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THE FINANCING OF HIGHER EDUCATION:
WITH SPECIFIC APPLICATION TO MICHIGAN

By

Glenn Lawrence Nelson

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ABSTRACT

THE FINANCING OF HIGHER EDUCATION: WITH SPECIFIC APPLICATION TO MICHIGAN

by

Glenn Lawrence Nelson

Two inter-related questions lie at the core of the issues addressed in this thesis: (1) what is the probable magnitude and distribution of future costs implied by alternative higher education policies? and (2) how should higher education be financed? The complexity of the issues is largely derived from the multitude of roles which higher education is presumed to have, but it is compounded by an inadequate understanding of the relationships among the important physical variables.

A review of the history of American higher education and of the roles recommended for colleges and universities by past and present influential spokesmen reveals important differences in many dimensions. However, disagreements related to the role of the higher education community as critics of society appear to be a central concern. Some argue that colleges and universities should facilitate the endeavors of external groups, others maintain that higher education should be insulated from outside pressures, a significant number of people support an active critical role for higher education, and a few believe that the higher education community should play a leading part in the overthrow of existing centers of power. The diversity in role orientation implies differences in organizational and financial links

between higher education and the remainder of society. Those who expect higher education to assume a facilitating role tend to favor clearly defined, responsive linkages. Others abhor any such linkages, while still others favor a diverse set of relationships consistent with a perceived pluralism of roles.

The statistical technique of multiple regression was used in two major analytic efforts. First, a study of aggregate undergraduate and graduate enrollments (analyzed separately) in Michigan in 1951-69 indicates that changes were associated with variations in the college-age population, number of people discharged from the Armed Services, income, and unemployment. Projections based in part on the statistically estimated parameters and in part on supplementary policy assumptions yield strong evidence that the growth in undergraduate enrollments will slow to a very small rate by the late 1970's.

Using the results of the above analysis plus more detailed data for 1965/66-70/71 in a second application of multiple regression, the impacts of tuition and student aid variables on enrollments were investigated. Increases in tuition at the public four-year institutions did appear to have a negative impact on enrollments; the evidence was inconclusive elsewhere. Two student aid programs administered by the State of Michigan seemed to be affecting enrollment patterns and possibly levels. There is very little evidence, however, that federal student aid programs had an impact on enrollments.

The final modeling effort required before policy alternatives could be analyzed was the development of a framework which enables estimates of future financial requirements to be computed, assuming alternative public policies and enrollments. The estimate can be

modified to reflect changes in the student-faculty ratio, faculty compensation, mix of institutions with respect to size, relative program emphasis, and many other factors. ~~.....~~

There are strong indications that the rate of increase in total financial requirements in the remainder of the 1970's will be quite comparable to the rate of growth in the economy, as opposed to the 1960's when higher education consumed an ever increasing fraction of the gross national product. Students, as a whole, are likely to continue to bear the great majority (slightly over three-quarters) of the total costs--including opportunity costs--associated with their education.

Adoption of a full-cost tuition and vouchers policy would lead to the average student in the public sector experiencing a much larger net charge while those in private institutions would have much lower net costs. Expansion of existing federal student aid programs with the addition of a "cost of education" grant directly to the institution would benefit private institutions and their students most, public two-year colleges and their students least, with public four-year institutions and students in an intermediate position.

Numerous other policy implications are derived with the aid of the discussion of proposed goals for higher education, the statistical analysis, and the financial requirements model.

ACKNOWLEDGEMENTS

The aid of many other people played a crucial role in increasing both the scope and quality of this research. The necessity to be brief prevents me from mentioning all but a few to whom I feel the greatest debt.

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The selection of the topic grew out of my experience as a Research Associate on a study directed by James Bonnen, The Study of the Role of the University in Public Affairs. The opportunity to work with Dr. Bonnen on the Study and later on this thesis was invaluable in both a professional and personal sense.

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Finally, Cherry, my wife, shared in both the drudgery and joy of the thesis. Whether it was searching for enrollment data in a dusty records center, typing, editing, or grappling with a substantive issue, her help and encouragement added much to the quality of the research.

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Chapter I

Introduction

The basic issues to be dealt with can be stated succinctly—how should higher education be financed, and what is the probable distribution and magnitude of future costs? The financial status of higher education is a cause for deep concern among many educators, public officials, students and citizens. "Crisis" has become the term most often used to describe the present state of affairs. Public and private commissions have struggled with the questions and offered suggestions, but no comprehensive philosophy or program has emerged which enjoys wide support as a sufficient basis for a long term solution.

The complexity of the issues is largely derived from the multitude of roles which higher education is presumed to have. Colleges and universities are expected to assist students in acquiring saleable skills, train students for good citizenship, perform research on a nearly endless variety of problems, extend their expertise to the general public, and criticize perceived injustices—to name but a few of the many tasks many people would assign to higher education. Historically, the system of finance has been closely tied to the paramount roles of the period. The direction of cause and effect has not always been clear. In some cases institutions of higher education and society have consciously set forth goals and established corresponding financial arrangements, while in other cases a change in the source of funds has caused changes in higher education which were often unanticipated, unwanted, or even both in the opinion of many. Thus, it is

very important in a study such as this to consider the values and goals related to higher education simultaneously with the financing arrangements. One should support changes in the financing of higher education only if he is willing to support the implied changes in the role of higher education; similarly, if one wishes to change the role of higher education, he should explore changes in the method of finance consistent with the revised role.

Another source of complexity and confusion in the discussion surrounding the finance of higher education is the inadequate understanding of the relationships among the important physical variables. There is a need to quantify the impact on enrollments of such factors as population, income, unemployment, tuition, and student aid. It would be useful to have a model of higher education which would allow one to determine the physical and monetary resources required, assuming alternative public policies and enrollments.

Performing a comprehensive analysis of the financing issue depends upon fulfilling three objectives, which were chosen as the focus of this research. These three objectives are:

- 1) Identify the relationships between the goals recommended for higher education and the alternative methods of finance.
- 2) Develop a model which specifies in quantitative terms the causal links among the physical variables of primary concern.
- 3) Evaluate several policy alternatives in order to assist those who are making public policy decisions and to demonstrate the use of the frameworks developed under objectives 1) and 2).

The following chapters contain the results of the analysis. A capsule

description of each chapter is provided below.

Chapter II contains a brief historical review of American higher education. Those who are familiar with this topic may wish merely to skim the chapter or begin their reading in Chapter III. Others will probably find the material useful, for it illustrates the interaction of institutional forms and societal values and helps us to understand current issues by establishing the context within which they arose.

A variety of roles, organized on the basis of the responsibility of the higher education community to actively criticize societal goals, are discussed in Chapter III. Accompanying each role is an exploration of the type of financing most conducive to the successful enactment of the desired goals. Chapters II and III are primarily designed to fulfill objective 1) noted above.

Chapters IV and V both present the results of investigations, using econometric techniques, into the factors causing student enrollments to vary in Michigan. The impacts of population, discharges from the Armed Services, and economic factors on aggregate undergraduate and graduate enrollment are estimated in Chapter IV. In the same chapter the model is used to derive enrollment projections which, with the aid of additional assumptions, are disaggregated into three sectors—public four-year, public two-year, and private. The econometric model in Chapter V, which is based in part on the results of the work in Chapter IV, is designed to yield estimates of the influence of tuition and student aid variables at the institutional and sectorial levels, respectively.

The first part of Chapter VI is devoted to developing a rather simple model of Michigan higher education which enables estimates of future financial requirements to be computed, assuming alternative public policies and enrollments. This model, in conjunction with those constructed in Chapters IV and V, satisfies objective 2).

The remainder of Chapter VI contains an evaluation of several policy alternatives, i.e., meets objective 3).

The conclusions and recommendations of the author are presented in Chapter VII. While not as essential to understanding the discussion of higher education finance as the preceeding material, it is hoped that this chapter will represent a specific, constructive addition to the continuing debate.

Chapter VIII is a brief summary of the major results of this research.

Chapter II

A Historical Perspective¹

An examination of the historical record of American higher education is useful, for it illustrates the interaction of institutional forms and societal values. Such a study also helps us to understand current issues by establishing the context within which they germinated and grew to importance. And finally, reflecting on the past often raises important questions concerning goals, values, and institutional forms which might otherwise be ignored in the press of current crises.

It is impossible, of course, to do more in one chapter than mention the outstanding events in higher education. Such severe condensation places a heavy burden on the author, for there is a constant danger that only materials which are consistent with one's own value screen will be included. The reader should also remember that ideas and institutions usually evolve slowly, rather than spring on the scene in final form; thus, the choice of the boundaries of the eras discussed below is somewhat arbitrary—and unimportant except as an organizational device. However, the choice of the theme and meaning of each era is not arbitrary and is properly the subject of vigorous

¹The author acknowledges a special debt to John S. Brubacher and Willis Rudy, Higher Education in Transition - Revised Edition (New York, N.Y., Harper & Row, 1968) and Frederick Rudolph, The American College and University (New York, N.Y., Vintage Books, 1962) for their scholarly histories and extensive bibliographies which were the starting point for this chapter. This does not, of course, imply that they bear any responsibility for the selection and organization of the material presented here.

debate where differences of interpretation appear.

This chapter focuses on the history of American higher education, for the developments in Michigan can only be understood in terms of a national context. Some special attempt has been made to include the Michigan experience, but in actuality a special effort is really not necessary—for Michigan has been in a position of leadership in so many instances that one cannot exclude it. But the beginning of the American college did occur early in the colonial period, long before Michigan was claimed by European settlers.

Laying A Foundation: 1636-1827

On October 28, 1636, the Great and General Court of Massachusetts passed the legislative act which established Harvard College, the first college to be founded in the English colonies.² From the beginning, the institution was modeled as closely as possible on the English college of Cambridge, for the new college was to be the instrument which would transmit and preserve culture in a foreign and barbaric land. The English model provided the residential pattern making the college a home for the students, the aristocratic nature of the collegiate experience, the emphasis on teaching rather than learning, and even the titles of the classes—freshman, sophomore, junior sophister and senior sophister.³ These English patterns, and especially those associated with the concept of a residential college,

²Samuel Eliot Morison, Three Centuries of Harvard 1636-1936 (Cambridge, Mass., Harvard University Press, 1936), p. 5.

³W.H. Cowley, "European Influences Upon American Higher Education," Educational Record, Vol. 20, April, 1939, pp. 168-9.

have come to be known as the "collegiate way"—a philosophy of education emphasizing the development of the whole person rather than a narrow focus upon his intellect.⁴ Other models did exist in the Continental European universities which offered a clear alternative in the form of developing nonresidential graduate schools, as reflected in the portions of America dominated by the French and Spanish.⁵

The Christian traditions were central to the culture of the colonists, and they looked to the early colleges for literate, college-trained clergy. Religious control of the colleges, also inherited from England, was natural in these circumstances.⁶ Individual denominations established Yale and Princeton in an attempt to help insure their own denominational survival, a pattern which would be repeated literally hundreds of times in the American experience.⁷ However, church-related concerns were not the sole function of the colleges; these institutions were also expected to train other leaders of society.⁸ In either case the emphasis was on creating leaders of established society who would attempt to preserve it, not reconstruct it.

⁴See Rudolph, op. cit., pp. 86-109, for his chapter on "The Collegiate Way."

⁵Brubacher and Rudy, op. cit., p. 5.

⁶Cowley, op. cit., p. 168.

⁷Edwin Oviatt, The Beginnings of Yale 1701-1726 (New Haven, Conn., Yale University Press, 1916) and Thomas Jefferson Wertenbaker, Princeton 1746-1896 (Princeton, N.J., Princeton University Press, 1946).

⁸Brubacher and Rudy, op. cit., p. 6.

The rigid curriculum imported from England was well-suited to the above role. Its core consisted of the classical languages and literatures, exactly what a minister must know to read the Scriptures from the original Hebrew and to study the work of later scholars in Greek and Latin.⁹ Knowledge consisted of the truths discovered and preserved by ancient scholars; it was to be absorbed faithfully by each generation so that it might be passed on.

In the eighteenth century pressure began to build for change in the classical curriculum as men like Newton developed a new concept of science and knowledge. Although the basic curriculum remained dominant and unchanged, by the of the 1700's additions had been made in the form of some attention to mathematics, natural science, English language and literature, and modern foreign languages.¹⁰ Thus, science, a force which would later cause almost unimaginable agony and upheaval, made a rather inauspicious arrival in higher education.

Entrance requirements, reflecting the curriculum, consisted of demonstrating a knowledge of Latin and Greek early in the period and later were broadened to include such subjects as arithmetic and English. Preparatory training was usually available only through private tutoring, often by a minister, although some good Latin grammar schools did exist.¹¹

⁹Morison, op. cit., p. 3.

¹⁰Brubacher and Rudy, op. cit., p. 14.

¹¹Ibid., pp. 11-13.

The financial position of these early colleges was usually very precarious. The principal expense was faculty salaries. The effort to minimize salaries sometimes resulted in little more than a subsistence wage being paid, certainly less than that of other professionals. To make matters worse, a faculty member usually received little or no increase in pay over the course of his career and had few opportunities to add to his income by means of outside endeavors.¹² The latter was as it should be in the opinion of many, who considered outside sources of funds to be a corrupting influence.

Turning to the revenue side, student tuition fees were an important source of income, but these funds did not cover anywhere near the full cost of the education.¹³ Out of necessity, but probably also by original design considering the English tradition of philanthropy, the colleges sought gifts from individuals and institutions.¹⁴ Gifts originating in England were substantial until the outbreak of the Revolutionary War.¹⁵ Organized religion was another significant source of donations, as one would expect given the religious origin of most of the colleges.¹⁶ Still, individual American citizens were

¹²Ibid., p. 38.

¹³Beverly McAnear, "The Raising of Funds by the Colonial Colleges," Mississippi Valley Historical Review (title has since been changed to Journal of American History) Vol. 38, March, 1952, pp. 591-2.

¹⁴Rudolph, op. cit., p. 178 and Jesse B. Sears, Philanthropy in the History of American Higher Education, Bureau of Education Bulletin 26 (Washington, D.C., Government Printing Office, 1922), pp. 22-32.

¹⁵Sears, op. cit., pp. 30-1.

¹⁶Ibid., p. 31.

also important--the gift might come in terms of corn or volunteer labor for a building project, but it was probably especially crucial as a concrete demonstration of the public support for higher education.¹⁷

These early colleges also received public subsidies, despite the fact that policy formulation rested in private hands. Because of their own revenue problems, the colonies usually found it easier to give colleges permission to operate lotteries and to grant title to lands for resale rather than to appropriate funds.¹⁸ Even more indirect but also very important were the privileges granted to the colleges, such as exempting the faculty and students from military duty and also exempting the faculty, students, and property from taxation.¹⁹ However, the colonies, and later the states, also provided crucial support in the form of direct grants of funds; one observer noted that without this support Harvard, Yale, and Columbia could not have survived the colonial period.²⁰

Two events occurred during the end of this period which, along with the rise of science mentioned above, were of immense significance--both because they gave form to ideas which had long been

¹⁷Rudolph, op. cit., pp. 182-3 and Frederick Rudolph, "Who Paid the Bills? An Inquiry into the Nature of Nineteenth-Century College Finance," Harvard Education Review, Vol. 31, Spring, 1961, pp. 146-7.

¹⁸Rudolph, American College, pp. 185-6.

¹⁹Frank W. Blackmar, The History of Federal and State Aid to Higher Education in the United States, Bureau of Education Circular of Information 1 (Washington, D.C., Government Printing Office, 1890), especially pp. 24-29.

²⁰Sears, op. cit., pp. 25-26.

developing and because they foreshadowed new forces at work in society.

One, of course, was the American Revolution. It signaled the arrival of democracy as an idea to be contended with--the belief that all men were equal before the law and should be as free as possible to realize the full benefit of their own ability and effort. Established authority based upon religion or ancestry became subject to doubt. Leaders began to think of education as the means by which individuals would be made capable of handling this heavy load--the responsibility for both their individual and national destiny.²¹

The other event of major proportions was the Dartmouth College Case of 1819. A then unknown Dartmouth graduate, Daniel Webster, argued the position of the trustees of the College before the Supreme Court in Washington. The issue was basically one of deciding whether the state-granted charter of Dartmouth College gave the state the right to impose its will upon the institution. Chief Justice John Marshall, speaking for the Court, announced a decision in favor of the trustees. Thus, private institutions won their independence from legislative interference, an independence which would protect them from the excesses of democracy, but which it can be argued would also result in a loss of contact with much of society--as we shall see more fully in the next section.²²

²¹Rudolph, American College, pp. 33-43.

²²Ibid., pp. 207-213.

Contesting The Inevitable: 1828—Pre-Civil War

By the end of the year 1828 it was clear that the bulk of American society was prepared to move enthusiastically into a new era where any man was the equal of any other and where the opportunity for economic advancement should be open to everyone. But it was equally apparent that the majority of the colleges were not prepared to embrace this new frame of reference. It could hardly have been more symbolic of this basic parting of the ways that Andrew Jackson's election to the presidency and the Yale Report should occur in the same year, 1828.

Jacksonian democracy emphasized equality and the benefits of material success which could be obtained through healthy competition. The concern of men such as Jefferson for a careful and conscious cultivation of those with special talents was largely forgotten—many appeared to reject even the possibility of the existence of such special talents. All privilege except that gained by individual effort was rejected, which sometimes led to a loss of public support for higher education—often to the benefit of common schools which were considered more democratic.²³ The frontier and the growing manufacturing sector seemed to offer material success to anyone with the courage and energy to grab it, and, not incidentally from the standpoint of the colleges, one's higher education had little or no relationship to one's economic success.

²³Ibid., p. 212.

It was in the above atmosphere, to which was added the growing pressure of the empirical sciences, that the President and Fellows of Yale College issued their influential "Report on a Course of Liberal Education."²⁴ The Yale Report defended nearly every aspect of the traditional college, from the classical curriculum to the residential style of student living. It argued that it would be a mistake for the colleges to cater to "a preparation for business;" on the contrary, the very fact of prosperity made the old curriculum even more crucial.

