleges must be assessed also in this long range manner in order to get some indication of the impact of higher education. The model is not suited for such an analysis, but such a study could be undertaken in a future project.

CONCLUSIONS

The purpose of the study was to determine the economic impact of higher education on Hampden county. We tried to point out where the model falls short in assessing the actual impact of the five selected colleges. For example, the five colleges as an "educational complex" are compared with all other enterprises in Hampden county. This illustrated the diminutive quantitative economic impact of the colleges because they comprise only 0.8% of the total local business volume. However, the five colleges are all located in the Springfield SMSA, thus their economic impact is much more significant on this smaller geographic area. To calculate the actual economic impact on the Springfield area, an additional study could be carried out along the lines of this impact study. This type of study could reveal the "exect" retail trade associated with the presence of the colleges, the expansion of bank credit, the municipal costs for the Springfield area, and the employment associated with the presence of the colleges. Such a study would be much easier to carry out than this county-wide impact study because data for the Springfield SMSA are readily available. The difficulty of data collection would not arise for this amaller geographic area as it did when twenty-three different towns had to be contacted. This was probably one of the most time-consuming parts of the Hampden county impact study.

The model created by John Caffrey and Herbert H. Isaacs

had several poorly defined areas which lead to some speculation. For example, the multipliers used for local expenditures were identical for students and faculty. This is not a realistic approach if a large portion of the students are from other communities and reside locally only during the academic year. Those who are not full-time residents spend higher percentage of their disposable income locally (during an academic year) than the full-time resident of the community. For Hampden county, a slight adjustment had to be made to account for this variation.

As already stated, the model includes only the full-time student body. This means that the model is not an accurate indicator of municipal costs (college related) because a large part-time student body is excluded from the sample. In the calculations carried out in submodel G-1. to G-5. there was no adjustment allowed to include the part-time student body. This means that for Hampden county, the municipal costs associated with the presence of the colleges are over-stated because the part-time students are not included. If they were included, the per-capita municipal costs would decrease by approximately 35% because these students use the college facilities and municipal services more intensively without increasing the operating costs. The similar cost situation arises when the colleges expand their facilities. That is, there will be a very slight increase in municipal costs as the colleges expand because many municipal services

are not used to capacity. Hence, the increase in the student body will mean a more intensive use of existing infrastructure with no increase in the municipal operating costs.

As a recommendation for future research sponsored by the New England Board of Higher Education, I suggest setting up a data bank at the Lower Pioneer Valley Regional Planning Commission. This would be very helpful for any type of future research because at present there is no uniformity in town reports. Also, there are many areas left unrecorded by the town reports, such as the value or real estate in different categories: government property, school property, business property.

Those who read this report are advised to read through the explanatory notes of the model when some clarification is needed. Additional sources of information are available in the appendix.

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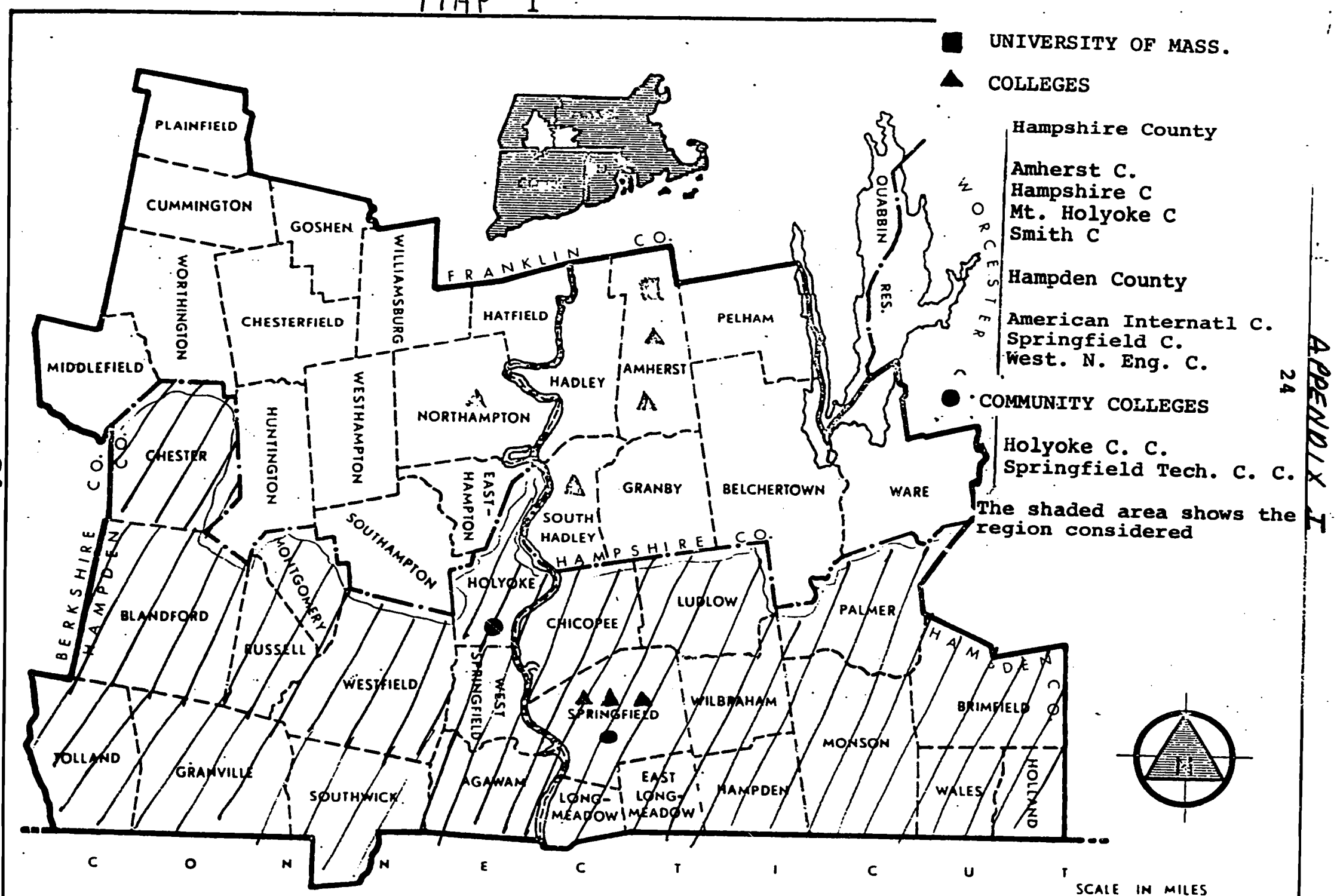
MAP I



■ UNIVERSITY OF MASS.

▲ COLLEGES

Hampshire County

Amherst C.
Hampshire C
Mt. Holyoke C
Smith C

Hampden County

American Internatl C.
Springfield C.
West. N. Eng. C.

● COMMUNITY COLLEGES

Holyoke C. C.
Springfield Tech. C. C.

The shaded area shows the region considered

SCALE IN MILES
5 0 5

LOWER PIONEER VALLEY REGIONAL PLANNING DISTRICT

T.R. FELLOWS JAN. 1970

APPENDIX II

Questionnaire submitted to the Five Colleges in Hampden county

Balance Sheet

A Salary paid to faculty, staff and students:

B Total college expenditures:

C Non-local college expenditures:

D Internal accounts transfer payments:

E Taxes payed to local government - all payments:

F Local college expenditures:

Faculty and Staff

A Total number of faculty and staff:

B. Number residing locally:

1) rent housing

2) own housing

C Non-local residents:

D Total disposable income of faculty and staff:

Students

A Number obtaining local room and board:

1) dormitories:

2) fraternities and sororities:

3) parents:

B Average expenditure per student of this type (exclusive of R.&.B.)