Is it not desirable that (the newly prosperous) should be men of superior education, of large and liberal views, of those solid and elegant attainments, which will raise them to a higher distinction, than the mere possession of property; which will not allow them to hoard their treasures, or waste them in senseless extravagance; which will enable them to adorn society by their learning, to move in the more intelligent circles with dignity, and to make such an application of their wealth, as will be most honorable to themselves, and most beneficial to their country?...Light and moderate learning is but poorly fitted to direct the energies of a nation, so widely extended, so intelligent, so powerful in resources,²⁵ so rapidly advancing in population, strength, and opulence.

This was to be the stance of most of higher education throughout the first half of the nineteenth century. The educators were determined to preserve civilization on the frontier and in the new manufacturing centers just as they had in the newly settled colonies.

The lack of societal support for this course became increasingly evident as time passed. Public bodies--unable to force their will upon the colleges because of the Dartmouth case, seeing that the Yale Report's acceptance ruled out voluntary adjustment by the colleges,

²⁴"Original Papers in Relation to a Course of Liberal Education," The American Journal of Science and Arts (title has since been changed to American Journal of Science), Vol. 15, No. 2, 1829, pp. 297-351.

²⁵Ibid., pp. 323-4.

and swayed by their Jacksonian rejection of privilege--reduced legislative support for private higher education.²⁶ Many potential students saw the classical curriculum as irrelevant, and those who attended did so partly under the inducement of very low tuitions.²⁷ Interestingly, once on campus the students often formed literary societies which were much more open and intellectual than the classes they attended--even to the extent of possessing a library superior to that of the college!²⁸ Reinforcing the viewpoint that these societies acted somewhat as a substitute for a stale curriculum is the fact that they began to decline in importance as the colleges broadened their offerings in the mid and late nineteenth century.²⁹ This was also the period in which fraternities grew to be an important factor; these organizations offered escape from the monotony of the classical curriculum and gave the opportunity to learn and cultivate the attitudes and skills which would lead to material success.³⁰ Not surprisingly in view of the colleges' financial problems, faculty salaries remained very low.³¹

²⁶Brubacher and Rudy, op. cit., p. 36.

²⁷Francois Wayland, Thoughts on the Present Collegiate System in the United States (Boston, Mass., Gould, Kendall & Lincoln, 1842) as reprinted by (New York, N.Y., Arno Press & The New York Times, 1969), pp. 14-17.

²⁸Rudolph, American College, pp. 138-146 and Henry D. Sheldon, Student Life and Customs (New York, N.Y., D. Appleton and Company, 1901), pp. 125-142.

²⁹Rudolph, American College, pp. 145-6.

³⁰Ibid., pp. 144-9.

³¹Wayland, op. cit., p. 14.

Despite the above difficulties, this period saw an unprecedented explosion in the number of all types of colleges, especially denominational colleges. One study suggests that approximately seven hundred colleges opened and failed before the Civil War, a fatality rate of about eighty percent.³² As this figure implies, most of these institutions were ill-planned in almost every respect—available students, faculty, buildings, endowment, location, and so on.

Many factors were at work in this multiplication of colleges, but two of the most important were the Dartmouth College Case mentioned earlier and the spirit of Jacksonian democracy. The Dartmouth Case, along with the First Amendment principle of separation of Church and State, guaranteed denominational interests, once chartered, the right to exist free of legislative interference.³³ They were encouraged to found institutions by the Jacksonian enterprising spirit, the home missionary movement, and denominational rivalries.³⁴ The zeal with which Yale and Princeton produced home missionaries for the West was an important factor in the widespread dominance of the Yale Report up to the Civil War.³⁵ Although some new public institutions were founded in response to the independence of the private institutions and inter-state rivalry, the evidence is strong that the

³²Rudolph, American College, p. 47 and Donald G. Tewksbury, The Founding of American Colleges and Universities Before the Civil War, No. 543 in the Series of the Columbia University Teacher's College Contributions to Education (New York, N.Y., Bureau of Publications, Teachers College, Columbia University, 1932), pp. 23-28.

³³Tewksbury, op. cit., pp. 62-66.

³⁴Rudolph, American College, pp. 52-58, 211.

³⁵Ibid., p. 131.

combination of denominational and Jacksonian interests delayed much of the development of state universities by several decades, i.e., until after the Civil War.³⁶

However, the traditional liberal arts college was the focus for a growing dissatisfaction which appeared and re-appeared in various ways throughout the period--foreshadowing what was to come. The ideas inherent in democracy, science, and the Enlightenment spread and would not be silenced; people both in and out of the colleges were demanding that higher education be more widely available, more intellectual, and more directed towards the easing of human misery. The reformers usually looked to the German university for at least part of their new model. Two of the most significant and revealing struggles were those of Thomas Jefferson at the University of Virginia and Henry Philip Tappan at the University of Michigan.

Thomas Jeffereson, from his position on the Board of Visitors, had instituted many reforms at William and Mary College in the eighteenth century, but he was dissatisfied with the results and devoted his time to an entirely new institution, the University of Virginia, in the nineteenth century.³⁷ In 1818 he succeeded in the legislative effort required to obtain a charter, and in 1824 his plans were adopted by the Board of Visitors.³⁸ Jefferson's vision was a public institution offering advanced training to mature students, a proposal

³⁶Tewksbury, op. cit., p. 151.

³⁷Brubacher and Rudy, op. cit., pp. 19-20, 99-100.

³⁸Roy J. Honeywell, The Educational Work of Thomas Jefferson, Vol. 16 of the Harvard Studies in Education (Cambridge, Mass., Harvard University Press, 1931) as reprinted by (New York, N.Y., Russell & Russell, Inc., 1964), pp. 67-87.

which was revolutionary in all respects. Control of the University was to rest with a Board of Visitors appointed by the governor and confirmed by the legislature, rather than in the hands of any religious group.³⁹ There were to be eight schools: ancient languages, modern languages, mathematics, natural philosophy, natural history, anatomy and medicine, moral philosophy, and law; each would offer advanced training and award its own diploma.⁴⁰ The student would be free to choose which school he would enter and could proceed at his own desired pace.⁴¹ This remarkable innovation could not be sustained, however, in the face of such difficulties as a dearth of prepared students due to the poor system of secondary education, the lack of equipment and libraries, and the difficulty of recruiting adequate faculty.⁴² On the other hand, Jefferson's ideas inspired many people, one of whom was Judge Augustus B. Woodward who in 1817 was the major backer behind legislation creating the "Catholepistemiad" or University of Michigania.⁴³

Probably nowhere else were the conflicts of this period more evident or more bitterly fought than in Michigan in the 1850's and early 1860's. Under the influence of Woodward, Michigan had adopted from the very beginning a policy favoring a centralized system of education—even going so far as to give the University of Michigan the

³⁹Brubacher and Rudy, op. cit., pp. 148-9.

⁴⁰Philip Alexander Bruce, History of the University of Virginia 1819-1919, Vol. I (New York, N.Y., The Macmillan Co., 1920), pp. 322-7.

⁴¹Ibid., pp. 326-7.

⁴²Brubacher and Rudy, op. cit., p. 152.

⁴³Ibid., p. 153.

exclusive right to confer degrees.⁴⁴ This view was reinforced by a plan developed by Isaac E. Crary and John D. Pierce and adopted in 1837; it proposed a central state university with "Branches" which would provide secondary education and feed qualified students into the university.⁴⁵ These events were important factors in the decision of Henry Philip Tappan to accept the presidency of the University of Michigan in 1852, for he was also a great admirer of the system of education developed in Germany.⁴⁶ Many of his ideas were similar to those of Jefferson; he broadened the course of study, raised it to a more advanced level, and introduced electives for the students.⁴⁷ Tappan fought all sectarian influence and continued the battle to retain a monopoly on degree granting; the denominations, of course, fought him tooth and nail, trying to limit public support for the University and gain collegiate rights--succeeding in the latter in 1855.⁴⁸ Tappan's actions antagonized many groups, as illustrated by the following newspaper quote, "Of all the imitations of English aristocracy, German mysticism, Prussian imperiousness and Parisian nonsensities, he is altogether the most un-Americanized, the most completely foreignized specimen of an abnormal Yankee we have ever seen."⁴⁹

⁴⁴Willis Dunbar, "Public Versus Private Control of Higher Education in Michigan, 1817-1855," Mississippi Valley Historical Review (title has since been changed to Journal of American History), Vol. 22, December, 1935, pp. 389-391.

⁴⁵Ibid., pp. 391-2.

⁴⁶Elizabeth M. Farrand, History of the University of Michigan (Ann Arbor, Mich., Register Publishing House, 1885), pp. 94-5.

⁴⁷Brubacher and Rudy, op. cit., pp. 105-7.

⁴⁸Ibid., pp. 155-7.

⁴⁹Farrand, op. cit., pp. 112-3.

In 1863 Tappan was forced out of office by a vote of the Board of Regents, but his influence as an architect of the American university would never be destroyed.⁵⁰

Towards the end of this period an important event occurred which foretold the degree to which society would create colleges and universities responsive to their needs, and once again Michigan was in the front ranks. The Michigan Agricultural College, the first such institution in the western United States, was established at East Lansing in 1855.⁵¹

Entering The Mainstream: Civil War—Pre-World War II

The United States underwent tremendous change in this period as did higher education, but now there was something new in their relationship. Before the Civil War, society had an impact on the colleges, but the impact of the colleges on society appeared small—even negligible. Few enrolled, and those who did enjoyed little or no advantage over others as the nation expanded from ocean to ocean. In this new era cause-and-effect would be less clear. Certainly, changes in society would still affect higher education but now society would find itself increasingly dependent on the colleges and universities to perform crucial functions. Higher education was moving into the mainstream of the nation, never to return to the eddies it occupied in the first half of the nineteenth century.

⁵⁰ Ibid., pp. 156-8 and

Edwin McClellan, "The Educational Ideas of Henry Philip Tappan," Michigan History, Vol. 38, March, 1954, pp. 69-78.

⁵¹ Madison Kuhn, Michigan State: The First Hundred Years (East Lansing, Mich., 1955), pp. 4-10.

While the Civil War was not the sole factor in bringing about a new orientation, it did appear to be a turning point. The trends toward industrialization and urbanization leapt forward under the influence of war-time factory and railroad growth. The nation was knit together by economic institutions, except for the war-ravaged South which was left isolated in many ways. And finally, the United States was truly a nation, the experiment of democracy had survived its most crucial test.

The Morrill Acts which led to the creation of the land grant colleges were almost certainly the most important Federal initiatives in this period. Responding to a rising pressure for more popular colleges which would offer applied-science or technical training in agriculture and the mechanic arts, Congressman Justin Smith Morrill of Vermont first introduced his bill in 1857.⁵² His bill was vetoed by President Buchanan in 1859, the same year in which The Origin of the Species by Charles Darwin appeared—a coincidence with the same ring of irony as occurred in 1828 with the simultaneous issuance of the Yale Report and election of Jackson.⁵³ But in this case the forces of change were not stifled for long; in 1862 President Lincoln, who had succeeded Buchanan, signed the Morrill Act passed by a Congress from which the South had seceded.⁵⁴ Despite the importance we now ascribe to the Act, it aroused no great public interest; the New

⁵²Ibid., pp. 248-9.

⁵³W.O. Thompson, "The Spirit of the Land-Grant Institutions," Proceedings of the Association of Land Grant Colleges and Universities, 1931, p. 106.

⁵⁴Earle D. Ross, Democracy's College: The Land-Grant Movement in the Formative Stage (Ames, Iowa, Iowa State College Press, 1942), pp. 60-5.

York Tribune did not mention it when summarizing the achievements of the Congress in that year.⁵⁵

The Morrill Act of 1862 was significant not only because of the purposes it supported but also because of the intervention strategy adopted by the federal government. The Act itself stated that each state would receive 20,000 acres for each senator and representative and that each territory would receive 60,000 acres. Ten per cent of the fund resulting from the sale of the land might be spent for a college site or experimental farm land, but neither the grant nor the income resulting from it could be used for constructing or maintaining buildings; the remainder of the fund was to be invested where it would yield a return of not less than five per cent.⁵⁶ For the first time the federal government was interpreting its duties under the "general welfare" clause of the Constitution to include the right to use federal grants to achieve certain specific objectives, in this case education of a certain type. Since the grant could not be used for buildings, the states had to provide "matching dollars" if they were to benefit from the Act.⁵⁷ Both of these practices have been greatly expanded until they are now of tremendous scope and importance. The consequences of this approach were felt immediately, for former federal land grants had primarily supported general or humanistic studies but after 1862 they could only be used in applied-sciences or technical

⁵⁵Ibid., pp. 65-6.

⁵⁶Ibid., pp. 46-7.

⁵⁷Wilfred E. Binkley and Malcolm C. Moos, A Grammar of American Politics, Third Edition, Revised, (New York, N.Y., Alfred A. Knopf, Inc., 1958), pp. 81-2.

fields.⁵⁸ The matching requirement, of course, tended to shift the state's allocation of funds in the same direction.

The early years of these land-grant colleges were fraught with problems. Qualified students were nearly nonexistent, many farmers would support only a vocational or trade school curriculum, and there was a scarcity of information to teach.⁵⁹ One observer noted, "The first group of agricultural professors were somewhat like a brass band trying to play without instruments."⁶⁰ Prospects were improved markedly by the Hatch Experiment Station Act of 1887 which laid the financial and institutional foundations for developing a scientific subject matter and with the second Morrill Act of 1890 which provided for greatly increased federal support.⁶¹

The land-grant funds were used in a wide variety of institutional arrangements. Michigan, along with Iowa, Maryland and Pennsylvania, chose to augment the existing agricultural college.⁶²

The problem of finding qualified students was not unique to the land-grant colleges, for at the end of the Civil War a gap existed between the public elementary schools and the universities--filled only by public secondary education in a few Northeastern urban centers

⁵⁸William Lowe Bryan, "Educational Policies of the United States Government," Educational Record, Vol. II, April, 1930, pp. 56-7.

⁵⁹Richard G. Axt, The Federal Government and Financing Higher Education (New York, N.Y., Columbia University Press, 1952), pp. 47-50.

⁶⁰Thompson, op. cit., p. 106.

⁶¹Axt, op. cit., pp. 50-9.

⁶²Rudolph, American College, p. 253.

and by private academies.⁶³ The traditional solution was to establish a preparatory program within the college which would take the unqualified students at whatever level they came and raise their competency to that required for college-level instruction.⁶⁴ The aspiring University of Michigan, however, initiated a much grander scheme in the post-war period. In 1871 the University, under the leadership of President Henry S. Frieze, began to certify the graduates of certain public schools as admissable at the collegiate level.⁶⁵ This, of course, was of tremendous significance: it encouraged the growth of secondary schools, it stimulated them to adopt programs of collegiate preparation with adequate standards, and it allowed the University to elevate its own standards. The procedure spread rapidly and by 1890 the leading Midwestern state universities depended almost entirely on the high schools for their students.⁶⁶

As these uniquely American institutions--the land-grant colleges--were developing, an equally important effort to import the ideals of German university scholarship was continuing. These ideals--some of which were mentioned in the discussion of Jefferson and Tappan--centered on a concept of the university as a place where truth would be pursued through original scientific investigation by free agents. The professor was free to investigate any subject and communicate his findings

⁶³Rudolph, American College, p. 281.

⁶⁴Ibid., p. 282.

⁶⁵Joseph Lindsey Henderson, Admission to College by Certificate, No. 50 in the Series of the Columbia University Teacher's College Contributions to Education, (New York, N.Y., Teachers College, Columbia University, 1912), pp. 49-51.

⁶⁶Rudolph, American College, p. 284.

to others. The students were free to study anything and anywhere they wished, with the only formal requirement being the final degree examination. This spirit of free inquiry yielded rich scientific dividends for the state, an aspect which became more consciously cultivated as the nineteenth century unfolded.⁶⁷

Although the influence of the German universities was felt throughout the 1800's, their ideals were not fully realized in America until Johns Hopkins University opened its doors in 1876 under the leadership of Daniel Coit Gilman.⁶⁸ The funds for this massive endeavor were donated from the fortune which Johns Hopkins accumulated through his interest in the Baltimore and Ohio Railroad.⁶⁹ The institution thrived, and its graduates soon began to influence all of American higher education in the development of advanced scholarship and teaching.⁷⁰

There was, and still is, such a variety among American universities that it is impossible to describe a "typical" American university. However, two characteristics did develop in this period which were distinctly American and widely adopted to some degree by all institutions, but especially by those in the public sector. The first of these is the all-purpose curriculum typified by the "Cornell Plan," and the second is service to the community or the "Wisconsin Idea."⁷¹

⁶⁷Brubacher and Rudy, op. cit., p. 175-6.

⁶⁸Rudolph, American College, p. 269.

⁶⁹John C. French, A History of the University Founded by Johns Hopkins (Baltimore, Md., The Johns Hopkins Press, 1946), pp. 94-7.

⁷⁰Brubacher and Rudy, op. cit., p. 183.

⁷¹Ibid., p. 161.

Even before the university was founded, Ezra Cornell knew what he wished to accomplish with his millions from the Western Union Telegraph Company, saying the words which would later appear on the university seal, "I would found an institution in which any person can find instruction in any study."⁷² In this he had the enthusiastic backing of the able first president, Andrew Dickson White, who recalled the inequality between the classical and science curriculum in his undergraduate days at Yale.⁷³ Although White was a strong supporter of vocational training throughout his career, he also believed education must develop the social nature of man so that democracy might work--securing rational, intelligent reforms wherever necessary; it is important to note that in 1980, forty years after his inauguration, he was convinced that the problem had been reversed and that the pressing need was "not only to make men and women skillful in the various professions and avocations of life, but to cultivate and bring out the best in them as men and women."⁷⁴

As the "Cornell Plan" was widely adopted, it tended to blur the old distinctions between vocation and profession, and between college and professional. Before the mid-1800's college training was of a preprofessional nature designed to prepare the student for later professional training in divinity, law, or medicine. After the Civil War

⁷²Carl L. Becker, Cornell University: Founders and the Founding (Ithaca, N.Y., Cornell University Press, 1943), pp. 60-2, 88.

⁷³Andrew Dickson White, Autobiography (New York, N.Y., The Century Co., 1905), p. 341.

⁷⁴Walter P. Rogers, Andrew D. White and the Modern University (Ithaca, N.Y., Cornell University Press, 1942), pp. 210-17.

a wide variety of fields from business to music could be studied—and at the undergraduate level. Rudolph argues that this was a significant change in a fundamental sense:

The old professionalism was characterized by a serious regard for the liberal studies and by the degree to which the central subject of every liberal study was man himself. The new professionalism, on the other hand, studied things, raised questions not so much about man's ultimate role and his ultimate responsibility as it did about whether this or that was a good way to go about achieving some immediate and limited object. There was, therefore, a difference, a real difference in kind between the old and the new professions, a difference that had once been clarified by the distinction between profession and vocation.⁷⁵

As the twentieth century opened, many people were beginning to feel as White did, i.e., that the spirit of individualism and competition so prevalent in the nineteenth century must be balanced by a concern for the nature of society. They objected to the concentrations of economic and political power which were appearing in businesses and cities as the country shifted in the direction of an urbanized, industrialized nation. Their attempts at reform, the Progressive movement, affected the entire nation, including higher education—but nowhere was the spirit of this period so captured as in Wisconsin where it gave rise to an educational philosophy, the "Wisconsin Idea."⁷⁶

Progressivism was extremely important to the development of colleges and universities because it gave new life to the concept of higher education's contribution to the public portion of society, a concept which had been widely accepted up to the nineteenth century but

⁷⁵Rudolph, American College, pp. 342-3.

⁷⁶Merle Curti and Vernon Carstensen, The University of Wisconsin: A History, 1848-1925, Vol. 2 (Madison, Wis., University of Wisconsin Press, 1949), pp. 3-4.

overshadowed since then by an emphasis on the individual and his material success. The Progressives were not opposed to the ideals of democracy and material progress; on the contrary, they were among their strongest supporters. The cures for society were more democracy and more progress through healthier competition: voting rights were expanded, balloting procedures changed, trusts dissolved, and unethical behavior exposed and legislated against. The support and adoption of such reforms required both an informed populace and leadership, hence the need for extension work and the creation of expertise in government circles. Both of these represented opportunities for the universities to close the gap with society. Another indication of the Progressive spirit was the development of settlement houses in urban areas by concerned students, whose activities are often a useful barometer of the times.⁷⁷

The University of Wisconsin gave expression to all of the above ideas and more. Industrial problems were attacked and often solved, such as in the case of the Babcock fat test which an enthusiastic observer credited with saving the co-operative dairy industry.⁷⁸ The Extension Division was sending faculty to outlying villages, conducting correspondence courses (enrolling 5,000 by 1912), serving as a reference bureau for citizen inquiries, and organizing discussions of the major public questions.⁷⁹ Faculty were serving on the boards and

⁷⁷Caroline Williamson Montgomery, Bibliography of College, Social, University and Church Settlements (Chicago, Ill., The Blakely Press, 1905).

⁷⁸Frederic C. Howe, Wisconsin: An Experiment in Democracy (New York, N.Y., Charles Scribner's Sons, 1912), p. 175.

⁷⁹Charles McCarthy, The Wisconsin Idea (New York, N.Y., The MacMillan Company, 1912), pp. 131-6.

commissions of the state with the enthusiastic backing of both Governor La Follette and Charles R. Van Hise, president of the University; state administrators and professors met informally each week in a Saturday Lunch Club while the legislature was in session.⁸⁰ This Progressive era, and particularly the Wisconsin experience, was the beginning of the use of the expertise of faculty in governmental affairs, which has now become widespread at the national level.

The involvement of faculty in societal conflict, plus the increased emphasis on research, the rapid growth of knowledge and the expansion of institutions, led to their professionalization, i.e., they tended to be judged by their peers rather than their clients and to have a decisive voice as to who entered the faculty.⁸¹ As original scholarship came to be emphasized, the Ph.D. became the admission ticket to the profession and the published article the means by which one insured his continuing membership.⁸² Within the universities the faculty organized into departments centered on disciplines and broke into ranks in order to facilitate both increasingly specialized scholarship and the administrative needs of a large institution.⁸³ Both the emphasis upon publishing and the separation into disciplinary

⁸⁰Robert S. Maxwell, La Follette and the Rise of the Progressives in Wisconsin (Madison, Wis., State Historical Society of Wisconsin, 1956), pp. 58-9.

⁸¹See Christopher Jencks & David Riesman, The Academic Revolution (Garden City, N.Y., Anchor Books, 1969) for a discussion of higher education which places great emphasis upon this point.

⁸²Rudolph, American College, pp. 395-7, 402-7.

⁸³Ibid., pp. 398-402.

departments tended to replace local and institutional loyalties with a commitment to a national, and even international, body of scholars.

The inevitable clash with vested interests, often represented by benefactors or trustees, which arose as faculty increasingly entered into public debate on policy issues gave rise to a heated discussion of academic freedom and tenure. The German model described earlier was an important factor in the controversy, but its application was too narrow for many American professors. The German conception of academic freedom applied only within the academic community; in the wider society the German professor was expected to defer to the German state, as were all German citizens.⁸⁴ The American professor claimed that he should be accorded the same right of free speech as all citizens and that he, in contrast to others, should not be subject to losing his position for doing so.⁸⁵ With the formation of the American Association of University Professors (AAUP) in 1915 the professors created an instrument which could both articulate and, as time would prove, ably defend their views.⁸⁶ Their 1915 statement of principles declared, in part, the responsibility of the professor was primarily to society; the governing board and president may "appoint", but the termination of an appointment should result from a decision by peers. Furthermore, the function of creating an informed and critical public opinion would suffer from any restriction of

⁸⁴Richard Hofstadter and Walter P. Metzger, The Development of Academic Freedom in the United States (New York, N.Y., Columbia University Press, 1955), pp. 383-91.

⁸⁵Ibid., pp. 405-7.

⁸⁶Brubacher and Rudy, op. cit., pp. 318-21.

academic freedom; the professor should be free to express his ideas within the classroom, university and society, but he should do so responsibly—especially encouraging students to examine the opinions of others.⁸⁷ There could no longer be any doubt—the appearance of the AAUP signified the arrival of the professional academic man.

Related to the issue of the role of a faculty member has been the question of the corporate role of the university. The predominant opinion was, and still appears to be, that the university must remain neutral in political affairs so far as is possible. However, the issue is still a subject of debate, which we will return to in more detail in the next chapter.

A phenomenal increase in enrollment took place over this period. In 1869-70 there were 52,000 students in higher education. The ratio of 1869-70 enrollment to the 18-21 age group was 1.7 per cent. (While this is a useful rule-of-thumb figure for purposes of comparison, it has strict limitations for all students are not members of this age group.) Forty years later, in 1909-10, enrollment was 355,000 students, 5.1 per cent of the 18-21 age group; the average increase per decade was 76,000 students or .8 percentage points. However, by 1939-40 student enrollment was 1,494,000 or 15.6 per cent; these three decades saw an average increase of 380,000 students or 3.5 percentage points per decade.⁸⁸ Young people were obviously responding to public attempts to make higher education more democratic and more relevant to a technical,

⁸⁷Ibid., p. 320.

⁸⁸U.S. Department of Health, Education, and Welfare, National Center for Educational Statistics, Digest of Educational Statistics, 1970 (Washington, D.C., U.S. Government Printing Office, 1970), Table 88, p. 67.

scientific world—and nowhere did these ideals come to be more clearly expressed than in the junior or community colleges.

The junior colleges played an important role in the expansion of higher education opportunities. The junior college was originally conceived as a splitting-off of the "collegiate" level of instruction from the more advanced and specialized "university" curriculum, following the German distinction between the "gymnasium" and "University."⁸⁹ However, it soon became evident that it was a terminal institution for most of its students, and the curriculum broadened from a liberal arts "transfer" program to include many specialized vocational-technical courses.⁹⁰ The driving point of the junior colleges is evident in their growth; in 1900-01 8 colleges enrolled 100 students, less than .1 per cent of total higher education enrollment; by 1921-22 207 colleges enrolled 16,031, almost 3 per cent of total enrollment; and in 1939-40 610 colleges had an enrollment of 236,162, 16 per cent of total enrollment.⁹¹ Thus, American society had spawned yet another viable institutional form of higher education—a college located close to large population centers, catering to the commuter and part-time student of all ages, and offering a broad curriculum short of the baccalaureate degree.

Two new developments were crucial to the financing of the rapid expansion of higher education in both scope and magnitude. First, a

⁸⁹Brubacher and Rudy, op. cit., pp. 258-61.

⁹⁰Ibid., pp. 264-5.

⁹¹U.S. Department of Health, Education, and Welfare, op. cit., p. 67 and

Edmund J. Gleazer, Jr., "Junior College Growth," Junior College Journal, Vol. 31, February, 1961, pp. 353-4.

pattern of regular tax support developed for public institutions after the Civil War. The precedent was again set in Michigan; although state appropriations had been made earlier, in 1873 the legislature provided that the revenue from a statewide property tax of one-twentieth of a mill should regularly go to the University.⁹² This practice gave the institution a more stable income which allowed for better planning, and it also resulted in greater flexibility with regard to the internal allocation of funds.⁹³ The leaders of private higher education quickly forgot their own past reliance on the public treasury and fought this trend, alleging that a laissez faire policy was preferable and that governmental support was a corrupting influence.⁹⁴

The second major development was the accumulation of personal fortunes which resulted in large gifts to higher education. Some of the largest were \$500,000 by Ezra Cornell, \$1,000,000 by Cornelius Vanderbilt, \$3,500,000 by Johns Hopkins, \$20,000,000 by Leland Stanford, and \$30,000,000 from Rockefeller to the University of Chicago.⁹⁵

⁹²Richard Rees Price, The Financial Support of State Universities, Vol. 6 of the Harvard Studies in Education (Cambridge, Mass., Harvard University Press, 1924) as reprinted by (New York, N.Y., Johnson Reprint Corp., 1969), p. 58 and The Financial Support of the University of Michigan: Its Origins and Development, No. 8 of the Harvard Bulletins in Education (Cambridge, Mass., Harvard University Press, 1923), pp. 35-6.

⁹³James B. Angell, Reminiscences (New York, N.Y., Longmans, Green, and Co., 1912), pp. 243-4.

⁹⁴Rudolph, American College, pp. 189-90, 278-9, Brubacher and Rudy, op. cit., p. 160 and Charles K. Adams, "State Aid to Higher Education," in State Aid to Higher Education, Herbert B. Adams, ed., Vol. 18 of the Johns Hopkins University Studies in Historical and Political Science (Baltimore, Md., The Johns Hopkins Press, 1898), pp. 1-14.

⁹⁵Brubacher and Rudy, op. cit., pp. 273, 275.

Although the individual gifts were of course much smaller, the response of alumni to fund-raising drives was no less important--especially in the private sector.

With the coming of the twentieth century there arose a new style of giving, the philanthropic foundation. These foundations used their money and staff as a lever to modify existing institutions rather than create new ones, and a powerful lever it proved to be. Institutions were encouraged to raise their endowment funds by \$140,000,000 between 1902 and 1925 in order to obtain \$60,000,000 from Rockefeller's General Education Board.⁹⁶ The Carnegie Foundation, through the eligibility standards for institutional participation in its pension plan, (1) raised the standards of admission to four years of high school or its equivalent, (2) established the minimum size of a college at six to eight departments, in effect, by requiring a four-year curriculum manned by at least six (eight in 1921) full professors, (3) promoted the Ph.D. as a standard by requiring it of all department heads, (4) weakened denominational colleges by excluding them, and (5) affected many other equally important matters.⁹⁷ There were many objections, such as that of President Jacob G. Schurman of Cornell University: "The very ambition of such corporations to reform educational abuses is itself a source of danger. Men are not constituted educational reformers by having a million dollars to spend."⁹⁸

⁹⁶Ernest Victor Hollis, Philanthropic Foundations and Higher Education (New York, N.Y., Columbia University Press, 1938), pp. 200-1.

⁹⁷Ibid., pp. 127-41.

⁹⁸Ibid., p. 39.

The last decade of this period, the 1930's, was one of severe economic depression. It was a time when all institutions and all of social philosophy, including matters related to higher education, were subjected to intense critical review. This, plus the growing disaffection of the humanists as the vocational and technical fields expanded, led to a vigorous debate which went to the roots of higher education. The leading spokesmen for the two philosophies were men well-qualified for such a serious and important confrontation; Robert M. Hutchins, president of the University of Chicago, and John Dewey, pragmatic philosopher of Columbia University. A close examination of their opposing viewpoints is more appropriately a part of the next chapter, but a history would not be complete without mention of some of the highlights of this historic battle.

The proper role of higher education, according to Hutchins, was not vocational but rather the cultivation of a liberal training which was unchanging over time. He saw the growing emphasis on current problemsolving as leading to a trivial, fragmented, ad hoc, empirical study; such matters were the proper realm of technical institutes, but the university must concentrate on its unique function of analyzing, and training others to analyze, in terms of a long-range theoretical perspective.⁹⁹ Dewey and his followers countered that theory was an instrument of inquiry which could be tested and advanced only by application to current problems. The role of the liberal arts was one of insuring that the technical subjects were applied in a humane direction; what constituted liberal education depended upon

⁹⁹Brubacher and Rudy, op. cit., pp. 297-301.

what forces, such as democracy, were at work.¹⁰⁰ Although the debate was vigorous, the verdict was probably never in doubt--the people, through their elected bodies and with their own presence, had been choosing the path which led to vocational training and applied problem-solving for nearly one hundred years.

Before moving to the next section, let us briefly summarize the events of this complex era. To the college of English origin, which emphasized the training of the "total gentleman," had been added the German concept of scholarly inquiry. But neither was transplanted without change. The American college and university was more democratic and more dedicated to service. Never before had a nation set out to provide higher education for so many people in so broad a curriculum. Never before had a faculty become so involved in society's current problems, both as researchers and as advisers.

Serving The Nation: World War II - 1965

The underlying theme for this period can be summarized in one word, "growth." Growth in enrollments, buildings, institutions, budgets, research monies, professionalization, and so on. All of the trends established in the last period seemed to be continuing at an accelerating rate--and the public seemed happy to make the required investment. In the immediate post-war period a commission appointed by President Truman returned with a report entitled Higher Education for American Democracy and this ringing challenge: "We may be sure our democracy will not survive unless American schools and colleges

¹⁰⁰Ibid., pp. 301-5.

are given the means for improvement and expansion...America's strength at home and abroad in the years ahead will be determined in large measure by the quality and the effectiveness of the education it provides for its citizens."¹⁰¹ All levels of government responded, but the federal government's role became especially crucial.

Enrollments, after falling in the war years, soared from 1,677,000 in 1945-46 to 2,659,000 in 1949-50 with the return of the veterans.¹⁰² Following a short respite, enrollments again climbed as the post-war baby boom wave came of college age. By 1965 there were 5,526,000 students enrolled in higher education.¹⁰³ The same pattern held in Michigan; enrollment in colleges and universities grew from 45,900 students in 1945 to 101,000 in 1949 to 268,000 in 1965.¹⁰⁴

World War II was also instrumental in the pattern of research support, for it was the expertise of the university faculties which developed many major technical devices such as radar, the proximity fuse, and the atomic bomb. The continuing Cold War led to a sustained

¹⁰¹President's Commission on Higher Education, Higher Education for American Democracy, Vol. 1 (Washington, D.C., U.S. Government Printing Office, 1947), p. 103.

¹⁰²U.S. Department of Health, Education, and Welfare, op. cit., p. 67.

¹⁰³U.S. Department of Health, Education, and Welfare, National Center for Educational Statistics, Projections of Educational Statistics to 1978-79 (Washington, D.C., U.S. Government Printing Office, 1969), Table 13, p. 30.

¹⁰⁴U.S. Office of Education, Biennial Survey of Education in the United States (Washington, D.C., U.S. Government Printing Office), 1944-46 and 1948-50 and

Michigan Department of Education, A Report on Enrollments in Michigan Colleges and Universities (Lansing, Michigan, 1968).

support of research, especially in the natural sciences. In 1957 the launching of the Russian Sputnik gave a renewed impetus to federal support for higher education.

The growing extent of the federal involvement is probably best shown by the changing sources of income of higher education. Before World War II, in 1939-40, the federal government contributed about \$40 million (5 per cent) of the \$720 million current fund income, \$32 million of which was to land-grant institutions. Ten years later, in 1949-50, the federal government's share of a total of \$2.39 billion was \$527 million (22 per cent) and in 1959-60 the corresponding figures were \$5.81 billion and \$1.04 billion (18 per cent). Finally, in 1965-66 the federal government contributed \$2.66 billion (21 per cent) of a total current fund income of \$12.80 billion.¹⁰⁵

Despite the magnitude and importance of its support, by 1965 the federal government still had not formed any comprehensive plan for its funding of higher education. It was still operating many categorical programs, largely uncoordinated, to deal with specific needs--basically the same approach as had originated one hundred years earlier in the first Morrill Act. The G.I. Bill was prompted by a concern for veterans, much of the contract research was motivated by the interest in national defense, the need for facilities gave rise to separate programs such as the Higher Education Facilities Act of 1963, and one could go on--seemingly for pages and pages. While this unquestionably produced positive results, the practice was often criticized for its concentration of support to a relatively small number of fields, faculty, and

¹⁰⁵U.S. Department of Health, Education, and Welfare, Digest, Table 126, p. 95.

institutions. After careful study one observer concluded, "The government (and vaster historical forces) has divided the liberal arts faculty into a contingent of relatively young scientists and social scientists with lighter teaching loads, higher income, substantial research support, and other perquisites, and another contingent of older humanists, with heavier teaching loads, lower incomes, and little research support."¹⁰⁶

The Higher Education Act of 1965 might be viewed as a culmination of such efforts. Although it recognized a broad federal responsibility, both in the public and private sectors and at the undergraduate and graduate levels, there still did not exist a comprehensive underlying philosophy. The Act is summarized as follows by Brubacher and Rudy:

The omnibus act of 1965...authorized federal financing to enable colleges and universities to assist in the solution of community problems such as housing, public health, and poverty by way of research, university extension, or continuing education programs. It established a program whereby federal funds would be appropriated to help institutions of higher education improve and expand their libraries. It made provision for federal assistance to help raise the quality of developing colleges that "For financial and other reasons are struggling for survival and are isolated from the main currents of academic life." National Teaching Fellowships were established to encourage graduate students and junior faculty members to teach at such institutions. Four types of federal assistance were provided to academically qualified students in financial need, including Educational Opportunity Grants, an expanded program of low-interest insured loans, and increased college programs offering the opportunity for part-time employment. Fellowships were established for the university training of those who wished to enter or re-enter the field of elementary or secondary education. Finally, the legislation made available financial assistance for the acquisition by colleges of laboratory equipment, audio-visual materials, and television equipment and materials for the

¹⁰⁶Harold Orlans, The Effects of Federal Programs on Higher Education (Washington, D.C., The Brookings Institution, 1962), pp. 293-4.

improvement of undergraduate instruction. The federal government, already the principal financier of America's programs of higher education, had, in 1965, turned a significant corner. It was now permanently committed to a continuing broad-based effort to maintain academic quality and encourage, where necessary, collegiate improvement and expansion.¹⁰⁷

Thus, by the mid-1960's higher education was viewed as a service to the nation and enjoyed support coordinate with that role. Young people were flocking to the campuses and paying increasing tuitions for the privilege. Foundations and businesses were funding a wide variety of projects in the firm belief that the expertise within the university offered the best hope for the solution of problems. Government bodies at all levels had comprehensive programs for the support of higher education. Problems existed, but they were primarily problems of providing for the needed growth--and with such widespread support, few questioned whether the nation and its citizens would be equal to the challenge.