C Number of students renting local housing:

D Number of non-local students:

APPENDIX II

Visitors

A Number of visitors to the college:

B Number of expenditures and kind of expenditures done locally by each visitor:

Bank Balance

A Average time deposits by the college:

B Average demand deposits by the college:

Income received by college from the operating of local

A On campus enterprises:

B Off campus enterprises:

Geographic area of the college

A Campus size:

B Other college-owned property:

Value of municipal type services self provided by the college

A Police and Security:

B Sanitation:

C Street Lighting:

D Street Maintenance:

E Other Services:

APPENDIX II

Capital Expansion program - Volume

A How much new construction in the coming 3-5 years:

B Local companies:

C Non-local companies:

Qualitative Contributions

A Use of Library by community members:

B Cultural facilities, Number of outsiders using them:

C Lecture and Seminar attendance by outsiders:

D Newsletter subscribers:

E Reunions and Athletic events:

F Conferences - use of college facilities:

G Museum attendance:

Appendix III

VARIABLE	DATA SOURCES	
B-1. College-Related Local Business Volume	Sum of B-1.1, -1.2, -1.3	$30,736,212
• B-1.1. College-Related Local Expenditures	Sum of B-1.1.1, -1.1.2, -1.1.3, -1.1.4	$15,762,160
B-1.1.1. Local Expenditures by the College		
* $(a_L)_C$ = proportion of total college expenditures, excluding compensation, internal items, and taxes, that are local	College records	$5,309,708
E_C = total college expenditures	College records	.25
E_{NL} = college expenditures known to be nonlocal[a]	College records	$20,544,015
$W_{F,S}$ = Gross compensation to faculty, staff, and students	College records	$3,021,986
XF_C = Internal account transfers and payments	College records	$12,212,321
R_C = Taxes and other payments to governments	College records	$1,300
B-1.1.2. Local Expenditures by Faculty and Staff	Sum of B-1.1.2.1, -1.1.2.2, -1.1.2.3	$20,000
B-1.1.2.1. Expenditures by Faculty and Staff for Local Rental Housing		$5,016,022 X
f_L = proportion of faculty and staff residing locally	College records	$796,048 •
f_H = proportion of local faculty and staff who rent housing	College records, local planning studies, U.S. Census of Population	.97
DI_F = total disposable income of faculty and staff	College records	.28
e_H = proportion of a tenant's total expenditures likely to be spent for rental housing	Appendix A	$9,159,240
B-1.1.2.2. Local Nonhousing Expenditures by Local Faculty and Staff		.32
f_L = proportion of faculty and staff residing locally	See model B-1.1.2.1	$4,197,907 •
e_L = proportion of total nonhousing expenditures that an individual is likely to make in his local environment	Appendix C	.97
DI_F = total disposable income of faculty and staff	See model B-1.1.2.1	.75
$(e_{NH})_F$ = proportion of a consumer's total expenditures spent on nonhousing items	Appendix A	$9,159,240
B-1.1.2.3. Local Expenditures by Nonlocal Faculty and Staff		.63
f_L = proportion of faculty and staff residing locally	See model B-1.1.2.1	$22,065
F = total number of faculty and staff	College records	.97
$(E_i)_F$ = estimated average local expenditures by each nonlocal faculty and staff person	Questionnaire or judgment	1471
B-1.1.3. Local Expenditures by Students	Sum of B-1.1.3.1, -1.1.3.2, -1.1.3.3, -1.1.3.4, -1.1.3.5	500
B-1.1.3.1. Local Miscellaneous Expenditures, Exclusive of Room and Board, by Students Obtaining Local Room and Board in Group Arrangements or with Parents		$5,132,678
S_L = number of students obtaining local room and board from dormitories, fraternities, sororities, other groups, or parents	College records	$3,135,578
		8446

[a]Not used in this study. See note on model.

HOW TO WO

VARIABLE		DATA SOURCES	
$(E_m)_S$	= average expenditures, exclusive of room and board, per student of this type	Appendix D, college financial aid office, some judgment	$495
e_L	= proportion of total expenditures, exclusive of room and board, that an individual is likely to make in his local environment	Appendix C	.75
B-1.1.3.2. Expenditures by Students for Local Rental Housing			$555000
S_H	= number of students renting local housing	College records	1110
$(E_h)_S$	= average rental housing expenditures per student	Appendixes D and E	$500
B-1.1.3.3. Local Nonhousing Expenditures by Students Who Rent Local Housing			$1,365,300
S_H	= number of students renting local housing	See model B-1.1.3.2	1110
$(E_{nh})_S$	= average nonhousing expenditures per student	Appendixes D and E	$1700
e_L	= proportion of total nonhousing expenditures that a student is likely to make in his local environment	Appendix C	.75
B-1.1.3.4. Local Expenditures by Nonlocal Students			$76800
S_{NL}	= number of nonlocal students	College records	300
$(E_l)_S$	= estimated average local expenditures by each nonlocal student	Questionnaire or judgment	256
B-1.1.3.5. Local Expenditures by Local Fraternities, Sororities, and Other Student Living Groups			Not significant
$(E_{LGH})_S$	= expenditures by student living groups for local rental housing	Survey	
$(e_{LGNH})_S$	= proportion of nonhousing expenditures made locally by local living groups	Survey	
$(E_{LGO})_S$	= total operating and food expenditures of local living groups	Survey	
B-1.1.4. Local Expenditures by Visitors to the College			$303,752
V_n	= estimated number of visits to the college by visitors in the n^{th} category	College records, other sources, some judgment	$5 $10 $25 $40
$(E_n)_V$	= Estimated local expenditures by each visitor in the n^{th} category during each visit to the college	College records, other sources, some judgment	
1.2. Purchases from Local Sources by Local Businesses in Support of Their College-Related Business Volume			$11,033,512
m_p	= coefficient representing the degree to which local businesses purchase goods and services from local sources	Appendix B	.70
$L)_{CR}$	= college-related local expenditures	Model B-1.1	$15,762,160
1.3. Local Business Volume Stimulated by the Expenditure of College-Related Income by Local Individuals Other Than Faculty, Staff, or Students			$3,940,540
m_l	= coefficient representing the degree to which individual income received from local business activity is spent and respent locally	Appendix B	.25

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VARIABLE	DATA SOURCES	
$(E_L)_{CR}$ = college-related local expenditures	Model B-1.1	15,762,160
B-2. Value of Local Business Property Committed to College-Related Business	Sum of B-2.1, -2.2, -2.3	
B-2.1. Value of Local Business Real Property Committed to College-Related Business		$4,531,463
BV_{CR} = college-related local business volume	Model B-1	$2,640,000 ✗
BV_L = local business volume	U.S. Census Bureau	15,762,160
V_B = assessed valuation of local business real property	Local government	$3744,955,000
amv = local ratio of assessed value to market value of taxable real property	Local government	$300,000,000
B-2.2. Value of Local Business Inventory Committed to College-Related Business		.50
ibv = inventory-to-business-volume ratio	Appendix F	$1,891,464 ✗
BV_{CR} = college-related local business volume	Model B-1	.12
B-2.3. Value of Local Business Property, Other Than Real Property and Inventory, Committed to College-Related Business		15,762,160
OP_n = value of local business property, other than real property and inventory, of the n^{th} enterprise	Survey	Not available ✗
BV_n = business volume of the n^{th} enterprise	Survey	—
BV_{CR} = college-related local business volume	See model B-1	—
BV_L = local business volume	See model B-2.1	$15,762,160
B-3. Expansion of the Local Banks' Credit Base Resulting from College-Related Deposits		$3,744,955,000
t = local time-deposit reserve requirement	Federal Reserve Board or Local Bank	$6,800,100
TD_C = average time deposit of the college in local banks	College records	.05
TD_F = average time deposit of each faculty and staff person in local banks	Appendix G	$1,877,000
F = total number of faculty and staff	See model B-1.1.2.3	1,500
TD_S = average time deposit of each student in local banks	Appendix G	1471
S = total number of students	College records	50
d = local demand-deposit reserve requirement	Federal Reserve Board or Local Bank	9856
DD_C = average demand deposit of the college in local banks	College records	.13
DD_f = average demand deposit of each faculty and staff person in local banks	Appendix G	$1,407,000
DD_s = average demand deposit of each student in local banks	Appendix G	$300
cbv = cash-to-business-volume ratio	Appendix F	$50
BV_{CR} = college-related local business volume	Model B-1	0.037
B-4. Local Business Volume Unrealized because of the Existence of College Enterprises		$15,762,160
$(I_{BV})_C$ = income received by the college from the operation of local and on-campus college-owned business enterprises	College records	$3,815095
G-1. College-Related Revenues Received by Local Governments	Sum of G-1.1, -1.2, -1.3, -1.4	$3,815095
G-1.1. College-Related Real-Estate Taxes Paid to Local Governments	Sum of G-1.1.1, -1.1.2, -1.1.3, -1.1.4	$895,357
G-1.1.1. Real-Estate Taxes Paid to Local Governments by the College		$492,015
$(R_{RE})_C$ = real-estate taxes paid to local governments by the college	College records	$20,000
		$20,000