If one listened closely, however, he could hear the faint roar of the rapids downstream--for higher education was soon to learn that the mainstream was not always calm and well-charted. The buffeting which was to come would cause a complete re-examination of the chosen course, the vessel, and even the crew.

Seeking A Mission: Present

The recent turmoil surrounding higher education is all too familiar to most of us and requires only a brief review. Somewhat ironically, the first cracks in the solid base of support for higher education appeared among students--the very group reaping the most benefits

¹⁰⁷Brubacher and Rudy, op. cit., pp. 241-2.

in the opinion of many people.

At a time when the entire nation was becoming more sensitive to racial, economic and other injustices, the students were perhaps more caught up in the spirit of idealism than any other group. They discovered poverty along with John F. Kennedy and joined in the fight to eradicate it both at home and abroad. They marched, rode buses, and registered voters in the South in support of expanded political and economic power for blacks. And, with ever increasing intensity and resulting violence, they protested against a war in Southeast Asia which they viewed as an immoral expedition whose only results were death and destruction for the Indochinese, consumption of federal resources urgently needed elsewhere, and exploitation of their own generation. From the viewpoint of many students, U.S. society required reform and renewal.

But the colleges and universities, in the eyes of a significant number of students, were catering to the demands of the very elements most in need of reform. College administrators and trustees were seen as willing, and even anxious, to prohibit controversial speakers from appearing if their presence might antagonize legislators or alumni. On most campuses, the students found that minority groups were as underrepresented on the staff (except as custodians, of course) and in the student body as was true in other influential groups. The research program came to be viewed as primarily a tool of federal agencies, such as the Department of Defense, whose goals were not shared. In sum, higher education was as badly in need of reform, if not more so, than the rest of society. To those who expressed skepticism concerning their description of the forces at work, the student critics could

point to a book by one of the most respected university administrators, Clark Kerr, who wrote (in a much less critical vein), "The location of power has generally moved from inside to outside the original community of masters and students. The nature of the multiversity makes it inevitable that this historical transfer will not be reversed in any significant fashion..."¹⁰⁸ and "The university and segments of industry are becoming more alike...The two worlds are merging physically and psychologically."¹⁰⁹

The controversy over these issues and others soon spread from a limited number of students on a few campuses to many groups across the nation. Portions of the general public and their legislators supported reprisals against demonstrating students, administrators who were "responsible for a break-down in discipline," and even institutions in which disturbances occurred. Others were sympathetic to the arguments of the critics. But most citizens were probably unsure of who was right—suddenly feeling less certain about what was taking place in the colleges and universities and, more importantly, what should be happening.

At the same time as internal divisions became more apparent, many of the anxieties associated with international issues subsided—adding to the uncertainties facing higher education. The United States space program landed the first man on the moon, the much touted "missile gap" proved to be an illusion, our economic growth rate overtook and even surpassed that of the Soviet Union, the Cold War thawed significantly,

¹⁰⁸Clark Kerr, The Uses of the University (New York, N.Y., Harper & Row, 1963), p. 26.

¹⁰⁹Ibid., pp. 90-1.

and the Soviet Union and China were obviously rivals rather than allies in many respects. That support for higher education which was rooted in the fear of external forces tended to decline or even disappear.

As general public support for higher education wavered, the potential fiscal resources also became tighter. Increased expenditures for the Indochina War and the Great Society programs put intense pressure on the federal budget, leaving little or no room for greater support of higher education. The difficulties were compounded when the economy entered a recession, but recovery from that recession did not eliminate the genuine fiscal crisis facing colleges and universities at a time when their credibility seemed to be sinking to the lowest level in decades.

Thus, the higher education community now finds itself the subject of both internal and external reexamination—partly to justify its funds but maybe even more to find and justify its proper role in society. In the next chapter we will examine and compare some of the major proposals being made in the course of the deliberations.

Chapter III

Financing For What?

Controversies over matters of political philosophy, since they are controversies over fundamental beliefs, are exceedingly dangerous for any nation. They certainly ought not to happen too often, for they then make civilized political life very difficult to sustain. But they ought to—they inevitably will—rise occasionally. We seem to be living through such a moment now; and the first thing to do is consciously to face up to this critical fact and make it manifest in all its implications. We must go behind the smaller questions in order to contemplate the larger answers they tacitly demand.¹

In many respects the present financial crisis in higher education is a derivative of even more basic controversies in higher education and society. Until there is agreement on the purposes of higher education, the prospects for resolving the financial crisis are exceedingly poor; but agreement on the purposes of higher education is possible only within the context of a general consensus as to the appropriate goals and values for our society.

Evidence abounds that the United States is experiencing a period of uncertain and conflicting goals. The traditional values associated with national security, national prestige, private consumption, and economic growth have been rejected by many—and questioned by many more. Billions are spent on war materials, subsidies to business, and luxury items while the environment deteriorates, cities decay, children hunger, and crime grows. The forces of change seem to press from all directions, and yet a large number view change as a threat which must be resisted. If higher education—as a "prime instrument of national

¹Irving Kristol, "From Priorities to Goals," The Public Interest, Summer 1971, p. 4.

purpose" or "a means to the achievement of the country's ideals"—seems harried and confused, it is at least partly due to a bewildered society.²

If society is confused about what it expects from the colleges, the colleges are at least as confused over how to define current societal problems and their own responsibilities for achieving solutions. Proposals range from more basic research to political action, from greater attention to the intellectual elite to open admissions. Internally, the "community of scholars" has often broken into factions—students, faculty, administrators, and trustees each striving to gain or retain power over some part of the decision process.

The importance of the above to the financing question is that the chosen means of finance will in large measure determine who will exert influence—thus determining the purpose of higher education and affecting national policy. The historical record reviewed in the previous chapter contains many examples of such shifts in influence: the Morrill Act led to a great expansion in educational opportunity and vocational programs; huge fortunes enabled individuals to establish institutions of their choosing; the Carnegie Foundation, through its pension plan, set admission standards; the G.I. Bill enabled a huge wave of returning veterans to demand, and gain, higher education; federal grants changed the research emphasis within institutions and increased the power of

²Clark Kerr, The Uses of the University (Cambridge, Mass., Harvard University Press, 1963), p. 87.

Robert M. Hutchins, The University of Utopia (Chicago, Ill., University of Chicago Press, 1953), p. 100.

the faculty who received them, and so on.³ Of course, one must hasten to add that instituting a financing scheme consistent with a given set of goals and values does not guarantee their dominance. There are many other control mechanisms, such as the system of governance and the rules of tenure, which will influence the purpose of higher education. But most would agree that control of a significant portion of the budget is an important source of leverage.

Thus, it is clear that the problem of financing higher education is in a fundamental sense a problem of conflicting values. The question relevant to the policy process is not so much "how valuable is an education?" as "how is an education valuable?". The work of economists up to now has tended to concentrate on the former, resulting in estimates of private and social money rates of return using the well-known maximizing and minimizing principles of economic theory.⁴ The approach followed here is much broader. It might be best characterized as "political economy;" the emphasis is not on finding the most efficient means to achieve a given end (such as maximum money wealth) but on

³Many others have noted the connection between the control of financial support and the wielding of power. Among them are:

Sir Eric Ashby, Any Person, Any Study (New York, N.Y., McGraw-Hill Book Company, 1971).

Robert M. Hutchins, The Higher Learning in America (New Haven, Conn., Yale University Press, 1936), especially pp. xi-xii in the preface to the 1962 printing.

Christopher Jencks and David Riesman, The Academic Revolution (Garden City, N.Y., Doubleday and Company, Inc., 1969).

Kerr, op. cit.

Edgar Litt, The Public Vocational University: Captive Knowledge and Public Power (New York, N.Y., Holt, Rinehart and Winston, Inc., 1969).

⁴For example, see the papers on "Cost-Benefit Analysis of Educational Expenditures" in M. Blaug, ed., Economics of Education 1 (Baltimore, Md., Penguin Books, Inc., 1968).

comparing the characteristics of ends so that decision makers will be better informed as they make the hard goal choices.⁵ Let us hope that if a change comparable to the Morrill Act occurs in the near future, we will this time have the foresight to recognize its significance.

Many roles have been proposed for higher education. They differ in many respects, but disagreements related to the role of the higher education community as critics of society appear to be at the core of much of the conflict. Some would have colleges and universities provide the means for attaining goals set by the larger society, and any attempt by faculty and students to promote alternative goals is viewed as arrogant behavior undeserving of support. At the other end of the spectrum are those who argue that the institutions of higher education and the people associated with them have a responsibility to vigorously support drastic changes throughout society.

Attention began to focus on the potential role of higher education as a critic of society quite recently, relative to the periods when other roles were articulated. As was observed in the historical review, the early American colleges were expected to preserve culture, not reconstruct it. Despite being eroded somewhat by the spread of ideas associated with the Enlightenment, this general thrust held sway until the Progressive era less than one hundred years ago—out of

⁵There are strong indications that this approach will be of increasing importance. The Organization for Economic Co-operation and Development (OECD) concludes in its report Science, Growth and Society (Paris, France, OECD, 1971) that "economic growth per se is no longer a sufficient overall objective." Interested readers might also look at the section on "From Economics to Political Philosophy" in The Public Interest, Summer, 1971.

which arose the AAUP, largely as a protector of the faculty's critical role. Certainly the German model of scholarship with its deference to the state was not a positive influence in this matter.

In this chapter a broad range of activities and roles are examined which span the continuum from uncritical acceptance of existing institutions to frankly revolutionist ideas. Our central concern will be to relate these different positions to compatible financing frameworks. If this link can be established, we are then in a position to reason in both directions, i.e., (1) that a given role of higher education will be consistent with, and encouraged by, a certain financing scheme and (2) that a proposed means of finance is likely to stifle some roles while encouraging others. Using an analogy from economic theory, we will be in a position to specify the opportunity cost of alternative financing proposals in terms of the values and goals implicitly rejected.

Adaptation To Existing Societal Goals

The central thesis of the proponents of this position is that institutions of higher education, and more specifically their employees, are means to be used for attaining goals chosen by others in society. The faculty is regarded as a source of skills, expertise, and ideas upon which individuals and groups may wish to draw for enhancement of their own goals. There is, however, considerable disagreement as to who should have priority access to this pool of resources and upon what terms access should be granted. Three rather different approaches will be examined: (1) laissez faire, (2) societal goals assigned precedence, and (3) student goals assigned precedence.

Laissez faire

From this vantage point colleges and universities are seen as selling a service to individuals and other institutions; the service may be purchased for its consumption value (attending a college or university is an end in itself) or as an investment (the higher education service yields to the purchaser both monetary and non-monetary returns which are the desired end) or, more typically, a combination of the two aspects. In any case, the ability and willingness of buyers to pay and the desire of educators to reap monetary gain are the forces at work which determine who receives educational services and what form these services take. The well-known theorems of economics are used to "prove" that the most efficient allocation of resources will occur if each individual or group bears the full cost of his higher education experience; this assumes, of course, that all individuals wish to maximize their own utility, people are completely independent with respect to their utility functions (no one's enjoyment is affected by the joy or misery of others), individuals can obtain funds in a perfectly functioning capital market, the common denominator of monetary value is adequate to provide a basis for the aggregation of all the "good" and "bad" effects, expenditures on education are subject to diminishing marginal productivity and utility (mathematical "second order" conditions), and several other things.⁶

⁶For a more detailed discussion of the limitations of the customary assumptions of economics see Glenn L. Johnson, "The Quest for Relevance in Agricultural Economics," American Journal of Agricultural Economics, Vol. 53, No. 5, December 1971, pp. 728-739.

The existence of a "public good" component is not recognized—or the public good component of training is said to be irrelevant for public policy purposes because the private rate of return is so high people will invest in higher education without the spur of a public subsidy.⁷ Thus, expenditures on higher education become completely analogous to purchases of automobiles or housing which also yield a mix of consumption and investment services. The various political bodies and corporate organizations act as the representatives of groups for the purchase of services, primarily research, whose impact is on a set of individuals; the analysts thus assume that the existing political system provides an appropriate weighting of the goals and values of individuals.

This role as a "service station" for the needs of others has a long history and is recognized as being an important element in contemporary higher education even by those who condemn much of its influence.⁸ For example, it was encouraged by the Dartmouth Case in 1819 which guaranteed the right of special interest groups, primarily religious denominations, to maintain educational institutions free from governmental interference and by the Morrill Act which emphasized

⁷Milton Friedman, Capitalism & Freedom (Chicago, Ill., The University of Chicago Press, 1962), pp. 85-107.

W. Lee Hanson and Burton A. Weisbrod, "A New Approach to Higher Education Finance," Discussion Paper 64-70, Institute for Research on Poverty, University of Wisconsin (February, 1970), especially pp. 7-8.

⁸For example, see William M. Birenbaum, Overlive: Power, Poverty, and the University (New York, N.Y., Dell Publishing Co., Inc., 1969), especially pp. 114-9.

Edgar Z. Friedenberg, "The University Community in an Open Society," Daedalus, Winter 1970, pp. 56-74.

Paul Goodman, The Community of Scholars (New York, N.Y., Vintage Books, 1962), especially pp. 30-1.

the development of vocational skills and applied research. The moves toward regular institutional support and faculty tenure, however, are events which arguably reduced the necessity or ability of colleges to respond to external demands and thereby diluted this role.

An appropriate financing scheme given the above philosophy of education is fairly obvious. In general, students should be required to pay the full cost of their education, for they reap the benefits. Special interest groups, such as religious denominations, might desire to subsidize certain kinds of education--ministerial, for example--when they see the group benefiting; this is consistent with, and in fact commendable within, the framework outlined above. The important point is that general tax revenues should not be used to defray the costs of training individuals. If concern for the unequal distribution of wealth leads to public subsidies for the poor, these subsidies should be given directly to the poor rather than to the institutions; presumably this issue should not arise, however, for if higher education is equivalent to other goods, there is no reason to tie subsidies to higher education. Thus, loans should be an adequate means to finance a student's costs of higher education. Research projects would be financed by those who wish to see the project done, be they individuals, private corporations or public bodies.

The obvious, and intentional, impacts of this policy are:

(1) students would have a greater impact on educational policy, (2) government bodies would lose any control over curricula associated with the financing functions, but would influence research, (3) colleges and universities would experience greater financial pressure to adjust their programs quickly in a manner consistent with current public

opinion, and (4) there would be no distinction between the public and private sector with regard to financing.

Societal goals assigned precedence

Although agreeing, implicitly or explicitly, that the proper role of higher education is to facilitate the attainment of the goals of others, some reject the laissez faire position in the belief that there are over-riding public interests which should take precedence over student concerns. In their view an important function performed by the college and university system is the identification of the level of ability of young people and the cultivation of that ability in a manner consistent with society's needs. Part of the responsibility of higher education, they maintain, is to insure that sufficient numbers of trained individuals, such as medical doctors, teachers and accountants, are available to fulfill perceived needs.

Two related concepts, selection and equal opportunity, are involved. Before considering each individually, let us more carefully examine their relationship. If the nation is to reap the full benefits of the available intellectual resources, it is essential that no group be excluded from the educational process; thus, the functions of selectivity and equal opportunity are complementary in that the former can operate to its fullest only when the latter is also fully realized. On the other hand, the constant pressure of scarce resources forces us to choose at the margin between a greater expenditure on those who have proven superior ability and those with less education who may prove to be equally able with additional education; in this sense the two concepts are competitive. This last aspect, of course, is the one that colleges, universities, and societies are struggling with in the

policy process.⁹

The importance for society's welfare of identifying and cultivating an elite on the basis of ability so the best possible leadership would appear in both the private and public sectors is usually linked to Jefferson's concept of an aristocracy of ability rather than origin. It is widely accepted among educators that higher education has played an important role in this regard, and it is felt this function must be defended against the threat of Jacksonian populism.¹⁰ A relatively few private colleges and universities have been most instrumental in this regard, especially at the undergraduate level, according to some observers.¹¹ Although not as closely linked to the education of a small group of elites, public institutions have played a major part in encouraging some young people to continue their education and certifying them as competent while discouraging others.

Insuring equal opportunity to higher education with respect to people's socio-economic background has been widely discussed in almost every forum—e.g., journals, books, newspapers, legislative—and needs little amplification. The goal appears to be universally accepted in

⁹For example, see OECD, op. cit., p. 99.

¹⁰For example, see Ashby, op. cit., pp. 31-2.

John S. Brubacher and Willis Rudy, Higher Education in Transition (New York, N.Y., Harper & Row, 1968), p. 402.

Jencks and Riesman, op. cit., p. 12.

Kerr, op. cit., p. 121.

Edward H. Levi, Point of View (Chicago, Ill., University of Chicago Press, 1969), pp. 35-6.

¹¹Ashby, op. cit., pp. 31-2.

Jencks and Riesman, op. cit., pp. 282-5.

principle, although the priority placed on its achievement varies markedly from one setting to another. Some of the important milestones in our American heritage which bear witness to our commitment to this ideal are the American Revolution, Jacksonian populist ideas, Emancipation Proclamation, Morrill Acts, and G.I. Bills.

A comprehensive program to provide more equal opportunity of education would involve several elements. With regard to the financial component, public subsidies should focus on the economically disadvantaged. Such aid should be tied to attendance in a college or university only if higher education is viewed as at least partially a public good. In order to remove any financial disincentive which might otherwise affect admission policies, institutions should receive supplemental grants to cover any additional costs they incur as a result of admitting educationally disadvantaged students rather than more typical students. Organizationally, institutions should be prepared to admit a more diverse group and to offer them a curriculum geared to their special needs. Higher education would increasingly be expected to provide levels of achievement ordinarily attained in other settings, i.e., admit students according to some measure of innate capability, rather than past performance, and offer them an appropriate curriculum. This, as evidenced by our discussion of the early colleges, especially the land-grant movement, is not as much a new issue as one of renewed relevance.

A policy emphasizing the identification and cultivation of those with greater ability would ideally start from a broad base such as that outlined above, but other elements would increasingly become dominant as the students moved through the system. Screening devices

would be necessary to identify the more able. Once identified, they should be given the necessary financial incentive to continue their education. The number receiving such awards would decrease at each stage, leading to a hierarchy of groups and associated institutions based on ability. Finally, those allocating funds would recognize that it is appropriate to have different levels of funding for different institutions. Those students having different levels of intellectual ability and/or different ambitions require different kinds of educational experiences which implies different costs.¹² Presumably, following the elitist argument, the best faculty and the best students will tend to gravitate to that institution with the most resources and this critical mass will give society its best hope for renewing and transforming itself.

Recently, however, the function of screening the population has come under intense criticism. One complaint is that this has led to an over-emphasis on certification by higher education which has, in turn, subverted the educational process.¹³ It is alleged that a person's college record, especially his degree status, has become an important criteria used by employers in their hiring decisions. This has the consequence of causing many people to associate (correctly—

¹²Ibid., pp. 9-17.

American Academy of Arts and Sciences (AAAS), The Assembly on University Goals and Governance: A First Report (Cambridge, Mass., AAAS, 1971), p. 29.

Ralph A. Dungan, "Higher Education: The Effort to Adjust," Daedalus, Winter 1970, pp. 143-6.

¹³AAAS, op. cit., p. 14.

Dungan, op. cit., pp. 147-9.

the evidence would indicate) a higher income with possession of a college degree; this leads, of course, to attendance merely to make money (attain a degree), with little or no genuine intellectual motivation.¹⁴ If there was a high level of confidence that those who attained degrees were in fact superior in some respect, this would not be a severe problem. The solution would be to weed out accurately and as quickly as possible those who were not capable or not motivated; such students would recognize they were not as well suited as others for such training and they could then search for their own area of comparative advantage. But such confidence is sorely lacking.

Student goals assigned precedence

A growing number of people, especially the young, have come to doubt the legitimacy of the present professionals and leaders and, in turn, the processes by which they are selected.¹⁵ This is true not only in education but also in our political system, civil service, and businesses. The educational system, it is argued, does nothing but legitimize the continued holding of power by the sons and daughters of the powerful; the rhetoric and actions disguised under "equal opportunity" are merely means of making the disadvantaged feel their failure

¹⁴Ashby, op. cit., p. 7.

¹⁵Jill Conway, "Styles of Academic Culture," Daedalus, Winter 1970, pp. 45-6.

Edgar Z. Friedenberg, The Vanishing Adolescent (New York, N.Y., Dell Publishing Co., 1959), p. 27.

Stanley Hoffman, "Participation in Perspective?", Daedalus, Winter 1970, p. 180.

Ivan Illich, "Why We Must Abolish Schooling," The New York Review of Books, July 2, 1970, pp. 9-15.

is due to their own lack of ability rather than to the system they must inhabit.¹⁶ What is needed, they contend, is a higher education system which caters to the needs of students—rather than to those of a society rife with injustice and inhumanity.

Using results from the study of psychological development, especially among the young, several prominent critics of higher education have hypothesized that our individual, educational, and societal problems revolve around the issue of individual self-identity.¹⁷ Their line of reasoning proceeds as follows: A crucial stage in the development of an individual is the period in which he defines his life style in relationship to both the people and objects in the surrounding environment; this time, which usually contains elements of conflict between the individual and society, is customarily referred to as "adolescence."¹⁸ It is only after this period of critical evaluation of himself and others that he begins to act as the free moral agent which is prized in our Western tradition. He makes choices which, although affected by the environment, are designed to further the ideals he holds in his mind; thus, he exhibits personality and maturity.

¹⁶ Friedenberg, The Vanishing Adolescent, p. 117.
 Ivan Illich, "Schooling: The Ritual of Progress," The New York Review of Books, December 3, 1970.
 Jencks and Riesman, op. cit., p. 491.

¹⁷ Erik H. Erikson, Identity: Youth and Crisis (New York, N.Y., Norton, 1968).

Friedenberg, The Vanishing Adolescent.
 Kenneth Keniston, Young Radicals: Notes on Committed Youth (New York, N.Y., Harcourt, Brace and World, 1968).

Harold Taylor, How To Change Colleges (New York, N.Y., Holt, Rinehart and Winston, 1971).

Robert Paul Wolff, The Ideal of the University (Boston, Mass., Beacon Press, 1969).

¹⁸ Friedenberg, The Vanishing Adolescent, pp. 19-38.

Such a person is thought to be worthy as an individual and an asset to society.

Continuing to develop their case, they maintain that contemporary society is fast deserting the above model for one that describes the mature, well-adjusted individual as one who does not resist change, conforms to the group mode, and—in general—accepts the environment.¹⁹ One must be prepared to go to work at 8 a.m. and leave at 5 p.m., repeat the same mechanical task every four minutes on an assembly line, change jobs several times in a life-time, make and break friendships every few years with a change in residence, not "make waves" but be a good "member of the team," refrain from "stapling, spindling, folding or otherwise mutilating" scores of times each year, and a million other big and little things. The fact that we are a society of mass-production, huge bureaucracies, mass-communication, and other generalized institutionalized means of impersonally handling human beings and their problems becomes the dominant fact in our lives.

Rather than providing a counter-vailing force as those holding this position would deem appropriate, higher education is viewed as aiding and abetting the move towards a bland society where adjustment and conformity are values in themselves, i.e., performing the role outlined in the previous section with deadly efficiency. Although our concern centers on contemporary higher education, it may be worth noting that almost 500 years ago Erasmus, while at the University of Paris, "mentioned in a letter that, as he wanted to obtain the doctor's degree, he tried to say nothing either graceful or witty."²⁰ Modern

¹⁹Ibid., pp. 17, 24-9, 65, 200-12.

²⁰Bertrand Russell, A History of Western Philosophy (New York, N.Y., Simon and Schuster, 1945), p. 513.

critics describe the impact of colleges and universities in the following manner. The emphasis is on teaching the student how to move into the world as it now exists with a minimum of anxiety for both himself and others.²¹ The young person learns to defer to faculty authority in his selection of courses because they know "what the role requires;" to look upon education as 60 separate units of 3 credits each because of "administrative necessity;" to exhibit the proper decorum when addressing those in authority, which must, of course, be done "through channels;" and even to submit to regulations concerning where he lives, when he eats, and when he (increasingly only "she") must be in his room. In summary, the entering eager, potentially idealistic adolescent emerges as one of thousands with a ready-made job-orientation and a ready-made psyche—a victim of, in Harold Taylor's words, "institutions organized against the interests of those who attend."²²

The alternative system of higher education proposed by those whose views are described above would focus on fulfilling the needs of students rather than serving the demands of corporate, governmental and other established powers. In the following paragraphs their ideas for reform are presented, accompanied by a financing proposal consistent with their framework.

Higher education should, if it is to encourage the development of people with firm self-identities, offer the student an opportunity to explore, free from restrictive rules, the world and his relationship

²¹Hutchins, The Higher Learning in America, pp. 26-7.
Taylor, op. cit., pp. 30-6.

²²Taylor, op. cit., p. 35.

to it. Students should design their own programs with advice from others, including faculty; the present practices merely restrict the experience of the student, serve the interests of employers who desire a uniform output (not unlike produce buyers), and distort the relationship between students and faculty--which should be one of equals in a community of scholars.²³ Colleges and universities, as virtually the only means to socio-economic mobility, must acknowledge and reward a much broader range of competencies; "society must recognize the claims to dignity and opportunity of all its constituent groups."²⁴ Every student should have the opportunity to experience the creative arts as a way of expressing one's feelings concerning himself and life, instead of the usual view which leads people to expect only diversion and decoration.²⁵

Several current characteristics of higher education should be moderated or eliminated completely. The "manpower" approach is completely inappropriate: higher education is not a factory turning out "x-number of engineers" and "y-number of teachers" but a place where people can come to know their own unique competencies and ideals. The dossier-building and certification functions are destructive to learning; not only do they put an emphasis on serving the current employment market and inhibit social mobility as discussed earlier, but they destroy the personal relationships between students and others which are

²³ Goodman, op. cit., pp. 259-61, 312-6.
Taylor, op. cit., pp. 76-84.

²⁴ Friedenberg, "The University Community...", p. 61.

²⁵ Friedenberg, The Vanishing Adolescent, p. 96.
Taylor, op. cit., pp. 120-8.

important in both moral and intellectual growth.²⁶ Finally, the influence of administrators must be decreased and kept at a minimum. The administrative tendency to preclude conflict, controversy, and confrontation in the interests of a bland consensus both within the institution and between the institution and society is exactly the disposition which must be resisted.²⁷

The key element in this approach to higher education is the freedom of students to choose and thus put pressure on the institution to respond to their desires rather than those of external power centers. The students' influence would be greatly enhanced if they, in addition to having free choices among courses and instructors, were the major source of financial support for the instructional program. This could be accomplished by a voucher system, i.e., all public funds for higher education would be distributed to students as an automatic feature of admission rather than, as is now customary, giving public grants to institutions. A wide range of institutions must be acceptable places for the use of the vouchers; efforts of established powers to restrict the choices of students by limiting the character of qualifying institutions should be resisted. Those institutions, departments, and classes that were not responsive to students would soon be vacant.

This approach should not be construed as a threat to non-teaching faculty hired for other purposes, such as the performance of research or public affairs functions. These other activities would continue to be appropriate when specifically authorized and funded. What would

²⁶Friedenberg, The Vanishing Adolescent, pp. 102-5.

²⁷Birenbaum, op. cit., pp. 109-11.
Goodman, op. cit., pp. 172-4, 186-8, 192-5.

not be appropriate is hiring researchers who "go through the motions" in the classroom for required courses and receive instructional support under the guise of serving students; these faculty would find their classrooms vacant under this new procedure and the administrators would be under great pressure to support these people with non-instructional funds or drop them from the faculty. Thus, through greater freedom and budget leverage, the students would find both faculty and administrators more responsive.

The proponents of this student centered model would probably contend that continued public support, in the form of vouchers, is justified. In their view the development of a strong sense of self-identity, which is encouraged by the above system, is absolutely essential if our society is to maintain and increase its vitality in a manner consistent with our democratic heritage.

Before leaving this section, it might be well to note that a substantial majority of students within a voucher system might opt for a highly vocational program with little or no emphasis on obtaining a liberal education. This would almost certainly disappoint those writers who emphasize the place of the liberal arts in a good educational experience. One can only speculate concerning their continued support of a "student oriented" model under such admittedly hypothetical conditions, but some defections would not be surprising.

Concluding comments: adaptation to existing societal goals

Despite the range of views contained in this first section—from laissez faire economists to self-identity psychologists, there is a common theme running through their statements. Higher education

assumes a passive role of responding to the needs of individuals and other institutions; it is essentially a means to be used to attain ends set by external forces. The important decisions concerning the goals of education are left to those with economic power, political power, or students—depending on the values of the particular writer. The colleges and universities are expected to facilitate the endeavors of others, not criticize them.

The organizational and financial systems consistent with the above are designed with clear, responsive linkages between higher education and those to be served. Any lack of responsiveness on the part of educational institutions is to be met by a cut-off in support so severe that the institutions must adjust quickly if they are to survive. Financially, this is best accomplished by giving control over funding decisions to those who are to be served. If the economic powers are to be served, then they should be the sources of funds; if students are to be served, then all funds should be channeled through them; and so on.

Neutral To Existing Societal Goals

Advocates of this role maintain that a detached pursuit of knowledge leads to the best formulation of problems and solutions. They believe that those who are committed to a position will, at best, be unconsciously biased, or, at worst, deliberately deceptive, and that either represents inadequate service to mankind. The fullest flowering of this position was found in the German university, which, as was previously mentioned, greatly influenced Jefferson at the University

of Virginia, Tappan at the University of Michigan, and especially Gilman at Johns Hopkins University. The spokesmen for this position are well-known and eloquent; liberal use will be made of quotations from their works.

Abraham Flexner who was one of the early students at Johns Hopkins, later wrote:

The university professor has an entirely objective responsibility—a responsibility to learning, to his subject, and not a psychological or parental responsibility for his students.²⁸

I have not in mind the training of practical men, who faced with responsibility for action, will do the best they can. That is not the task of the university.²⁹

(The faculty member) has, I repeat, no practical responsibility for the trouble he makes; it is his business and duty to preserve his independence and irresponsibility. But he must go on thinking; in that realm his responsibility is of the gravest. And, perhaps, in the fullness of time, the very license of his thought may, without intention or forethought on his part, suggest inventions or profoundly influence solutions, as it has done heretofore.³⁰

For those who prefer a modern spokesman, let us turn to Edward H. Levi, president of the University of Chicago. Addressing those who urge the university to intensify its problem-solving efforts, he writes:

Today, with the growth of specialization and freedom, we ask of the individual scholar only that he formulate his views so that they may enter into some kind of marketplace for rational discussion.....It is assumed the exchange of ideas will build upon the individual work of many persons, and we rely on this process to somehow achieve a kind of coherence.³¹

²⁸ Abraham Flexner, Universities: American, English, German (New York, N.Y., Oxford University Press, 1930), p. 8.

²⁹ Ibid., p. 11.

³⁰ Ibid., p. 22.

³¹ Levi, op. cit., p. 64.

It is important to note that the above principles outline a strategy for dealing with inquiry, including that related to current problems.³² To describe this approach as unrelated to current issues is inaccurate, although most who subscribe to it would exclude the more applied fields of inquiry from the university.³³

The supporters of this role stress the following principles with regard to the students. The education of students is not to be governed in any large part by their whims; such an approach would inevitably lead higher education into striving to adjust to the transitory needs of the public, rather than concentrating on long-range issues of substance.³⁴ Young people must be made aware of the basic premises of our culture and civilization; this requires intellectual effort in a prescribed course of studies.³⁵ Given this common base, the faculty and advanced students can then proceed to the specialization made necessary by the knowledge explosion and yet retain an ability to communicate; the communication among specialists which is a necessary part of the advancement of knowledge must be of a free, informal fashion rather than a forced type that destroys freedom and specialization.³⁶ This approach will not only yield good scholars; it is also

³²Flexner, op. cit., pp. 11-12.

³³For example, see Levi, op. cit., pp. 167-8.

³⁴Hutchins, The Higher Learning in America, pp. 5-6.

³⁵Flexner, op. cit., p. 97.

³⁶Ibid., pp. 97, 114-9.

Hutchins, The Higher Learning in America, pp. 57-9. The emphasis upon specialists interacting to form a productive union seems very close to what Johnson, op. cit., describes as a productive way to organize problem-solving research. Johnson terms the distinction one of multi-disciplinary rather than inter-disciplinary teams.

a source of strength for a democratic society, whose health depends upon the understanding by its citizens of the moral, intellectual, aesthetic, and spiritual values underlying their culture.³⁷

Industrialism and consumerism, such as that outlined in the previous section on Adaptation To Existing Societal Goals, are roundly condemned. Writing in his usual blunt way about these matters, Robert Hutchins states:

Art and thought are the highest activities of man. They are the aims of life, and society should be organized to promote them first of all. It is a sign of a backward civilization when in a financial crisis the first thing a community thinks of is to close the art museums and reduce expenditures on education. A civilization without art and thought, or one that does not value them, is a pack rather than a civilization.³⁸

and he quotes a contemporary (otherwise unidentified) who was pondering man's attempts to master the world for his own use:

Behold man the center of the world, a world all the parts of which are inhuman and press against him. ...In such a morality, not man nor human life as such, but agents exterior to man, material forces, instruments of human life, are subjected to reason. ...This morality does not liberate man but on the contrary weakens him, dispossesses him, and makes him slave to all the atoms of the universe, and above all to his own misery and egoism. What remains of man? A consumer crowned with science.³⁹

Financing this type of higher education is a more complex matter than that of the "adaptation" model for people are now being asked to finance what a small group feels the public needs, not necessarily what it wants. The first important point is that those supporting this

³⁷Hutchins, The University of Utopia, p. 14.

³⁸Ibid., pp. 17-18.

³⁹Hutchins, The Higher Learning in America, p. 100.

role also support vocational education and applied research in institutions separate from true higher education.⁴⁰ Thus, the first logical move would be to select a very few universities most closely approximating the desired neutral model and humanely shift their vocational and applied work to other institutions. One step might be to phase out all research grants coming from private businesses and governmental action agencies (e.g., HEW, USDA, and DOD but not NSF or NIH); this would help to insure that most research was a result of faculty initiative, unbiased, and of basic (as opposed to applied) importance.⁴¹ These select universities would admit only those students who were committed to unbiased, detached study for its own sake.

In the best of all worlds, viewed from this position, the independence of the institution would be buttressed by an endowment sufficiently large to place the university's income entirely within its control. The fortunes of Hopkins and Rockefeller were undoubtedly significant factors in the successful endeavors of Gilman at Johns Hopkins University and Harper at the University of Chicago, as compared to the earlier frustrations of Jefferson at the University of Virginia and Tappan at the University of Michigan. The appropriate strategy for those who must rely on external funding sources, which would probably include all cases to some extent, is to obtain funds from a wide

⁴⁰For example, see Flexner, op. cit., p. 28.