VARIABLE	DATA SOURCES	DI RI
G-1.1.2. Real-Estate Taxes Paid to Local Governments by Local Faculty and Staff		$381,715 *
F_L = number of faculty and staff residing locally	College records	1429 persons
f_H = proportion of local faculty and staff who rent housing	See model B-1.1.2.1	.28
pt = local property tax rate	Local government	0.07
V_{PR} = total assessed valuation of all local private residences.	Local government	$448,416,850
N_{PR} = total number of local private residences	Local government	84,631 homes
G-1.1.3. Real-Estate Taxes Paid to Local Governments by Local Fraternities, Sororities, and Other Student Living Groups		Not applicable *
$(R_{RE})_{Sn}$ = real-estate taxes paid to local governments by local student living groups in the n^{th} category	Survey	
G-1.1.4. Real-Estate Taxes Paid to Local Governments by Local Businesses for Real Property Allocable to College-Related Business		$90,300 x
pt = local property tax rate	See model G-1.1.2	.07
BV_{CR} = college-related local business volume	Model B-1	$15,762,160
BV_L = local business volume	See model B-2.1	$3,744,955,000
V_B = assessed valuation of local business	See model B-2.1	$300,000,000
G-1.2. College-Related Property Taxes, Other Than Real Estate, Paid to Local Governments	Sum of $(R_{NRE})_C$ and G-1.2.1, -1.2.2, -1.2.3	$163,802
$R_{NRE})_C$ = inventory and other nonreal-property taxes paid to local governments by the college	College records	none *
G-1.2.1. Nonreal-Property Taxes Paid to Local Governments by Local Faculty and Staff		$31,400 x
F_L = number of faculty and staff residing locally	See model G-1.1.2	1429
R_{OP} = total property taxes for other than real estate or inventories paid to local governments	Local government	$22 capital water charge $10,099,100
T_C = total number of local households	Local government	144,163
G-1.2.2. Nonreal-Property Taxes Paid to Local Governments by Local Fraternities, Sororities, and Other Student Living Groups		Not applicable *
$(R_{NRE})_{Sn}$ = nonreal-property taxes paid to local governments by the n^{th} local student living group	Survey	—
G-1.2.3. Inventory and Other Nonreal-Property Taxes Paid to Local Governments by Local Businesses for Assets Allocable to College-Related Business		$132,402 x
it = local inventory tax rate	Local government	.07
$(I_B)_{CR}$ = value of local business inventory committed to college-related business	Model B-2.2	$1,891,464
ot = local property tax rate for other than real estate or inventories	Local government	not available
$(OP_B)_{CR}$ = value of local business property, other than real property and inventory, committed to college-related business	Model B-2.3	Not available
I-1.3. Sales Tax Revenue Received by Local Governments as a Result of College-Related Local Purchases		None
st_{LG} = proportion of sales tax retained by local governments	Local government	none
		[if .20 is used then E 1-3 is 196,60.1]

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VARIABLE	DATA SOURCES	D R	
ST = total sales tax collected locally	College records, local government		$112,348,650
BV_{CR} = college-related local business volume	Model B-1		$15,762,160
BV_L = local business volume	See model B-2.1		$3,744,955,000
G-1.4. State Aid to Local Governments Allocable to the Presence of the College	Sum of $(R_A)_{PC}$ and G-1.4.1		$239,540
$(R_A)_{PC}$ = other state aid received by local governments on a per capita, service-unit, or tax-unit basis and influenced by the presence of the college, e.g., gasoline tax allocations, road maintenance subsidies (established on the basis of local conditions)	Local government		Not applicable
G-1.4.1. State Aid to Local Public Schools Allocable to Children of College-Related Families			$239,540
A_{PS} = total state aid to local public schools	Local school districts		$22,378,687
$(CH_{PS})_F$ = number of faculty and staff children attending local public schools	Appendix H		1069
$(CH_{PS})_S$ = number of students' children attending local public schools	Appendix H		88
CH_{PS} = total number of children attending local public schools	Local school districts		108,391
G-1.5. Other College-Related Revenues Collected by Local Governments			not available
$(R_O)_{CR}$ = other college-related revenues collected by local governments	College records, local government		
G-2. Operating Cost of Government-Provided Municipal and Public School Services Allocable to College-Related Influences	Sum of G-2.1 and -2.2		$2,572,952
G-2.1. Operating Cost of Government-Provided Municipal Services Allocable to College-Related Influences			$1,846,000 Y
F = total number of faculty and staff	See model B-3		1471
S = total number of students	See model B-3		9856
POP_{LD} = total local daytime population	U.S. Census Bureau, local government		465,550
FH_L = total number of persons in local faculty and staff households	College records or questionnaire		4277
SH_L = total number of persons in local student households	College records or questionnaire		8,858
POP_{LR} = total local resident population	Local government, U.S. Census of Population		459,050
B_M = local governments' operating budgets for all municipal services except public schools	Local government		$71,009,000
G-2.2. Operating Cost of Local Public Schools Allocable to College-Related Persons			$726,952 X
$(CH_{PS})_F$ = number of faculty and staff children attending local public schools	See model G-1.4.1		1069
$(CH_{PS})_S$ = number of married students' children attending local public schools	See model G-1.4.1		88
CH_{PS} = total number of children attending local public schools	See model G-1.4.1		108,391
B_{PS} = local governments' operating budgets for public schools	Local government		$67,939,400
G-3. Value of Local Governments' Properties Allocable to College-Related Portion of Services Provided			$1,880,000
$(OC_M)_{CR}$ = operating cost of local government-provided services allocable to college-related influences	Model G-2.1		$1,846,000

VARIABLE		DATA SOURCES	
B_M =	local governments' operating budgets for all municipal services except public schools	See model G-2.1	71,000,000
GP_M =	value of all local government property except public schools	Local government	30,000,000
$(OC_{PS})_{CR}$ =	operating cost of local public schools allocable to college-related persons	Model G-2.2	$726,952
B_{PS} =	local governments' operating budgets for public schools	See model G-2.2	$67,939,400
GP_{PS} =	value of all local government property associated with public schools	Local government	$100,000,000
G-4. Real-Estate Taxes Foregone through the Tax-Exempt Status of the College			$652,658
R_{RE} =	total real-estate taxes collected by local governments	Local government Springf + Holyoke	$48,967,029
$(R_{RE})_C$ =	real-estate taxes paid to local governments by the college	Model G-1.1.1	$20,000
G_C =	geographical area of the college	Local planning department, college records	.74 sq mi
G_L =	geographical area of the local environment exclusive of the college	Local planning department Springf + Holyoke 52.86	52.12 sq mi
G-5. Value of Municipal-Type Services Self-Provided by the College			$422,286
$(OC_M)_{SC}$ =	1. Police and security services	College records	$302,086
	2. Sanitation		51,300
	3. Street lighting		20,300
	4. Street maintenance		40,000
	5. Other services		8,500
I-1. Number of Local Jobs Attributable to the Presence of the College			3121
F =	total number of faculty and staff positions	See model B-3	1471
j =	full-time jobs per dollar of direct expenditures in the local environment	Appendix B	.00009
$(E_L)_{CR}$ =	college-related local expenditures	Model B-1.1	$15,762,160
$(OC_{M,PS})_{CR}$ =	operating cost of government-provided municipal and public school services allocable to college-related influences	Model G-2	$2,572,952
I-2. Personal Income of Local Individuals from College-Related Jobs and Business Activities			$21,638,360
f_L =	proportion of faculty and staff residing locally	See model B-1.1.2.1	.97
W_F =	gross compensation to faculty and staff	College records	$12,212,321
p =	payrolls and profits per dollar of local direct expenditures	Appendix B	.66
$(E_L)_{CR}$ =	college-related local expenditures	Model B-1.1	$15,762,160
I-3. Durable Goods Procured with Income from College-Related Jobs and Business Activities			$649,150
i =	proportion of total income typically used to purchase dursble goods	Appendix I	0.03
PI_{CR} =	personal income of local individuals from college-related jobs and business activities	Model I-2	$21,638,360