⁴¹This may seem drastic (and it probably would tend to decrease the number of volunteers for "select" status!), but the United Kingdom system of financing research comes quite close to approximating this scheme; see Ashby, op. cit., pp. 85-9. Moreover, it was recently advanced as the preferred scheme for the United States by Philip C. Ritterbush, "Adaptive Response Within the Institutional System of Higher Education and Research," Daedalus, Summer 1970, pp. 649-51.

variety of sources so that no one source has controlling influence. The primary sources of general fund support are student fees, local and state government, private gifts, and endowment income. Most institutions would gain a greater degree of independence from their present sources of funds if the federal government would, as has been proposed elsewhere, make direct institutional grants based on enrollment; the possible exceptions are universities now receiving a major portion of their money from the federal government by virtue of research grants. Public support is completely appropriate, it is argued, for nothing could be more of a public good than guarding our culture and civilization, cultivating perceptive and sensitive citizens, and searching for ways to improve the state of mankind.

Finally, to those who suggest that the public will support only tangible results, Flexner would retort:

The problem of America is not "Main Street;" there are Main Streets in all countries. The hopelessness of America lies in the inability and unwillingness of those occupying seats of intelligence to distinguish between genuine culture and superficial veneer, in the lowering of institutions which should exemplify intellectual distinctions to the level of the venders of patent medicines. So, too, there are Babbitts in all countries, not only in the United States; but "Babbitttry" in the presidency of great universities is an exclusively--as it is a widespread--American phenomenon.⁴²

Critical Of Existing Societal Goals

Many people, disturbed by what they see in society and even more alarmed at the uses to which new knowledge is put, are unwilling to see higher education remain neutral or--worse yet--adapt itself to

⁴²Flexner, op. cit., pp. 151-2.

prevailing notions. They maintain that those in the higher education community have a responsibility to assess the present culture and inform the citizenry of their judgement. Only in this way, it is argued, can society transcend its present state to attain a better one. Higher education must, in their view, maintain a careful balance between responding to the wishes of those served and simultaneously offering advice as to alternative goals and means. Stated differently, they see higher education's role as serving the perceived needs of society through research, problem-solving, and teaching activities in such a way that those served emerge with a broader, more liberated view of mankind and his cultural possibilities.

Before examining this position in more detail, it will be useful to distinguish between "science" and "technology"—making a distinction which is not original but yet not universally applied.⁴³ The upheavals in society as a result of technologies developed in large part within universities have been instrumental in stimulating a reexamination of the relationship between higher education and society.

Distinction of science and technology

Science is inquiry conducted within rules of evidence which eliminate the variation due to the values held by the investigator; these rules are not neutral themselves, i.e., the decision as to what evidence is permitted as valid depends on one's values. However, the

⁴³The usefulness of this distinction became evident from my reading of the following two books, and it is from these that I draw the defining concepts:

Sir Eric Ashby, Technology and the Academics. (London, England, Macmillan and Company Ltd., 1958), especially pp. 81-3.

OECD, op. cit., especially pp. 17, 49, 70-1.

world community of scholars has by-and-large come to accept a common set of rules of evidence which then neutralizes their judgements so long as no rule is violated.⁴⁴ A more common, but less precise, way of describing science is to refer to it as the production of new knowledge. Technology consists of applying the results of science to the affairs of man, i.e., the application of knowledge to human purposes. Thus, the problems of technology include, by definition, an element of human values—even if the technologist is utterly ignorant of any such implications. Science and technology are, of course, intimately related; indeed, one of the pressing problems of society is how to institutionalize their relationship to attain a productive complementarity.⁴⁵

The importance of this distinction is stated well in the OECD report on Science, Growth and Society:

It is essential to distinguish joint enterprises whose objectives are purely scientific from those aimed at application. Once the enterprise is launched, the weight of political factors is obviously lighter in the first case than in the second; there is less dispute about the objective pursued and the results hoped for; whatever the differences in investment, the gain is always a common good, because knowledge is not diminished by being shared. Moreover, precisely because it is the extension of knowledge alone that is involved, the result can be evaluated only by the yardstick of scientific achievement, which is universal and does not touch national values or interests. The scientists, who alone can make this evaluation, belong to a single community with a common standard

⁴⁴This rather difficult, but fundamental, point is discussed very well in John F.A. Taylor, The Masks of Society (New York, N.Y., Meredith Publishing Co., 1966), pp. 156-172 in the chapter on "Science and the Covenant of Inquiry."

⁴⁵The experience of the agricultural sector in the United States may be one of the more successful efforts which will help to suggest guidelines. See James T. Bonnen, "Some Observations on the Organizational Nature of a Great Technological Payoff," Journal of Farm Economics, December 1962, pp. 1279-94.

of values so far as their science is concerned...

On the other hand, when application becomes significant, the weight of political factors increases and scientists are no longer solely responsible for deciding on the orientation of the project and the value of the results. The balance of political and technical factors varies from one joint enterprise to another, but both are always present. From the point of view of the management and execution of the research programmes, political considerations become, in effect, multipliers of difficulties.⁴⁶

Role of higher education

With the above distinction in mind, we will now consider the appropriate role of higher education as defined by the people urging that it be more critical.

In their research programs, the institutions of higher education have a responsibility to evaluate all costs and benefits of actual or proposed technologies, i.e., not merely economic aspects but the implied social alterations, value adjustments, institutional changes, and so on.⁴⁷ Change almost inevitably has the result of rendering certain production processes, groups, and regions as obsolete or comparatively worse off; such implications should be included in the analysis.⁴⁸ The results of such research would take the form of a delineation of the consequences of alternative policy choices, including both choices of ends and of means.⁴⁹ The purpose is not to usurp the decision-making function now residing in the political process but

⁴⁶OECD, op. cit., p. 49.

⁴⁷Ibid., pp. 15, 82.

⁴⁸Ibid., pp. 30, 98.

⁴⁹Ibid., pp. 63-5, 78.

to inform it so that choices are less arbitrary.⁵⁰ Technological change should not be an end in itself, but a means of attaining ends consciously chosen.⁵¹ Thus, applied study is neither rejected as inappropriate or circumscribed completely by society's current preferences.

Turning to instruction, those holding this view argue that higher education should create in students an awareness of the full implications of their own framework of values and of their chosen technological pursuits. The student should be made aware of inconsistencies within his personal values and those proposed by different philosophers as necessary for a truly human community; he should be confronted with a realization of the means required to attain his preferred end—and one could go on.⁵² In his technological studies he should develop a habit of considering the full range of consequences flowing from his work—social, ethical, economic, environmental, and others. Ashby writes, "A student who can weave his technology into the fabric of society can claim to have a liberal education; a student who cannot weave his technology into the fabric of society cannot claim even to be a good technologist."⁵³ A liberal education does not consist of forcing students to sample a variety of courses; the students' exposure to the humanities and sciences must be related to his specialty.⁵⁴

⁵⁰Ibid., pp. 65, 88.

⁵¹Ibid., pp. 39, 77.

⁵²Frederic Lilge, The Abuse of Learning (New York, N.Y., The Macmillan Company, 1948), pp. 136-45.

⁵³Ashby, Technology and the Academics, p. 85.

⁵⁴Ibid., pp. 77-86.

This same point was stressed by John Dewey, whom we encountered in the last chapter as a major participant in the turmoil of the 1930's which saw the problem-solving, scientific emphasis replace the older, classical tradition. He wrote:

Isolation of subject matter from a social context is the chief obstruction in current practice to securing a general training of mind. Literature, art, religion, when thus dis-associated, are just as narrowing as the technical things which the professional upholders of general education strenuously oppose.⁵⁵

and

Knowledge is humanistic in quality not because it is about human products in the past, but because of what it does in liberating human intelligence and human sympathy. Any subject matter which accomplishes this result is humane, and any subject matter which does not accomplish it is not even educational.⁵⁶

Again, the suggested approach is not to exclude the vocational and professional areas of training, but, on the other hand, not to accept as adequate society's existing standards for what such training should include.

Criticism of the adaptation model

Although much of Dewey's energy was focused on persuading humanists, such as Robert Hutchins, that current problem-solving and technical studies should be included in education, he also emphasized that the resulting tendency towards making educational institutions mere adjuncts of existing economic and social organizations must be strongly resisted. Dewey warned of the "grave danger" that "any scheme for vocational

⁵⁵John Dewey, Democracy and Education (New York, N.Y., The Macmillan Company, 1948), pp. 136-45.

⁵⁶Ibid., p. 230.

education which takes its point of departure from the industrial regime that now exists, is likely to assume and to perpetrate its divisions and weaknesses, and thus to become an instrument in accomplishing the feudal dogma of social predestination."⁵⁷

Many concerned observers feel that today's colleges and universities have ignored Dewey's warning and devoted themselves to merely searching for efficient means of attaining the ends determined by existing power centers in society, i.e., they have adapted to existing societal goals (a position supported by others, as we saw in the first section of this chapter).⁵⁸ These people argue that we have allowed, some would say encouraged, our activities to be dictated by those with resources available for specific types of inquiry, which almost invariably means: (1) those who control large amounts of private wealth, (2) those governmental agencies with strong political backing, or (3) a team composed of elements of both—for they are usually related. They see the system turn out a torrent of men and procedures designed to cope with the limits imposed by nature (questions of efficiency, of means) but only a trickle concerned with ends, the limits man imposes upon himself.⁵⁹ Bertrand Russell, in assessing the impact of science on philosophy and society, observed:

⁵⁷Ibid., p. 318.

⁵⁸For a sample see Ashby, op. cit., pp. 74-5.

Birenbaum, op. cit., pp. 110-11.

Robert S. Morison, "Some Aspects of Policy-Making in the American University," Daedalus, Summer 1970, pp. 609-10.

Edward Joseph Shoben, Jr., "Cultural Criticism and the American College," Daedalus, Summer 1970, especially pp. 677-82.

John F.A. Taylor, op. cit., pp. 6-8, 245-9,

⁵⁹John F.A. Taylor, op. cit., pp. 6-8.

The philosophies that have been inspired by scientific technique are power philosophies, and tend to regard everything non-human as mere raw material. Ends are no longer considered; only the skillfulness of the process is valued. This...is a form of madness. It is, in our day, the most dangerous form, and the one against which a sane philosophy should provide an antidote.⁶⁰

In a context focused more directly on education, another philosopher, John F.A. Taylor, wrote:

The dilemma of twentieth-century man is at his core, not at his surface. His dilemma is philosophical: it concerns his fundamental commitments, not his incidental acts, the quality of the ends he pursues, not the efficiency of the means he commands in pursuing them.⁶¹

and Taylor's conclusion:

We have lost in the modern world our capacity for regarding the destiny of mankind as a problem.⁶²

This situation did not arise overnight but developed over a long period, probably centuries. The growth of science was intimately involved in at least three important ways. First, the skepticism concerning absolute truth quickly led to a doubting of all proposed ends and a concentration on means which has more gradually led to a reluctance even to consider ends.⁶³ Second, the explosion of knowledge encouraged specialization and organization along disciplinary lines, cutting the breadth of any one person's knowledge and creating barriers between humanists, scientists, and technologists.⁶⁴ Third, from the plausible contention that all scientific advance represents progress

⁶⁰Russell, op. cit., p. 494.

⁶¹John F.A. Taylor, op. cit., p. 246.

⁶²Ibid., p. 248,

⁶³Morison, op. cit., pp. 609-10.

⁶⁴Ashby, Technology and the Academics, p. 38.
Lilge, op. cit., pp. 72-4.

and "good"—in the sense that it increases man's understanding of himself, his environment and their relationship to each other, there has grown a feeling that all technological change represents progress and "good;" the latter is, as is obvious from the earlier discussion, completely erroneous and catastrophic in its implications.⁶⁵

A reluctance by many scientists and humanists to accept technological studies as legitimate has exacerbated the natural tendency to specialize as knowledge expands. The origins of this attitude may go back to the fact that in many early cultures the vocations were often filled by slaves, but regardless of whether one accepts this, the previous chapter demonstrated the hostility with which the early colleges greeted the new scientific and technological studies.⁶⁶ It would only be natural for the condescending nature of others in that period, and today, to cause the technologists to minimize their contact with the rest of the college or university and, all too often, develop their own inflated sense of importance. Rudolph, as pointed out in the previous chapter, saw a significant change in higher education following the Civil War when higher education absorbed many new professions which concentrated on things rather than man.

More recently, scientific and technological research has come to require such large outlays of funds that those controlling the funds wield considerable leverage on the direction of research. In the period prior to World War II most investigators were content with a quiet study, a good library, and maybe a modest laboratory—with a few

⁶⁵Lilge, op. cit., pp. 76, 136.
OECD, op. cit., p. 45.

⁶⁶Brubacher and Rudy, op. cit., p. 305.

exceptions. In recent decades, however, the use of such tools as particle accelerators, intricate measuring devices, huge surveys, and the all-pervasive computer has been deemed essential for further advances.⁶⁷ The dominant practice in the United States, and this is very significant, is and has been that decisions concerning the allocation of funds for technological research are left in the hands of action agencies with vested interests of their own and, quite often, well-identified private clientele. This is in sharp contrast to the allocation of funds for scientific research which tends to be administered by independent agencies whose decision panels are dominated by members of the scientific community.

Financial and organizational implications

With the above as a framework, what can we say about a financing system which will promote the desired ends? First, although society certainly has the right to determine the total amount of funds to be allocated to scientific and humanistic research and possibly should delineate general areas of emphasis, the bulk of the allocative decisions should be the responsibility of the scientific and scholarly community, for they are the best judges of what areas are ripe for breakthroughs and what projects are well-designed. This research is of potential benefit to all of society, and thus it is appropriate that the federal government should fund it.

Second, funding for technological research should come from both an independent agency, let us call it the Foundation for the Appraisal of Societal Change (FASC), and from groups with decision-making

⁶⁷Morison, op. cit., pp. 628-30.

responsibilities.⁶⁸ The FASC would be responsible for funding projects which would analyze the costs and benefits of actual and proposed technologies as outlined earlier. The decision-making boards of the FASC should include a mix of scientists, humanists, technologists, and political representatives—for all can contribute to the assessment of what technologies most need to be assessed. It would be a mistake to eliminate all funding from bodies other than the FASC for it is through these contacts that higher education is kept conscious of pressing problems and decision-making groups are kept abreast of the most recent scientific research. What is crucial, and now lacking, is a proper balance (undefined by anyone to the best of my knowledge) between FASC funds and other sources more closely tied to vested interests.

Finally, since the education of students provides them with both saleable skills and some knowledge of the broad non-market implications of events, the cost should be shared by the student and society as a whole. The latter knowledge, such as an awareness of the impacts of pollution or an appreciation of the trauma experienced by people left behind when economic progress is recorded, can rarely be translated into higher incomes by those who acquire it. Yet it is upon such understanding that the humanity and justice of society rests—and thus society must take measures to encourage it, according to this viewpoint. This assumes, of course, that the students' educational experience does create awareness—which is presently true only to a very limited extent. The creation of the FASC would be of assistance since research money in an area is followed by faculty research, graduate research,

⁶⁸OECD, op. cit., pp. 61, 66, 69, 102 presents a similar proposal.

graduate education, and undergraduate education—probably roughly in that order.⁶⁹ But more help is needed. Seminars are needed where students from various specialties focus on the same problem area; instruction is needed on the history of technologies and the relationship between technology and social change.⁷⁰ Without such measures, the justification for public support dissolves in a flood of courses focusing on purely private concerns, i.e., increasing the employability of the students.

Rejection Of Existing Societal Goals

At the opposite end of the continuum from those who see the role of higher education purely as a facilitator of the goals of others are people who believe that higher education should be instrumental in overthrowing existing institutions. They maintain that colleges and universities as corporate institutions, as well as the people associated with them, should take action to solve the problems of individuals and society. Most argue that it is impossible for institutions of higher education to remain neutral, leaving the only real choice to be one of whom shall be served—the establishment or a counter-culture. When identifying pressing problems warranting such action, they usually speak of the disadvantaged, the poor, the exploited (politically and economically), the non-white, the hungry, and the war-ravaged—both in this nation and others.

⁶⁹For example, see Jencks and Riesman, op. cit.

⁷⁰Ashby, Technology and the Academics, pp. 86-7 makes a set of specific suggestions for courses.

Higher education as it now functions, they contend, serves the existing centers of power to the detriment of the powerless.⁷¹ Along with others discussed in previous sections, they see it as preparing young people for job roles as they exist in society, emphasizing conformity, certifying the young of the powerful but excluding others, and performing research for vested interests. Their feelings are summarized well by Edgar Z. Friedenberg:

The American University system, like Dr. Frankenstein and Dr. Faustus, is in trouble not because it has failed, but because it has succeeded; and succeeded in undertakings to which it would not have committed itself had it not relinquished moral responsibility in favor of empirical mastery in the first place. If this is too harsh an indictment, it is so for one reason only: that it attributes too much autonomy to the university. University faculty, especially, are inclined to be taken in by their own traditional, but increasingly deceptive pretense that they run the place. In fact, universities are run as America is run: indirectly, by a power structure that depends on the ambitions of the faculty and the lust of its individual members to be close to sources of power to induce it to organize itself so as to do what is expected of it. Power within the university aligns itself to power outside of it.⁷²

It is argued that part of the reason for the above is a futile attempt by institutions to remain neutral when this is impossible, for reasons such as the following. An institution hires people, displaces people when it expands, invests its assets, and interacts with society in many other ways merely by virtue of existing.⁷³ But furthermore,

⁷¹ Birenbaum, op. cit., pp. 16-18.
 Goodman, op. cit., p. 210.
 Litt, op. cit..
 Harold Taylor, op. cit., pp. 2-3.

⁷² Friedenberg, "The University Community...", pp. 73-4.