APPENDIX III

Worksheet for the Model

B1.1.2.1
$(E_m)_F = (F_L)\ (F_H)\ (Dl_F)\ (e_H)$

.2716x
2487649.5840 y.32
=$796,047.866880

B1.1.22
$(E_{NH})F = (F_L)\ (e_L)\ (Dl_F)\ (e_{NH})F$

.7275x
6663347.1000x .63
4,197,908.673

B1.1.23.
$(E_L)NLF = (1-F_L)\ (F)\ (E_l)_F$

.03 x F
44.13 x 500
22,065.00

B1.1.1.31
$(E_M)S - (S_L)\ (E_M)_S\ (e_L)$

8446 x 495
=4,180,770 x .75
3,135,577.50

B1.1.1.33
$(E_{NH})_S = (S_L)\ (E_{nn})S\ (e_L)$

1820400 x .75
=1,365,300.00

B1.1.3.4
$(E_l)_s$ = obtained by obtaining from college administration that $8.00 is spent a week by SNL

$256

B2.1 $(RP_B)_{CR} = \frac{BV_{CR}}{BV_L} \quad \frac{V_B}{amv} = \frac{15762160}{3744955000} \quad \frac{300,000,000}{.50} =$

.0043 x 600,000,000 = 2,640,000

B-3 $CB=(1-t)\ [TD_c \& (TD_f)\ (F) \& (TD_s)\ (S)] \& (1-d)\ [DD_c \& (DD_f)\ (F) \& DD_s)\ (S) \& (Cbv)\ (BV_{er})$

CB= (.95) [1,877,000 & $2,206,500 & 492,800] & (.87)

[1,407,000 & $441,300 & $492,800 & $583,200]

= (.95) (4,576,300) & (.87) (2,924,300)

= $4,255,959 & $2,544,141 = 6,800,100

G1.1.2.

$$(R_{RE})_F = [(F_L)\ (1-F_M)]\ [pt\ \frac{V_{PR}}{N_{PR}}] = [1429\ (.72)]$$

[.07(5,300)

= 1028.88 x 371 = $381,714.48

G1.1.4.

$$(R_{RE,B})_{eR} = (pt)\ (\frac{BV_{eR}}{BV_L}\ V_B) = (.07)\ (.0043)\ (300,000,000)$$

= $90,300 $22/cap.

G1.2.1

$$(R_{NRE})\ F = F_L\ (\frac{R_{op}}{T_e}) = 1429.22 - \$31,438$$

G 1.41

$$(R_A)_{CH} = A_{PS}\ \frac{(CH_{PS})_F\ \&\ (CH_{PS})_S}{CH_{PS}} = (22,378,687)\ (\frac{1157}{108,391.0107})$$

= $239,549

G 2.1

$$(OC_M)_{CR} = \frac{(\frac{F\ \&\ S}{POP_{LD}}\ \&\ \frac{FH_L\ \&\ SH_L}{POP_{LR}})}{2}\ (B_M) = \frac{11,327}{465,550}\ \&\ \frac{13,135}{459,050})$$

$$(71,000,000) = (\frac{.024\ \&\ .028}{2})\ (71,000,000) = (\frac{.052}{2})$$

(11,000,000)= 1,846,000

G 2.2. $(OC_{PS})_{CR} = [\frac{(CH_{PS})_F\ \&\ (CH_{PS})_S}{CH_{PS}}]\ (B_{PS}) = (\frac{1157}{10,8391.0101})$

(67,939,400) = $726,952

G3.

$$GR_{ER} = [\frac{(OC_M)_{CR}}{B_M}]\ (GP_M)\ \&\ [\frac{(OC_{PS})_{CR}}{B_{PS}}]\ (GP_{PS})$$

$$= (\frac{17846,7000}{71,000,000})\ 30,000,000\ \&\ (\frac{726,952}{67,939,400})\ (100,000,000).$$

.026 x 30,000,000 .011 (100,000,000)

$780,000 & $1,100,000 = $1,880,000

G4.

$$(RE_{RE})_C = [R_{RE} - (R_{RE})_C] \left(\frac{G_C}{G_L}\right) - (R_{RE})_C.$$

$$= (48,067,029 - 20,000) \frac{.74}{52.12} - 20,000$$

$$= 48,047,029 \quad (\ )14) \quad - 20,000 = \$653,176$$

$$= 672,658 - 20,000 = \$652,658$$

I.1.

$$J_L = F \& (j) [E_L)_{CR} \& (OC_{M'\,PS}) CR]$$

$$= 1471 \& (.00009) [\$15,762,160 \& \$2,572,952[$$

$$= 1471 \& (.00009) \times (\$18,335,112)$$

$$= 1471 \& 1650.16 = 3121$$

I.2.

$$Pl_{CR} = (F_L) (W_F) \& (p) (E_L)_{CR}$$

$$= (.97) (\$12,212,321) \& (.66) (\$15,762,160)$$

$$= \$11,235,335.32 \& 10,403,025.60 = \$21,638,360$$

I.3.

$$DG_{CR} = (i) (Pl_{CR}) = (.03) (21,638,360) = \$649,150.80$$

APPENDIX III

Calculations and Explanatory Notes for the Five College Study in Hampden County.

Some of the variables used are self-explanatory, and find no extensive description will be necessary. Also, the sources of the variables will be indicated next to the variables on the data/worksheet. Since the "Impact Study" of John Caffrey and Herbert Isaacs was used as a model, the format and the submodels will be the same. Only the sources of information will vary, in some cases considerably, due to the lack of aggregated data available for Hampden County. One particular town in Hampden County.

Model	Calculations and Explanatory Notes
B-1.1.1	
$(E_L)_C$	This factor can be obtained from a sampling study of vendor purchases analyzing the amount paid to local vendors. We were limited by time, hence, we asked the colleges to give us an estimate of their local purchases. The aggregate figure for the five colleges was then compared with the figure obtained when a .75 multiplier was used to double check the total obtined from the colleges
E_C	This figure was obtained from the business office of each college. Since there is no uniformity of bookkeeping at each institution, the help of the controller and/or other

officials was solicited. This figure then includes all types of expenditures - local as well as non-local.

E_{NL} This figure in some colleges was readily available, while in others it was estimated. Social Security payments, Insurance payments to non-local companies, technical equipment, books, etc.

$W_{F,S}$ Wages were obtained in different ways at all the colleges because the payment of funds is by departments and not by individual faculty salaries; that is, all departmental expenses were included in such transfer payments.

$S_{F,C}$ Only one college reported such a transfer payment. The other institutions said they do not engage in such practices.

R_C Only one college reported paying any taxes. Even this figure is estimated by the college as a high approximation.

Model
F 1.1.2.1.

f_L We asked the college administrators how many of the faculty and staff rent, and we derived our proportion in that manner. The nature of this area as well as the income group considered is such that there is a bias against renting, that is, most of the faculty-staff with families owned their own homes.

DI_F The gross wages were computed from college records. Tax deductions plus Social Security deductions were 20 percent.

Furthermore, all the colleges had their own pension fund which was an additional 5 percent; in all, 25 percent out of gross income gave us disposable income.

C_H This value was obtained from the 1967 Bureau of Labor Statistics report "The Standard of Living for an Urban Family of Four Persons" found in Appendix A of the "Impact Study". To test it applicability for the Hampden County, the 1970 Census Data on housing expenditure was consulted; there was little variations between the two figures.

Model B1.1.2.2

e_L This proportion was decided upon not by the use of a gravity-potential model, but rather, by judgement about the "closedness" of Hampden County. This county has a $3.7 billion business volume of which $842.2 million is retail trade, hence, the variety is very wide and the choice of .75 might even be on the low side.

Model B1.1.2.3

F The number was available from college records.

$(E_1)_F$ The number was taken to be $500 after college officials were consulted.

Model B1.1.3.1

SL This information was obtained from the registrar's office. There were no accurate records on off-campus students; hence, the figures might be off by roughly 100 students as far as living with family or renting local housing.

$(E_m)_s$ This figure of $15/week spent by a student of this

type was suggested to us by the college administrators interviewed.

Model B1.1.3.2

$(E_n)_S$ This figure was obtained by using local rent figures around the colleges as well as the guidelines given in Tables 7 & 8 of Appendixes D and E of the Claremont Study. Since most of the students renting housing were graduate students or seniors, the upper limits of the rent schedule were used.

S_H This information was obtained from the registrar's office along with S_{NL}.

Model B1.1.3.3

$(E_{nh})_S$ These figures were computed from the same source as $(E_n)_S$. For Hampden County, because the 5 colleges are located in urban centers, the figures were higher than for the Claremont study. For Springfield, it was estimated that a student needs from $2,000 - $3,000 to live off-campus, our figures add up: $500 & $1,700 = $2,200.

Model B1.1.3.4

$(E_1)_S$ This was obtained by questionnaires as well as by dividing the faculty expenditure by two $\frac{500}{2} = 250$ and averaging the two figures, $\frac{250 \text{ \& } 262}{2} = \$256$ a year.

Model B1.1.3.5

Since of the total 9856 student population, only 100 lived in fraternities, we decided it was not a significant element in our calculations (especially since we had only 10 weeks to work in.)

Model B1.1.4

There were roughly three categories of visitors; alumni, visitors-to-students, and visitors to events. All these categories were further divided into one-night, two-nights, and only day. The colleges were asked to supply us with what they observed as the average expenditure per day for these different categories.

Alumni	Parents-to-Students	Visitors to Events
3300 x $30 = $99,000	3600 x $30 = $108,000	792 x $30 = $23,760
57 x $60 = 3,420	750 x $60 = 45,000	193 x 60 = 11,580
225 x $10 = 2,250	800 x $10 = 8,000	225 x 10 = 2,250
$104,670	$161,000	$37,590

TOTAL OF THE THREE GROUPS IS $303,260

This figure does not include visitors to special performances or athletic events who are basically residents of Hampden County. The qualitative contributions of the colleges are enumerated and these figures are listed on page 9 of this report.

Model B1.2

mp The coefficient used here is higher than that used in the Claremont Study. The range was given in Appendix B of the Claremont Study and since this county is highly diversified, .70 was chosen as an adequate coefficient.

Model B1.3

mj This coefficient was chosen from the same source as mp and for the same reasons.

Model B2.1

BV_L According to the U. S. Census of Manufacturing 1967 for Hampden County, the value of shipments was $1,491,700,000. From the Census of Business, 1967, wholesale trade volume was $1,410,982,000. According to a publication by a local bank (Franklin Savings Bank) the retail volume for the year 1970 was $842,273,000. The 1967 wholesale and manufacturing figures were not updated for 1970 because the volume has not considerably increased in the past two years due to the recession as well as the out migration of several industries.

Hence, the total BV_L is $3,744,955,000.

V_B The assessed valuation of all property in Hampden County was obtained from State Reports - Massachusetts, Bureau of Census. This report did not indicate what percentages were private residences, or business, or government property.

Allocating dollar figures to these separate sectors took a great deal of judgement. Some of the 23 town reports were used as guidelines in deciding on approximate assessed values.

1) Residential - $448,416,850

2) Business - $300,000,000

3) Undeveloped - $315,981,120

Local Government - $30,000,000

School (Public) - $100,000,000

Colleges - $89,683,370

Churches - $36,000,000

THE TOTAL REAL ESTATE VALUE IS $1,320,081,340

amv This figure was obtained from several town assessors and averaged out as closely as possible to include the whole county.

Model B2.2

ibv This figure was obtained from Appendix F of the Claremont Study since there was no time to take a local survey.

Model B3.

t + d Were obtained by inquiring of the local banks.

TD_C +DD_C These figures were provided by the controller of the colleges. In some cases, Boston had to be contacted for permission.

TD_F + DD_F These figures were obtained from Appendix G of the Claremont Study. As far as time deposits are concerned, these figures are higher than in Claremont because for the past 12 months consumers have been saving 8 % of their income.

TD_S + DD_S These figures were obtained also from appendix G, the TD_S is higher here because most of these students are also influenced by the consumer austerity drive. Furthermore, the students in this sample are largely local in origin; hence, they keep larger accounts.

S This was obtained from college records and it represents full-time undergraduate and graduate students. In this area there is a very large part-time student population. Hence, the cost results obtained in this study will be in some cases overstated while in other cases understated because with present cost the part-time student population is also enjoying the college facilities.

cbv This was obtained from Appendix F of the Claremont Study.

Model B-4

$(I_{BV})_C$ This was obtained from the colleges' financial reports and includes dormitories, dining halls, college unions, book store, and any other enterprises.

Model G-1.1.2

$(R_{RE})_C$ Only one college paid any tax what-so-ever to the local government.

F_L Same source as f_L, Model B-1.1.2.1

pt This was obtained from the town assessors' offices. Again, an average was obtained for Hampden County because of great variation in tax rates as well as assessing practices, arriving at a suitable average was quite a task.

V_{PR} This can be seen on data sheet V_R that Residences = $448,416,850.

N_{PR} This was obtained from the 1970 Census listing the number of owner-occupied private residences for Hampden County.

Model G-1.2

$(R_{NRE})_C$ None was paid by any of the colleges asked. I am sure they would gladly disclose such a figure to avoid being "needled" for not paying taxes.

Model G-1.2.1

R_{OP} This was obtained by multiplying the average water charge per year, per family, by the number of families. Actually, the water charge is $22/capita which means $31,400 for college related.

T_e This was obtained at Lower Pioneer Valley Regional Planning Agency from 1970 Census.

Model G-1.2.3

it + ot This was obtained from the Town Assessor's office; ot was not used in this study.

Model G 1.3

st_{LG} This figure was not available in any definite terms; the tax collector's office told us that no portion of the sales tax is retained locally. When we asked them about refunds on the "Cheny Sheets", they said that none of the tax comes back.

ST This figure was estimated by multiplying BV by 3%. This submodel was not used in the study.

Model G-1.4

$(R_A)_{PC}$ This was ignored in the study.

Model G-1.4.1

A_{ps} This figure was obtained by updating the 1968 per capita state aide from $59.5 to $65. Of this, 75% is spent on public schools, which is $48.75 per capita. This multiplied by the population [459,050 x 48.75 = $22,378,687] yields $206 per pupil.

$(CH_{ps})_F$ We derived this by the following method. There are 1429 faculty and staff residing locally. The 1970 Census showed that there are 144,163 households and 127,519 children between the ages of 5 to 17 years. This means that there were .88 children per household of school age. Also significant is that 15% of school age children attend parochial schools, leaving 85% for public school. Hence,

$\frac{127,519}{144,163}$ x 1429 x .85 = 1069 public school students for faculty and staff.

$(CH_{ps})_S$ There were approximately 1100 students who were renting local housing, of these 550 were graduate students. Approximately half (275) were married and fifty percent (137) had children. That is 137 x .75 (school age) x .85 (Public schools) = 88 school age public school children.

CH_{PS} This was derived from the 1970 Census of ages 5 to 17 times .85 to control for parochical school attendance.

Model G2.1

POP_{LD} This was obtained from Lower Pioneer Valley Regional
+ POP_{LR} Planning Commission.

FH_L There were 1429 local faculty and staff members, 82 percent of whom were married; hence:

1429 x .82 = 1172 spouses

1172 x 1.43 children/couple = 1676 children

1429 + 1172 + 1676 = 4,277

SH_L There were 8446 local students plus 275 spouses plus 137 children which equals 8858 people in student households.

B_M This figure was obtained by updating a report, Public Funds: Sources & Uses, done for the LPVRPC. In this 1968 report government expenditures were $285/capita. We raised this figure to $302/capita. Also, this report stated that 45.7% of the funds are spent on public education. This percentage was raised to 46.5% and thus, total government revenues were: $138,939,400 - $67,939,400 = $71,000,000 all other.

Model G-2.2

B_{PS} Is obtained like B_M; it is \$148 per capita which means \$148 x 459,050 = \$67,939,400

Model G-3

GP_M See data sheet for V_B model B-2.1
(Actually it is \$30,000,000.).

GP_{PS} See data sheet for V_B
Actual value is \$100,000,000.

Model G-4

G_L All along the government data and all other data applied to the entire Hampden County. For a realistic calculation of the tax exempt status of the colleges, only the cities in which the colleges are located were taken into consideration. For a meaningful appraisal only the area of Springfield and Holyoke was calculated.

Springfield	31.7 sq. mi. land	(Water bodies are excluded)
Holyoke	21.6 sq. mi. land	
	52.3 sq. mi.	

R_{RE} The total R.E. taxes collected in these two cities is:

Springfield:	\$36,462,470	(Personal Tax is not included)
Holyoke	11,604,559	
	\$48,067,029	R.E. Tax

Since the value of the land differs greatly even in the city, the results of the calculation should be viewed with caution. The value of a college-held acre is approximately \$1,400 which is not an unrealistic price; this includes the developed as well as undeveloped college property.

G_C This area was obtained in acres from the colleges themselves and later converted into square miles.

Model G-5

This data was obtained from the colleges.

Model I-1

j This was obtained from the Claremont Study Appendix B.

Model I-2

W_F This was obtained from college records.

p The payroll and profits per dollar of local direct expenditures was obtained from the Claremont Study - Appendix B. This multiplier is possibly on the low side for Hampden County, but .66 is not much smaller than .70 as I would guess the actual multiplier to be.