⁷³ Birenbaum, op. cit., pp. 37-9.
 H. Lynn Jondahl, Unrest on the Campus (New York, N.Y., Friendship Press, Inc., 1970), pp. 59-61.

the very purposes of higher education—education, problem-solving, research—imply possession of a great deal of influence and power as to the direction of society in a culture heavily dependent on educated people and new knowledge; the choices of who to admit, what to teach, and what research to pursue have an immense impact which cannot be construed as neutral.⁷⁴ Given the above power plus the fact that many other centers of power recognize higher education's importance and strive to direct it to their own means, a stated policy of neutrality only lessens higher education's sense of identity and increases the probability that other powerful institutions will be successful in using it for their own purposes.⁷⁵

An attitude that disturbs those who hold this view is that action biases thought, an attitude found in its most extreme form in the "neutralist" case but also held elsewhere. The revolutionists maintain that action and thought are, and should be, intimately related—and that the educational process should reflect this. Learning and working often take place simultaneously and are often complementary; reflecting this, more students should be given the opportunity to engage in work related to their area of study while in college, and more faculty should be drawn from the group of practicing professionals in the community.⁷⁶ Similarly, those who hope to solve our pressing social problems must often become intimately involved in the problem

⁷⁴Birenbaum, op. cit., pp. 69-71, 139-46.
Jondahl, op. cit., pp. 76-7.

⁷⁵Jondahl, op. cit., pp. 77-9.

⁷⁶Birenbaum, op. cit., pp. 52, 86, 177-80.
Goodman, op. cit., pp. 300-6.

area before the necessary understanding will evolve.⁷⁷ Another point at which the connection between thought and action becomes crucial is the definition of a problem; the diagnosis "links knowledge to practice, binds thought to action."⁷⁸ In summary, the habit of thinking must often be linked to action if it is to be insightful, and action must be linked to thinking if it is to be effective. An institution which does not encourage its members to act in controversial problem areas may thus be abdicating any responsibility for their solution.

It is difficult to conceive of a financing scheme which will lead to broad support for institutions which openly advocate political positions, especially positions sympathetic to the economically and politically powerless. However, some suggestions can be made which, even if they do result in a drastic decrease in the scope of public support for higher education, might create institutions more responsive to the needs of the disadvantaged. The first step would be to eliminate all funding from vested interests with no sympathetic concern for the disadvantaged; this might mean all funds from businesses and governmental action agencies. To the degree that the students' influences are positive, and most subscribing to the "revolutionist" purpose find the students' attitudes much more promising than those held by faculty and administrators, the voucher scheme outlined in the previous section should be instituted. As mentioned earlier, however, the flexibility embodied in a voucher scheme can be effectively neutralized by restrictions on where the vouchers can be redeemed; it seems unlikely that

⁷⁷Birenbaum, op. cit., p. 86.

⁷⁸Ibid., pp. 125-6.

public bodies will extend eligibility to students enrolled in revolutionary institutions. Finally, that money which the political process does allocate for study of the problems of the disadvantaged could be given to the disadvantaged with the stipulation that they use it to contract for the services of an accredited college or university; this would help to insure that colleges and universities would be genuinely responsive since the disadvantaged could spend their funds elsewhere. Under the present system, where the researcher usually receives the grant, a community often finds itself being examined and analyzed in a framework wholly or largely developed by the researcher in total isolation from the community.

Conclusion

The chosen manner of solving the present financial crisis in higher education will reveal a great deal about our view of society, higher education, and ourselves. Does society need more or less criticism? What is the responsibility of the faculty? Should higher education lead or follow cultural change? Is the primary goal of man greater material success? Are students responsible enough to choose their own curriculum? Whom should higher education respond to? Are human beings best regarded as unique individuals with freedom and dignity or as components of a complex social organization whose health depends upon the careful replacement of aging parts?

The desired solution will vary with the surrounding circumstances, even given a certain framework of values. For example, if one accepts the argument that faculties will tend to be even more conservative in the next two decades because of growing unionism and few additions of

young people (the reasons for a low rate of growth will become clear in later chapters), then one may be inclined to increase the ability of non-faculty groups to exert pressures for change as compared to the 1950's and 1960's. Thus, it is to be expected that the financing scheme should change over time in such a way as to always offer an incentive to move from the existing to the desired pattern of behavior.

Although society will wield a great deal of influence in the determination of higher education's role, those in the higher education community could be very persuasive if they would agree among themselves. This does not imply that all individuals and institutions perform the same function—only that they recognize as legitimate a set of purposes which they and others have a responsibility to pursue. If the internal political processes of higher education do not yield such an understanding, external political bodies are likely to dictate a solution based on their own perceptions and needs.

The struggle over the financing question has created, and will likely continue to create, unusual alliances. Radicals, self-identity psychologists, and laissez faire economists join in supporting the principle of voucher systems—the economists often seeing these as the first step towards elimination of all subsidies to the prosperous. The defenders of the ivory tower, the faculty using their appointment as a base for consulting and grantsmanship, and administrators who are jealous of their authority agree that student influence should not be broadened.

There is a great danger that the financial crisis in higher education will lead to solutions based on short-run expediency rather than an effort to harmonize the financing system and the goals of

society. The importance of the latter approach has been demonstrated in this chapter through a study of the inter-relationships between various educational philosophies and financing systems. The two must be arrived at jointly if higher education is to serve the difficult tasks which society demands of it.

Up to now nothing has been said concerning the resources required to implement the roles outlined above. In the following chapters the specific case of Michigan higher education will be examined in order to explore the economic costs associated with the various alternatives. A final decision on the best means to finance higher education must await such a comparison, for the additional benefits flowing from a preferred philosophical orientation may be more than off-set by the added costs.

Chapter IV

The Aggregate Demand For Higher Education

With this chapter, we begin dealing with the second objective presented in the introduction: develop a model which specifies in quantitative terms the causal links between the physical variables of primary concern. The observations concerning values, institutional forms, and compatible financing systems which were presented in Chapters II and III will be set aside for the moment. Only after an examination of the modeling effort will we be in a position to combine the philosophical material with the necessary quantitative data in an evaluation of policy alternatives, which will be done in Chapters VI and VII.

The demand for higher education is a crucial element in almost all phases of higher education planning. The number of faculty, classrooms, and administrators required is closely related to the size of the student body. Over the last two decades enrollment has expanded at an unprecedented pace, made possible only by an equally impressive commitment of financial resources--both public and private. It would be impossible to analyze the future financial requirements of higher education without first giving careful attention to expected enrollments.

An econometric model is presented in this chapter which furnishes estimates of the impacts of the size of the college-age population, discharges from the Armed Services, income, and unemployment on each of statewide undergraduate and graduate enrollments. The model is used to derive enrollment projections which, with the aid of additional

assumptions, are disaggregated into three sectors—public four-year, public two-year, and private. The material in the chapter is organized into six sections: 1) review of selected research, 2) presentation of the model, 3) discussion of the data, 4) discussion of the statistical results, 5) derivation of enrollment projections, and 6) summary of results.

Looking ahead to the application of the analysis in this chapter, it will form part of the basis for a statistical model in Chapter V designed to yield estimates of the influence of tuition and student aid variables at the institutional and sectorial levels, respectively. The enrollment projections will be a primary input into the analysis of the future financial requirements based on alternative policies, to be presented in Chapters VI and VII.

Review Of Selected Research

Because of their importance to planning, enrollment models and projections have been constructed by many individuals and organizations. Probably every state and nearly every college makes some attempt to forecast enrollments. Rather than attempt a comprehensive review of this area, the following section contains a brief review of two aspects. First, some examples of a procedure typically used to project enrollments are examined. Second, the major pieces of research which have attempted to identify the factors causing variations in enrollment are reviewed.

The procedure used by the United States Office of Education to derive enrollment projections is representative of most attempts,

especially among public agencies.¹ The ratio of enrollments to an age group considered to be most typical among college students, usually 18-21 in the case of undergraduates, is computed for several recent years. The trend in this rate is then assumed to continue at an unaltered pace; this assumption, in combination with a projection of the population in the age group, is the basis for enrollment forecasts, i.e., the forecasts are the product of the assumed rate of enrollment times the projected population. In addition to the Office of Education, the widely available work of Ronald B. Thompson sponsored by the American Association of Collegiate Registrars and Admissions Officers uses such a framework, as did the Michigan Department of Education until 1970-71.² The advantages of this approach are its simplicity of computation, ease of explanation to policy makers, and minimal data requirements. However, the procedure ignores many of the factors causing the rate of enrollment to vary and thus results in an imprecise forecast in many cases.

Recent research has shed important light on the variables related to college enrollment. The primary concern of those engaged in this work has been to construct models which explain past patterns

¹U.S. Department of Health, Education, and Welfare, Projections of Educational Statistics to 1979-80, National Center for Educational Statistics, Office of Education, U.S. Government Printing Office, Washington, D.C., 1971 (updated annually).

²Ronald B. Thompson, Projections of Enrollments, Public and Private Colleges and Universities, 1970-1987, American Association of Collegiate Registrars and Admissions Officers, Washington, D.C., 1970. Michigan Department of Education, State Plan for Higher Education in Michigan, Lansing, Michigan, 1969.

of enrollment; they have not forecast enrollments, although their work could in most cases be used for such a purpose. In 1967 Campbell and Siegel published results indicating that the aggregate demand for higher education in the United States was positively related to disposable income per family and negatively related to tuition, as well as to the size of the population group most prone to attend college.³ Their analysis was based on nine observations for selected years from the 1919-1964 period; difficulties in obtaining estimates of tuition costs limited the number of observations. Looking at the same period but ignoring tuition in order to gain observations, Galper and Dunn later demonstrated that discharges and changes in the size of the Armed Forces also significantly affected total United States enrollment; this, of course, was widely known to be the case during and after World War II but had not been investigated in statistical models.⁴ Concerned that supply side effects had not been handled adequately by Campbell and Siegel, Hight added supply relationships to their model and found some evidence that the differential rates of growth in the private and public sectors were partially due to differences in the elasticity of enrollments with respect to subsidy income.⁵

³Robert Campbell and Barry N. Siegel, "The Demand for Higher Education in the United States, 1919-1964," American Economic Review, Vol. 57, June 1967, pp. 482-494.

⁴Harvey Galper and Robert M. Dunn, Jr., "A Short-Run Demand Function for Higher Education in the United States," Journal of Political Economy, Vol. 77, Sept.-Oct. 1969, pp. 765-777.

⁵Joseph E. Hight, "The Supply of Higher Education in the U.S.: The Public and Private Institutions Compared," Paper presented at the Allied Social Science Association Meetings, Detroit, Michigan, December, 28-30, 1970.

Research based on cross-section samples has verified the importance of income and tuition variables. In addition, measures of parental characteristics, student ability, student financial aid, unemployment, and student location have been identified as factors relevant to the decision to enroll in a college or university.⁶

Using the above work as a source of ideas, the following model of the aggregate demand for higher education was formulated.

Presentation Of The Model

A model's structure depends in part upon the objectives of the investigator and the time and resource constraints imposed, either by himself or others. In this case the objective was to develop a model of enrollments in Michigan higher education which could be used to project future enrollments based on alternative assumptions. The projections were a matter of interest in themselves, but the ultimate

⁶See A.J. Corazzini, D. Dugan, and H.G. Grabowski, "Determinants and Distributional Aspects of Enrollment in U.S. Higher Education," Paper presented at the Allied Social Science Association Meetings, Detroit, Michigan, December 28-30, 1970, and later published in Journal of Human Resources, Vol. VII, No. 1, Winter 1972, pp. 39-59.

Stephen A. Hoenack and Paul Feldman, "Private Demand for Higher Education in the United States," Research Paper P-649, Institute for Defense Analysis, Arlington, Virginia, 1969. This paper is essentially reprinted, except for the omission of detailed technical appendix material, in The Economics and Financing of Higher Education in the United States, a Compendium of Papers submitted to the Joint Economic Committee, Congress of the United States (Washington, D.C.: U.S. Government Printing Office, 1969), pp. 375-95.

R. Radner and L.S. Miller, "Demand and Supply in U.S. Higher Education: A Progress Report," American Economic Review, Vol. 60, May, 1970, pp. 362-34.

aim was to use them as a basis for forecasts of the financial requirements implied by different policy frameworks. A lack of both time and resources precluded any possibility of using a sample survey as a source of data.

In the early stages of the investigation it became apparent that accurate data on tuition and student financial aid were available for only the most recent years. Rather than limit the entire analysis to such a narrow data base, a two stage process was formulated. The first component, presented in this chapter, consists of an aggregate demand model containing implicit assumptions concerning tuition. The second stage, to be presented in the following chapter, concentrates on an analysis of the impact of tuition and student financial aid—based in part upon the results of the study of aggregate demand.

The aggregate demand model has its foundation in the conventional demand and supply framework, illustrated in Figure 1. The short-term demand and supply curves are assumed to intersect within a relatively elastic "band" which is the long-term expansion path.

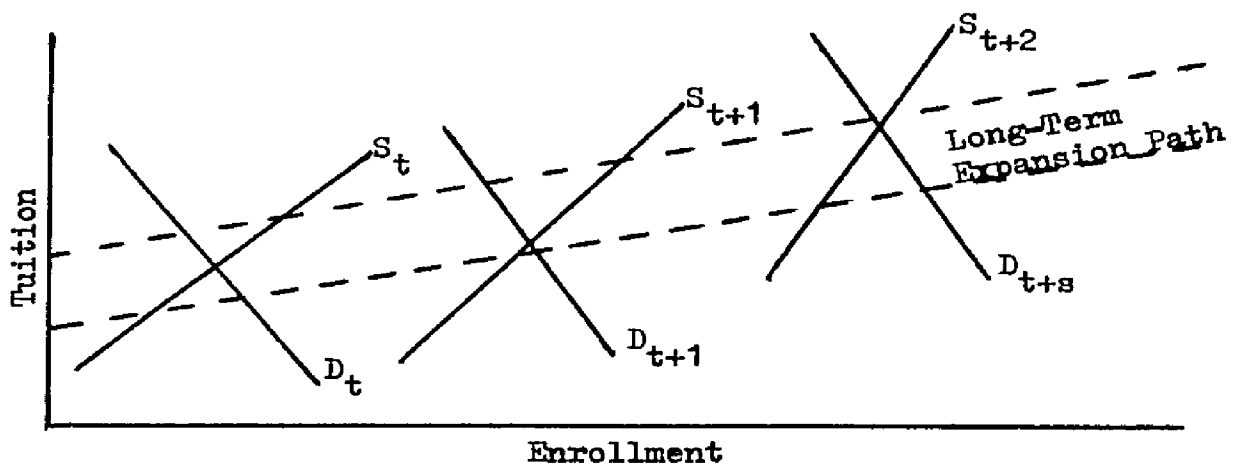


Figure 1
Illustration of the Aggregate Demand Model

The shape of the expansion path is determined primarily by the willingness of public bodies to subsidize higher education. The principle adjustment mechanisms are hypothesized to be reactions of political bodies to (1) tuition levels, (2) use of available facilities, and (3) complaints from constituents whose sons and daughters were not admitted to a college. If the advance of short-term supply exceeds that of demand so their intersection tends towards the lower edge of the band (such as in the case of period $t+1$ in Figure 1), either tuition rises more slowly compared to the long-term trend or—if the long-term rate of increase in tuition is maintained so that excess supply exists—colleges are perceived to contain excess capacity; in addition, it is unlikely that there will be many constituent complaints growing out of the use of non-price rationing because of excess demand. All three of these factors tend to cause a slow-down in the public's tendency to increase the supply of higher education. On the other hand, if the advance of demand exceeds that of supply—causing their intersection to tend towards the upper edge of the band (period $t+2$ in Figure 1), one or more of the following events are likely to occur: tuition charges rise at an increased rate, college facilities are crowded, and constituent complaints increase due to non-price rationing and higher tuition. These forces create pressures for an increased provision of higher education. Thus, so long as the philosophy of political representatives with respect to tuition charges and constituent pressures does not change radically, the long-term expansion path can be regarded as a relatively stable function. In other words, we can be confident that sufficient facilities are provided to insure that tuition charges do not exceed certain levels while, on the other

hand, facilities are not expanded so rapidly that they can be fully utilized only if tuition rates drop to unprecedented levels.

The modeling, and forecasting, problem can now be stated as one of estimating the shift in the short-term (annual, in this case) demand function along the stable long-run expansion path. The validity of the forecasts will, of course, depend heavily on the degree to which decision makers maintain stable values in the future with respect to higher education. If such stability exists, then accurate estimates of shifts in short-term demand provide a firm basis for the provision of needed short-term supply, i.e., a supply which insures that the intersection of the short-term supply and demand curves will be along the long-term expansion path. However, if a major change (i.e., a large shift which is inconsistent with past trends) occurs in the level of tuition charges or the amount of student aid awards, these projections would lose much of their value as a tool for policy studies. What remains to be done is a specification of the variables which cause the demand for higher education to shift and for which data are available.

Higher education represents both an investment and a consumption good from the viewpoint of most individuals. The exact mix varies from one to another and is the subject of some debate. Although the implications of these two factors differ in many respects, for our purposes the two suggest similar variables are likely to be important; no attempt will be made to isolate separate investment and consumption effects. As direct costs or opportunity costs rise, higher education becomes less attractive either as an investment or a consumption good. Higher levels of income should tend to increase enrollments as a

consumption good and may also have a positive effect on education investment decisions due to significant imperfections in the capital market in providing funds for investment in people. A population measure is essential in either approach. The investment approach places a great deal of emphasis upon the added future monetary and non-monetary benefits due to higher education; measuring or predicting these is difficult or impossible, of course. A consumption model might include a "keeping up with the Joneses" variable such as the educational attainment of those in the relevant environment.

The following variables were chosen as empirical measures of demand shifters. The population in the age group constituting the bulk of the college population in the future, assuming that most college students enter college in the fall following their graduation from high schools, was assumed to have a major impact on demand. A demographic measure consisting of the discharges from the Armed Services was also included because of its marked effect on enrollments; most of these individuals are young people who are eligible for benefits under the provisions of the "G.I. Bill" if they become students. Income and unemployment variables were considered because of their relevance to a person's ability to pay for higher education and to his opportunity cost. The income variable probably serves as a proxy for many other variables relevant to higher education such as the increasing technological nature of society and the consequent need for a greater number of highly trained people.