Model I-3

i This is also a national figure of .03 provided in Appendix I of the Claremont Study.

APPENDIX IV

Per Capita General Expenditures
Lower Pioneer Valley Regional Planning District
Selected years 1958, 1964, 1968 updated to 1970

Per Capita Expenditures for All Municipalities

Category	1958	1964	1968	1971
General Gov.	11.86	14.61	17.09	
Public Safety	22.99	24.18	30.82	
Health-Sanit.	9.07	12.90	13.61	
Highways	22.40	20.94	22.66	
Public Welfare	23.69	32.22	38.37	
Veterans Service	2.71	3.10	4.15	
Education	60.88	100.15	130.41	148
Library	2.96	2.89	4.16	
Recreation	3.45	4.41	6.01	
Pensions	3.45	9.54	11.72	
Interest]	2.59	5.33	6.13	
			$285.13	$302

Source: Computed from Annual Town Reports by The Center for Business and Economic Research. From a report by Prof. G. Burok, Public Funds: Sources and Uses. The 1970 figures were derived from the town reports as well as the monographs issued by several towns.

Per capita municipal costs	$154	
Per capita school costs	$148	
Per capita municipal costs for college-related persons	$140	($1,846,000) / (13,135)

APPENDIX IV

Percentage Distribution of General Expenditures by Category of Municipality and by Function Lower Pioneer Valley Regional Planning District, 1968

Category	All Municipalities	Central Core	Satellite Cities	Suburban Ring	Rural Fringe
Total General Expenditures	100.0%	100.0%	100.0%	100.0%	100.0%
General Government	6.0	7.8	3.9	3.9	4.8
Public Safety	10.8	12.8	11.3	8.9	4.5
Health-Sanitation	4.8	6.3	3.0	3.6	1.2
Highways	8.0	6.5	5.8	8.6	17.5
Public Welfare	13.5	19.7	9.9	4.9	9.2
Veteran's Service	1.5	1.8	1.1	1.1	1.2
Education	45.7	33.3	56.3	60.9	56.7
Library	1.5	1.5	1.4	1.6	1.0
Recreation	2.1	2.4	1.3	2.2	1.1
Pensions	4.1	5.9	4.1	1.7	1.6
Interest	2.1	2.1	2.0	2.6	1.2

Original Source: Computed from data gathered by the Center for Business and Economic Research, Table. From a report by George J. Burok, Public Funds, March, 1970.

Note: Items may not add to total due to rounding.

APPENDIX V

EDUCATIONAL CHARACTERISTICS OF SELECTED CITIES AND TOWNS: 1960

Area	% of Persons 14-17 in school	% Persons 25+ compl high sch.	Median Sch. Yrs. Completed
United States	88.1	44.2	11.1
Massachusetts	87.5	47.0	11.6
Mass. SMSA's			
Boston	88.5	53.4	12.1
Brockton	89.3	47.1	11.6
Fall River	80.5	23.7	8.6
Fitchburg-Leom.	82.2	39.0	10.3
Lawrence-Haver.	86.0	39.9	10.4
Lowell	83.3	39.7	10.6
New Bedford	81.5	24.0	8.6
Pittsfield	91.6	48.6	11.8
Spring-Chic-Hol.	88.6	41.8	10.9
Worcester	88.0	41.7	10.8
Other Cities and Towns (LPV)			
Agawam	89.2	46.3	11.5
Amherst	97.2	74.1	13.3
Chicopee	87.2	34.4	9.9
Easthampton	94.2	29.9	9.3
East Longmeadow	93.2	61.0	12.3
Holyoke	87.4	35.7	9.8
Longmeadow	99.4	78.4	13.3
Ludlow	89.3	39.2	10.5
Northampton	91.6	40.7	10.8
Palmer	88.1	34.6	9.9
South Hadley	97.0	50.4	11.9
Springfield	87.8	41.8	10.9
Westfield	88.4	42.8	10.9
W. Springfield	93.7	49.2	11.8

Source: U. S. Census, General Social and Economic Characteristics, 1960.

PART II

Estimating the Impact of the Five Colleges on the Five College Area

by

John S. Morehouse

Sponsoring Agency

Lower Pioneer Valley Regional Planning Commission

Project Committee

Mr. D. M. Gossland
Mr. James A. Kane
Mr. Robert H. Plattner

September 17, 1971

Preface

This project was undertaken in fulfillment of a Summer Internship in Economic Development sponsored by the New England Board of Higher Education. Guidance of the project itself was provided by the Lower Pioneer Valley Regional Planning Commission in cooperation with the Center for Business and Economic Research of the University of Massachusetts at Amherst.

An expression of appreciation, much more than can be set forth on paper, for their patience and guidance is extended to the project committee of Mr. D. M. Gossland, Dr. James A. Kane, and Dr. Robert H. Plattner. Also special thanks to Dr. North Burn, Five College Coordinator, Mr. L. R. Morrell, Associate Treasurer of Smith College, Mr. John McDermott, Assessor for the Town of Amherst, Mr. Henry Tragle, a member of the tax study committee for the Town of Amherst, and Dr. Eugene E. Kaczka of the University of Massachusetts.

Unselfish contributions were also received from Mr. Kurt Hetzfeld, Treasurer of Amherst College, Mr. George B. May, Comptroller of Amherst College, Mr. K. Rosenthal, Treasurer of Hampshire College, Mr. Merrill Ewing, Business Manager of Mount Holyoke College, Mr. Ellis, Treasurer of Smith College, Mr. Gerald J. Grady, Business Manager of the University of Massachusetts, Mr. Ronald Fitzgerald, Superintendent of Schools for the Town of Amherst, Mr. John D. Tegley, Administrative Assistant for the Town of Amherst, Mr. John M. Buteau, Superintendent of Schools for the Town of Northampton, Mr. Ronald Astley, Assessor for the Town of South Hadley, Mr. Wallace K. Monroe, Assistant to the Super-

intendent of Schools for Business Affairs for the Town of South Hadley, as well as the many other individuals. Without their help, this study could not have been executed. The firsthand experience of meeting and dealing with the many key individuals who represented the institutions involved in this study was both challenging and rewarding. I am grateful for having had this opportunity and I am sure that this practical experience will serve me well in years to come.

I would like to extend special thanks to Mr. Norman Stein of the New England Board of Higher Education for making this summer's internship possible.

Respectfully submitted,

John S. Morehouse

Table of Contents

Highlights

The Five College Area proved to be exceptionally well-suited for the type of study outlined by the American Council on Education

College and university-related business volume represented 24.2% of the total business volume of the three towns involved.

The models presented in the American Council on Education outline were able to be computerized and needed less than seven seconds of computer time to process.

The outline provided a good approximation of college-related business volume, but proved vague and unclear on other points.

There exists a great potential for an improved economic impact study provided further refinements and standardization of techniques are incorporated into the existing outline.

The Amherst-Springfield area with its many colleges is an excellent location for testing an improved model.

Introduction

The measurement of gain or loss resulting from the location of an "economic system" in an area has in the past eluded quantification. This is primarily due to the lack of agreement as to which criteria to use for evaluation gain or loss, what gain or loss is, and how it is to be measured.

Opportunity costs, social costs, marginal costs all are within the realm of analysis, yet each has its own unique characteristics that seperate it from the others. The decision as to which type of analysis to use, what is to be analyzed, what constitutes specific sub-systems of the whole, etc. are purely arbitrary and completely at the discretion of the analyst. With such a wide amount of latitude, any hope for valid comparisons and conclusions between any two distinct studies seems to decrease as the sophistication of the study increases.

The scope of the original topic, "Measuring the Economic Impact of Higher Education Institutions on the Economy of Western Massachusetts", proved to be too broad and ill-defined for research and analysis within a twelve-week period. Everything from capital expenditures and the resulting accelerator analysis to consumption spending and the resulting multiplier analysis could have been covered, not to mention the qualitative aspects associated with each. Instead, Mrs. Wachtel and I chose to follow an outline prepared by the American Council on Education (ACE) entitled "Estimating the Impact of a College or University on the Local Economy". The publication proved

to be helpful in organizing our approach, standardizing methodology and output, and stimulating further thought on the topic. It was, and is not, however, the "cookbook" formula one at first might have assumed it to be. (See Appendix AM)

Objectives

As outlined in our proposal of June 18, 1971 (See Appendix AM), the main objectives of this study are:

1. To serve as a beneficial learning experience for the parties involved;
2. To relate academic disciplines to practical real life situations in both a constructive and beneficial way;
3. To obtain meaningful results that are of value to the sponsoring agency as well as the other parties involved;

It was also expected that the study would provide the following:

1. Data on the economic impact of higher education institutions on the local economy;
2. An enumeration and discussion of the qualitative impacts involved, but not quantified;
3. Meaningful feedback to the American Council on Education;
4. A permanent computer model to be used for easy updating of this study, with possible applications to other impact studies;
5. Comments and recommendations for expanding and for improving the study.

We believe that we have met all the objectives outlined above.

Description of Project Area

For the pruposes of our study, two seperate, yet similar analyses were undertaken. One study dealt with the economic impact of five colleges on what might by comparison be considered an urban county. This may be termed a macro view of the American Council's (ACE) outline. The other study focused on the impact of four colleges and one university on the less urbanized areas in which they are located. This may be termed a micro view.

The division of the study into two parts was made for several reasons, the most important being the different, yet quite distinctive, growth rate of the urban county (2.9%) versus the growth rate of a second county (9.1%) in which the four colleges and one university are located.[1] This, coupled with the rapid expansion of the university (which tripled its size in the last ten years) was the basis for the division, not the geographical consideration of county level. (See appendix AM)

The two seperate yet similar analyses provided:

1. A test of the applicability of the outline to both situations;
2. An opportunity to contrast the two situations;
3. The opportunity to test the models and certain of the variable values in a situation similar to that at Claremont.

Amherst College, Hampshire College, and the University of Massachusetts all located in the Town of Amherst, Smith College

located in the City of Northampton, and Mount Holyoke College located in the Town of South Hadley were studied for the micro analysis.

Amherst, Massachusetts is a relatively small community of approximately twenty-six thousand people. Its main industry is higher education. Northampton, Massachusetts is primarily a retail and wholesale trade center with a population of approximately twenty-nine thousand people. South Hadley, Massachusetts is primarily a bedroom town for Holyoke and Springfield with some agriculture. Its population is approximately seventeen thousand inhabitants. This area is indeed well suited for the type of study as outlined by the ACE publication and therefore the micro view was adopted.

Methodology

Given the American Council on Education's outline, it would have been easy to follow it and achieve results at the end of so many weeks. However, this procedure would not have produced the most valuable results. It was decided instead, to modify the procedure suggested by the ACE.

The first task was that of sorting the variables by source and defining each variable. This was accomplished by cross referencing Chapter Five of the outline and producing a listing for colleges and universities (See Appendix BM), local governments (See Appendix CM) and miscellaneous data. (See Appendix DM)

Nest, the list for colleges and universities was distributed with the help of Dr. North Burn, the Five College Coordinator, to key individuals at each institution. These individuals were asked to obtain whatever data they could within a given number of weeks.

Local government officials, as well as members of a town committee (established to "investigate the disproportionate cost in taxes to the townspeople of Amherst of maintaining roads, sidewalks, and other facilities because of the presence of the state university and its more than twenty-five thousand related individuals" (See Appendix SIM-Financial Committee Report, p. 26-27)) were interviewed to obtain the required data as well as an appreciation of their point of view.

In the meantime, the forty-seven mathematical models, developed by the ACE study, were put on the University of

Massachusetts time-sharing computer terminal system. This was done to expedite the calculation processes as well as to increase the time allotted for collecting data. With the computer program, less than seven seconds of computer time were required to execute all of the calculations. The program and output for the aggregate impact of the five colleges on the Five College area, as well as the combined impact of Amherst College, Hampshire College, and the University of Massachusetts on Amherst may be found in appendices EM, FM, and GM respectively. The impact of the two colleges and the university on Amherst was measured for the purpose of verifying and/or qualifying the variable values supplied by the ACE outline.

Copies of the program as well as these and other outputs are on file with the Lower Pioneer Valley Regional Planning Commission and the University of Massachusetts School of Business Administration for future reference and use.

Findings

Available data was collected and assembled in worksheet form (See Appendix HM). Necessary data that was not available was estimated. The results are as follows: (See Appendix FM)

1. College and university-related business volume amounted to $29,058,750 out of a total business volume of approximately $130,000,000, or 24.2%, for the three towns involved;
2. College and university related real estate taxes including payments in lieu of taxes, amounted to $6,174,840 out of an actual total of $12,966,730 or 47.6%;
3. Real estate taxes foregone through the tax exempt status of the colleges and the university amounted to a negative $40,030; i.e., the $6,174,840 payments indicated under part 2 represents $40,030 overpayment based on the land area of the colleges.
4. Operating costs of local government-provided municipal and public school services allocable to college and university-related influences accounted for $12,976,160 out of a total of $38,355,180 or 33.8%;
5. The value of local governments properties allocable to college and university-related portion of the total services provided equals $16,701,260 of an actual total of $49,920,280 or 33.5%, i.e. the capital investment (33.5%) is closely related to operating costs (33.8%);

6. The number of local jobs attributable to the presence of the colleges and the university account for the employment of 9,360 individuals; and
7. The personal income of local individuals from college or university-related jobs and business activities equaled $47,556,280.

From these facts we may conclude that higher education is indeed a major industry of the area. Furthermore, the outline provided by the Council points to the fact that while the four colleges and the university bear responsibility for approximately one third of the total operating (33.8%) and fixed costs (33.5%) of the local government services, they pay either directly or indirectly 47.6% of the total real estate taxes collected by local governments.

Regarding the qualitative aspects associated with the presence of the four colleges and the university on the towns in which they are located, the following comments prepared by Mr. L. R. Morrell, Associate Treasurer of Smith College, may be considered typical of all the institutions involved.

> The College offers several cultural programs to the community including various lectures, a concert series, plays, theatrical productions, art museum, etc. In certain instances, an admission charge is made to offset a portion of the costs. This for example, is true for the concert series. Lectures and other educational program events are open to the public at no cost.
>
> Several scholarships are offered to local residents who enroll in the College and attend class on a day-student basis. All local students are eligible to apply for such awards.

Since 1961, the College and the City of Northampton have conducted the Smith-Northampton Summer School. The six-week program provides an opportunity for area public, independent and parochial school students to participate in remedial and enrichment education during the summer. Approximately 5,000 students have participated in the Program since its beginning.

Smith College Library privileges are offered to local professional people such as attorneys, doctors, school teachers, etc. Other residents may utilize the Library resources through an inter-Library loan arrangement with the Forbes Library.

The College operates a Day School with classes from kindergarten through ninth grade. Enrollment in the School consists chiefly of students from the local community. Tuition payments cover approximately 50% of the cost of the educational program; the balance representing a College subsidy.

There are several one-time joint studies conducted by the City and the College. For example, an ecological study of the Mill River was recently undertaken.

One unique item should be mentioned here. In 1962, the University of Massachusetts built the Marks Meadow Laboratory School. This school is for area children as well as for training new teachers and testing new and improved teaching techniques. The entire cost of construction was completely absorbed by the University.

When we look at the output for the impact of Amherst College, Hampshire College and the University of Massachusetts on the Town of Amherst, Massachusetts (See Appendices GM and HM), we are able to make some observations about certain of the variable values supplied in the Council's outline. It should be noted first, however, that all of the variable values that appear in this study were either obtained from the colleges themselves, from the Council's outline, or by estimation. And, averages used in the five college and three college

studies are arithmatic averages ($\frac{EX}{n}$).

The following observations may thus be made:

1. The proportion of college expenditures that are local seem to be underestimated in the Council's outline. Specifically, Smith College keeps detailed records of local expenditures, and after gross compensation to faculty and staff and taxes are deducted from total expenditures, the amount works out to be 13.6% of the remaining expenses. A range of 5-12.6% was used for this study with a three-college average of 8.35%. (ACE estimate 6.5%)
2. For the University of Massachusetts, the proportion of faculty and staff that reside in Amherst was found to be 47.8%. This was determined by going through the university phone book indexing addresses. This might imply that the Council's equivalent value of 68.0% (based on 1,068 faculty and staff in a town of 26,300 residents) may be high. However, the total number of faculty and staff at the university is approximately 4,400 people out of 26,300 residents, which could well account for the lower proportion. A three college average of 61.25% residing in Amherst was used.
3. The proportion of faculty and staff that rent was taken at 33.8% rather than 31.5 as suggested in the Council's outline. A study done in 1967 by Dr. Dugene E. Kaczka of the School of Business Administration provided the source for this and other values (see

Appendix JM). Therefore, the Council's value of 31.5 % would seem to understate the percentage.

4. The proportion of non-housing expenditures that are local was taken at 34.5%. Again, Kaczka's study is cited. It is interesting to note that the value suggested in the Council's outline was 38.7%.

5. The value suggested by the ACE outline for RMP 1 (local business purchase of local goods and services - MP in ACE outline) appear low and high respectively. This may be because of the unique relationship between the size of the town and the aggregate educational institutions.

6. Given the above five observations, it is worth noting that college-related business volume (BVCR) for Amherst was $20,847,990, while the estimated total business volume for the town of Amherst is (derived from the 1967 Census of Business) $20,000,000. Thus, the BVCR figure for college-related business seems high. It whould be remembered, however, that the $20 million figure is one updated estimate and subject to some error.

7. Many of the models were not applicable to this particular situation or proved too vague for analysis within a twelve-week period.

8. Determining the value of local business real property proved difficult. Hence, an estimate was developed based on the total of all property in town, both business and residential, and total business volume

of the town.

9. In Model B-3 (Expansion of the Local Banks' Credit Base Resulting from College-Related Deposits), as suggested by the ACE outline, the total number of faculty and staff as well as the total number of students was used. This implies that everybody does their banking in the college town, whether they live there or not. A better approximation might have been obtained if F (the total number of faculty and staff) had been fultiplied by FL, the proportion of faculty and staff that are local. Also SL,(the number of students local) plus SH (the number of students renting locally) should be revised to reflect only those students who bank locally.
10. In model G1.1.2., Real Estate Taxes Paid to Local Governments by Local Faculty and Staff, the term FL is defined as the number of faculty and staff residing locally. This could be obtained by multiplying F, the total number of faculty and staff, times FL (fL in outline), the proportion of faculty and staff local. This and other examples may be cited to show a need for further refinement of the models.
11. In Model G1.4.1., State Aid to Local Public Schools Allocable to Children of College-Related Families, the dollar figures may be obtained from the "cherry sheets" of each town. However, the allocation of aid on a per-pupil basis assumes no block grants of fixed amounts. Also, county aid and/or regional

school district aid is completely omitted. To do justice to an analysis of this type, each and every state law referenced on the cherry sheet, should be reviewed to confirm that this type of allocation is justifiable.

12. In Models G2.1 and G2.2, the definitions for the operating budgets of local governments and public schools proved vague. With the unique type of accounting systems local governments employ, it is difficult to determine which items should be included and which excluded. Also there is a question of how debt service is to be treated.

13. Because of the limitations noted in point 12, the cost-benefit type analysis employed in Models G1. and G2. is of questionable value.

The above points are meant to be constructive criticisms of the Council's Outline and they do not appreciably reduce the value of the outline and the purposes for which it was designed.

Conclusion

The general feeling of many residents of the Amherst-Northampton-South Hadley area may be confirmed by this study. That is, that higher education is indeed a major industry in the area. But more important, if the basic logic of the Council's outline is assumed to be valid, and I believe the three college study confirms this, it is then possible to accurately measure the economic impact of a college or university on the town in which it is located. Furthermore, it is possible to apply the same technique and methodology to other institutions as well as manufacturing firms both large and small.

Amherst, Massachusetts proved an ideal test for the Council's outline. What took place this summer is a preview of what might happen if the proper resources were employed in developing and executing an improved study. Amherst is an ideal location for such an undertaking in that higher education is the main industry, and data is generally available. Expansion of the University over the past ten years provides an excellent opportunitiy for comparative statics analysis and the existence of several other colleges in the area provided an opportunity to test the techniques in another environment. Also, it was helpful that a number of individuals who are employed at the colleges and the university staff are a majority of the towns' committees.

Included in this report is most of the supplementary material obtained this summer (See Appendix KM). This was

done to give readers of the report an appreciation for the situation as well as some help should they be inclined to undertake a similar study. Another reason for including the supplementary material, most of which has not been incorporated into this Study, is that the volume of data proved so overwhelming for one person that it could not be fully utilized in twelve weeks that were available for the study.

Recommendations

The ACE outline proved to be of invaluable assistance in organizing our summer project. However, certain qualifications should be made:

1. The models might have been refined more so than they were. Specific examples of this were cited in the findings.
2. The models should be computerized for easier processing. A batch program should be developed instead of the time-sharing program used in this study.
3. The variables need to be defined as precisely as possible. This is necessary in order to make valid comparisons between studies.
4. A standardized computer program might be employed to process the returns from any questionnaires distributed. There are forty-seven mathematical models requiring seventy-two variable inputs. Twenty-five of these values may be obtained by questionnaires. Also, a four or five digit code might be used so that the results may be segregated by institution.
5. For cases similar to and including the situation at Amherst, an analysis should be done for each year of the ten years during which the University tripled in population from 6,300 students in 1960 to a little over 20,000 by 1970. This may prove very enlightning if a trend can be discovered by one of the several

forecasting techniques employed in business or elsewhere.

6. A standardized package might be developed that could be used in most situations to expedite this type of study. (See Appendix LM)

Footnotes

[1]Leon F. Bouvier, Higher Education 1970-1990, Report prepared for the Lower Pioneer Valley Regional Planning Commission, West Springfield, Massachusetts, February, 1970, (West Springfield, Massachusetts: Lower Pioneer Valley Regional Planning Commission, 1970), p. 11.

Appendix
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The following outline was prepared by Mr. L. R. Morrell, Assistant Treasurer, Smith College, Northampton, Massachusetts.

Financial Data
(Fiscal Year)

1. Total Operating Expenditures
   Less: (a) Property Taxes
   (b) Social Security Taxes
   (c) Fellowships and Stipends
   (d) Insurance Payments
   (e) Utility Payments
   (f) Annuity Payments

   Net College Expenditures

2. (a) Gross Salary Payments (excluding students)
   (b) Number of Full Time Employees
   (c) Average Salary (a ÷ b)
   (d) Number of Local Employees (Northampton & Florence)
   (e) Local Salary Payments (c) x (d)
   (f) Number of Non-local Employees (b) - (f)
   (g) Non-local Salary Payments (c) x (f)
   (h) Local Disposable Income - average Salary (c) x 75% x number of Local Employees (d)
   (i) Average Local Expenditures by Non-local Employees- Non-local Salary Payments (g) x 75% x 15%
   (j) Number of Employees' Children in Local Schools - Number of Local Employees (d) x Average Number of School Age Children (1.6)
   (k) Number of Persons in Local Faculty and Staff Households - Number of Local Employees (d) x 95% x Average Family Size (4)
   (l) Gross Salary Payments (including Students)
   (m) Gross Compensation (including Students) (l) x 115%

3. Total Local Expenditures
   (a) Total Net College Expenditures (1h)
   (b) Less: Gross Salary Payments (2a)
   (c) Net Non-salary Expenditures
   (d) Local Expenditures
   (e) Non-local Expenditures
   (f) Total Local Expenditures - (2e) + (3d)

4. Payment to Governments
   (a) Social Security Taxes (1b)
   (b) Property Taxes (1a)
   (c) Water Bills
   (d) Sewer Bills
   (e) Total Government Payments

5. (a) Number of Resident Students
   (b) Average Expenditure Per Student
   (c) Total Student Expenditures (a) x (b)

6. Local Expenditures by Visitors
   (a) Students in Residence
   (b) Percentage Having Guests
   (c) Average Number of Guests
   (d) Total Guest Days
   (e) Average Expense Per Guest
   (f) Sub Total Guest Expense ~~(2,277)~~
   (g) Visits by Applicants (applicants x 3 x $40)
   (h) Gross Local Expenditures by Guests

7. Value of Municipal-type Services Self-provided
   (a) Police and Security
   (b) Street Lighting and Maintenance
   (c) Hospital and Health Care (Mason Infirmary)
   (d) Total Value of Municipal Services

8. Capital Expenditures (Since 7/1/59)
   (a) Total Capital Expenditures
   (b) % to Local Contractors
   (c) % to Non-local Contractors
   (d) % on Plant
   (e) % on Equipment

9. Off Campus Students
   (a) Number Residing Off Campus
   (b) Average Expense Per Student - Rent
   (c) Average Expense Per Student - Other
   (d) Gross Off Campus Student Expense (a) x (b) + (c)

10. (a) Average Demand Deposits in Local Banks (1970)
    (b) Average Time Deposits in Local Banks
    (c) Total Bank Deposits (a) + (b)

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