As mentioned earlier, data on tuition and student financial aid were not available for this analysis. Since both play a role--aid as a demand shifter and tuition as an indication of society's location

on the demand curve, it is important to examine the impact of their omission on the results.⁷ The estimated parameters for the included variables will be unbiased if the omitted explanatory variables are uncorrelated with the included variables. In this case we might expect that the tuition and aid variables would be positively correlated with the population and income variables but not correlated with the discharges and unemployment variables. Since the expected sign of the tuition coefficient is negative, the estimated coefficients of the population and income variables will be biased negatively due to this omission. But since the expected sign of the student aid variable is positive, the omission of the aid variable causes a positive bias in the estimated coefficients of the population and income variables. Thus, the net impact of the omitted variables on the estimated coefficients of the population and income variables is indeterminate, but is at least partially offsetting.

Finally, the timing of the planning and budget cycle was crucial to the structure of the model since it was to be used for decision-making purposes. In the case of state support for higher education the examination of institutional requests begins in the fall of the fiscal year preceding the fiscal year of the request. For example, in fall 1972, the institutional requests for the 1973-74 fiscal year were reviewed. Thus, planning for the ensuing year must be done without knowing the results of decisions made concerning the present year. Reflecting this, the equations which will be used to forecast enrollments in time t and beyond assume knowledge of data pertaining to $t-2$

⁷See Jan Kmenta, Elements of Econometrics (New York, N.Y., The Macmillan Co., 1971), pp. 392-5, for a general discussion of this issue.

but not to $t-1$.

Undergraduate and graduate enrollments were analyzed separately on a statewide basis. The equations which compose the model are listed in detail in Table 2 where the regression results are displayed. Before discussing these results, the nature of the underlying data will be examined in the next section.

Discussion Of The Data

Obtaining the necessary data was a difficult and time-consuming task. Needless to say, the quality of the results are directly dependent on the quality of the data. What follows is a very brief description of the nature of the data; all data used are listed in Appendix A accompanied by a detailed listing of the sources and a comment by the author as to their characteristics.

The period of analysis includes headcount enrollments in Michigan higher education in fall term, 1951-69. A beginning date of 1951 avoids essentially all of the post-World War II enrollment bulge, but the period does include a variety of rates of population growth, Armed Services discharges, and economic growth. Such variation is desirable because it enables a better test to be made of whether the specified variables and functional form accurately describe the behavior of the system, i.e., the researcher finds it easier to see if his assumptions are credible.

The enrollment series for higher education, presented in Table 1, was constructed from a variety of sources. All figures pertaining to the 1960's appear to be very reliable, as do those for the public four-year institutions in the 1950's. The least reliable data are those

Table 1

Fall Headcount Enrollment in Michigan by Student Level and Type of Institution, 1951-71

<u>Year</u>	<u>Public Four-Year</u>			<u>Public Two-Year</u>
	<u>Under-grad</u>	<u>Grad-uate</u>	<u>Total</u>	
1951	54,395	14,311	68,706	4,900
1952	54,834	14,661	69,495	6,854
1953	56,600	14,958	71,558	8,102
1954	61,439	16,097	77,536	9,739
1955	68,642	17,239	85,881	13,652
1956	75,046	19,687	94,733	16,176
1957	78,165	21,473	99,638	19,837
1958	78,447	23,525	101,972	22,784
1959	78,789	24,274	103,063	24,592
1960	80,653	27,005	107,658	27,229
1961	83,290	28,792	112,082	31,619
1962	89,374	30,560	119,834	34,356
1963	97,023	32,090	129,112	38,001
1964	107,528	35,586	143,114	46,123
1965	122,632	39,680	162,312	58,216
1966	132,677	43,810	176,487	69,496
1967	141,203	46,505	187,708	79,698
1968	149,841	48,578	198,419	95,065
1969	158,639	49,684	208,323	115,299
1970 ^{b/}	164,525	53,277	217,802	125,552
1971 ^{b/}	169,080	51,085	220,165	132,059

^{b/} Not available at the time the statistical analysis was done.
Sources: See appendix Table 26.

Table 1 (cont'd)

<u>Year</u>	<u>Private</u>			<u>All Institutions</u>		
	<u>Under- grad</u>	<u>Grad- uate</u>	<u>Total</u>	<u>Under- grad</u>	<u>Grad- uate</u>	<u>Total</u>
1951	21,536	1,593	23,129	80,831	15,904	96,735
1952	21,367	1,589	22,956	83,055	16,250	99,305
1953	21,766	1,598	23,364	86,468	16,556	103,024
1954	24,000	1,773	25,773	95,178	17,870	113,048
1955	26,857	1,911	28,768	109,151	19,150	128,301
1956	28,227	1,816	30,043	119,449	21,503	140,952
1957	28,999	1,929	30,928	127,001	23,402	150,403
1958	30,541	2,251	32,792	131,772	25,776	157,548
1959	31,763	2,350	34,113	135,144	26,624	161,768
1960	34,065	2,333	36,398	141,947	29,338	171,285
1961	35,184	3,094	38,278	150,093	31,886	181,979
1962	36,436	3,264	39,700	160,066	33,824	193,890
1963	37,015	3,596	40,611	172,039	35,686	207,725
1964	39,697	3,775	43,472	193,348	39,361	232,709
1965	43,766	4,130	47,896	224,614	43,810	268,424
1966	45,060	4,402	49,462	247,233	48,212	295,445
1967	45,979	4,482	50,461	266,880	50,987	317,867
1968	46,297	4,480 ^{a/}	50,777	291,203	53,058	344,261
1969	46,282	4,477	50,759	320,220	54,161	374,381
1970 ^{b/}	47,861	4,487	52,348	337,939	57,764	395,703
1971 ^{b/}	48,039	4,889	52,928	349,178	55,974	405,152

^{a/} Estimate

^{b/} Not available at the time the statistical analysis was done.
Sources: See appendix Table 26.

for private colleges in 1951-59, but these too are probably reasonably accurate.

Some of the necessary population data are based on primary and secondary school enrollment by grade by year (see appendix Table 27) while the remainder are based on census figures by single years of age (see appendix Table 28). The former have two major advantages: they are available for all required years, except for a portion of the private school enrollments, and they do not include school drop-outs in the base from which college enrollments are calculated. Adjusting the series for the missing private sector data was very important because of the recent decline in the percentage of students in the private sector. If the percentage in private schools had been constant and was expected to remain constant, public school enrollment would have exactly the same predictive powers as total enrollment in a regression model. However, in present circumstances a model including only public school enrollments would contain a misleading upward trend attributable to a transfer of students from the private to the public sector.

Since data on the population by single years of age are available only for census years, it was necessary to do a great deal of interpolating using the number of live births. This procedure yields a set of figures which are rough approximations, but since they enter only into the calculation of long-term projections which are themselves rough estimates, this difficulty is not crucial.

A more disturbing characteristic of the data is the lack of consistency between the school enrollment and population statistics. Although exhibiting the same pattern of year-to-year variation, the

enrollment figures exceed the population in the age group normally associated with the grade. For example, the 1940 census indicates there were 78,286 six year-olds while enrollment figures show there were 93,978 students in the first grade; in 1960 the respective figures were 181,638 and 195,300. To the degree that the census figures or the enrollment figures err in a consistent fashion, the predictive power of the regression model is not affected. However, a fluctuating or changing pattern of coverage might have significant effects.

The data on discharges from the Armed Services were obtained from unpublished records of the Department of Defense. There is no reason to doubt their accuracy; the series is consistent with the published figures on the size of the Armed Services. The economic variables, Michigan real personal income (total and per capita) and U.S. unemployment, are the standard indicators widely published and used.

Discussion Of The Statistical Results

The equations and estimated parameters are displayed in Table 2. The numbers to the left of each equation indicate the number of years into the future the equations are designed to forecast. For example, if in fall 1973 one were to want a forecast for fall 1980, he would use equation 7 and set the subscript "t" equal to 1980. It is interesting, and may be useful, to note that one should be able to obtain a reasonable forecast by using any equation with a number greater than or equal to the interval between the present and the year of the desired forecast. Choosing a number, and equation, greater than the interval would probably not yield the best estimate, however, for the

Table 2

Statistical Results of the Analysis of Aggregate Demand

Undergraduate regressions:

1a/	$\hat{U}_t = \begin{matrix} ** \\ -126,240 \\ (12,474) \end{matrix} + \begin{matrix} ** \\ 8,248D_t \\ (1,728) \end{matrix} + \begin{matrix} ** \\ 369(H(11) + H(12))_{t-2} \\ (76) \end{matrix} + \begin{matrix} ** \\ 678U_{t-2} \\ (63) \end{matrix} + \begin{matrix} ** \\ 43.08Y_t \\ (7.71) \end{matrix}$	$R^2 = .9983$ $S = 3409$ $d = 1.52$
2	$\hat{U}_t = \begin{matrix} ** \\ -139,988 \\ (15,388) \end{matrix} + \begin{matrix} ** \\ 8,026D_t \\ (2,128) \end{matrix} + \begin{matrix} ** \\ 276(H(10) + H(11) + H(12))_{t-3} \\ (79) \end{matrix} + \begin{matrix} ** \\ 593U_{t-3} \\ (103) \end{matrix} + \begin{matrix} ** \\ 49.73Y_t \\ (8.72) \end{matrix}$	$R^2 = .9975$ $S = 4104$ $d = 1.48$
3	$\hat{U}_t = \begin{matrix} ** \\ -177,995 \\ (22,215) \end{matrix} + \begin{matrix} ** \\ 9,009D_t \\ (2,723) \end{matrix} + \begin{matrix} ** \\ 506(H(9) + H(10))_{t-4} \\ (116) \end{matrix} + \begin{matrix} ** \\ 521(H(11) + H(12))_{t-4} \\ (133) \end{matrix} + \begin{matrix} ** \\ 51.48Y_t \\ (16.01) \end{matrix}$	$R^2 = .9917$ $S = 7547$ $d = 1.42$
4	$\hat{U}_t = \begin{matrix} ** \\ -199,861 \\ (22,487) \end{matrix} + \begin{matrix} ** \\ 8,794D_t \\ (2,927) \end{matrix} + \begin{matrix} ** \\ 471(H(8) + H(9))_{t-5} \\ (118) \end{matrix} + \begin{matrix} ** \\ 531(H(10) + H(11))_{t-5} \\ (124) \end{matrix} + \begin{matrix} ** \\ 57.64Y_t \\ (16.83) \end{matrix}$	$R^2 = .9903$ $S = 8145$ $d = 1.31$
5	$\hat{U}_t = \begin{matrix} ** \\ -216,923 \\ (21,012) \end{matrix} + \begin{matrix} ** \\ 9,213D_t \\ (2,917) \end{matrix} + \begin{matrix} ** \\ 473(H(7) + H(8))_{t-6} \\ (121) \end{matrix} + \begin{matrix} ** \\ 547(H(9) + H(10))_{t-6} \\ (126) \end{matrix} + \begin{matrix} ** \\ 57.84Y_t \\ (16.69) \end{matrix}$	$R^2 = .9905$ $S = 8082$ $d = 1.04$
6	$\hat{U}_t = \begin{matrix} ** \\ -235,621 \\ (20,754) \end{matrix} + \begin{matrix} ** \\ 10,692D_t \\ (3,094) \end{matrix} + \begin{matrix} ** \\ 503(H(6) + H(7))_{t-7} \\ (128) \end{matrix} + \begin{matrix} ** \\ 550(H(8) + H(9))_{t-7} \\ (134) \end{matrix} + \begin{matrix} ** \\ 58.10Y_t \\ (17.43) \end{matrix}$	$R^2 = .9897$ $S = 8393$ $d = 0.98$
7	$\hat{U}_t = \begin{matrix} ** \\ -238,374 \\ (18,774) \end{matrix} + \begin{matrix} ** \\ 12,994D_t \\ (2,896) \end{matrix} + \begin{matrix} ** \\ 548(H(5) + H(6))_{t-8} \\ (114) \end{matrix} + \begin{matrix} ** \\ 607(H(7) + H(8))_{t-8} \\ (121) \end{matrix} + \begin{matrix} * \\ 45.91Y_t \\ (16.77) \end{matrix}$	$R^2 = .9915$ $S = 7609$ $d = 1.01$

See last page of table for definitions of variables and other symbols.

Table 2 (cont'd)

8	$\hat{U}_t = -231,455 + 14,397D_t + 574(H(4) + H(5))_{t-9} + 685(H(6) + H(7))_{t-9} + 31.13Y_{pt}$ (17,676) (2,703) (104) (112) (16.50)	$R^2 = .9929$ $S = 6952$ $d = 1.06$
9	$\hat{U}_t = -221,892 + 13,938D_t + 567(H(3) + H(4))_{t-10} + 731(H(5) + H(6))_{t-10} + 23.44Y_{pt}$ (18,543) (2,725) (104) (114) (17.44)	$R^2 = .9928$ $S = 7040$ $d = 1.21$
10	$\hat{U}_t = -215,219 + 11,371D_t + 562(H(2) + H(3))_{t-11} + 672(H(4) + H(5))_{t-11} + 27.97Y_{pt}$ (19,637) (2,772) (107) (115) (17.76)	$R^2 = .9922$ $S = 7304$ $d = 1.20$
11	$\hat{U}_t = -208,963 + 8,593D_t + 602(H(1) + H(2))_{t-12} + 585(H(3) + H(4))_{t-12} + 29.50Y_{pt}$ (18,963) (2,517) (102) (104) (16.73)	$R^2 = .9929$ $S = 6976$ $d = 1.36$
12	$\hat{U}_t = -225,091 + 8,379D_t + 704P(5)_{t-13} + 493(H(1) + H(2) + H(3))_{t-13} + 46.31Y_{pt}$ (18,611) (2,567) (223) (81) (15.82)	$R^2 = .9924$ $S = 7190$ $d = 1.37$
13	$\hat{U}_t = -244,024 + 9,356D_t + 594(P(4) + P(5))_{t-14} + 455(H(1) + H(2))_{t-14} + 58.85Y_{pt}$ (18,977) (2,773) (125) (113) (15.77)	$R^2 = .9914$ $S = 7678$ $d = 1.38$
14	$\hat{U}_t = -250,897 + 11,283D_t + 605(P(3) + P(4) + P(5))_{t-15} + 400H(1)_{t-15} + 56.53Y_{pt}$ (19,240) (2,896) (94) (216) (16.22)	$R^2 = .9911$ $S = 7820$ $d = 1.42$
15	$\hat{U}_t = -241,333 + 13,401D_t + 739(P(2) + P(3))_{t-16} + 529(P(4) + P(5))_{t-16} + 39.23Y_{pt}$ (16,441) (2,599) (95) (103) (14.94)	$R^2 = .9935$ $S = 6651$ $d = 1.27$

See last page of table for definitions of variables and other symbols.

Table 2 (cont'd)

16	$\hat{U}_t = -231,932 + 13,523D_t + 747(P(1) + P(2))_{t-17} + 526(P(3) + P(4))_{t-17} + 36.84Y_{(15.25)}^P t$	$R^2 = .9934$ $S = 6698$ $d = 1.23$
17	$\hat{U}_t = -223,099 + 13,559D_t + 765(P(0) + P(1))_{t-18} + 518(P(2) + P(3))_{t-18} + 34.17Y_{(15.66)}^P t$	$R^2 = .9933$ $S = 6773$ $d = 1.21$
18	$\hat{U}_t = -215,754 + 13,384D_t + 785(P(0)_{t-18} + P(0)_{t-19}) + 512(P(1) + P(2))_{t-19} + 31.78Y_{(15.59)}^P t$	$R^2 = .9935$ $S = 6664$ $d = 1.21$
19	$\hat{U}_t = -210,750 + 13,160D_t + 785(P(0)_{t-18} + P(0)_{t-19}) + 515(P(0) + P(1))_{t-20} + 30.86Y_{(15.45)}^P t$	$R^2 = .9937$ $S = 6579$ $d = 1.16$
20	$\hat{U}_t = -211,766 + 13,155D_t + 784(P(0)_{t-18} + P(0)_{t-19}) + 518(P(0)_{t-20} + P(0)_{t-21}) + 31.37Y_{(15.55)}^P t$	$R^2 = .9936$ $S = 6633$ $d = 1.18$

See last page of table for definitions of variables and other symbols.

Table 2 (cont'd)

Graduate regressions:

1	$\hat{G}_t = \frac{-24,787}{(7,391)} - \frac{27.6U}{(48.7)}t^{-2} + \frac{629.5G}{(333.8)}t^{-2} + \frac{1861Y}{(532)}M_t + \frac{1422E}{(456)}t$	$R^2 = .9918$ $S = 1333$ $d = 1.21$
2	$\hat{G}_t = \frac{-43,195}{(7,364)} + \frac{27.1U}{(31.6)}t^{-3} + \frac{3049Y}{(439)}M_t + \frac{2466E}{(605)}t$	$R^2 = .9880$ $S = 1509$ $d = 1.50$
3	$\hat{G}_t = \frac{-42,261}{(7,845)} + \frac{31.8U}{(38.5)}t^{-4} + \frac{3009Y}{(471)}M_t + \frac{2389E}{(656)}t$	$R^2 = .9867$ $S = 1548$ $d = 1.45$
4	$\hat{G}_t = \frac{-36,218}{(4,081)} - \frac{183.9H(12)}{(37.6)}t^{-5} + \frac{136.5U}{(28.9)}t^{-5} + \frac{2939Y}{(265)}M_t + \frac{1774E}{(345)}t$	$R^2 = .9973$ $S = 714$ $d = 2.12$
5	$\hat{G}_t = \frac{-31,723}{(6,707)} - \frac{77.3(H(11) + H(12))}{(30.1)}t^{-6} + \frac{114.4U}{(45.2)}t^{-6} + \frac{2893Y}{(443)}M_t + \frac{1409E}{(567)}t$	$R^2 = .9947$ $S = 969$ $d = 1.60$
6	$\hat{G}_t = \frac{-31,473}{(3,059)} + \frac{106.3(H(10) + H(11) + H(12))}{(44.1)}t^{-7} + \frac{1725Y}{(548)}M_t + \frac{1258E}{(395)}t$	$R^2 = .9819$ $S = 1945$ $d = 0.96$
7	$\hat{G}_t = \frac{-34,074}{(3,002)} + \frac{93.8(H(9) + H(10) + H(11))}{(36.8)}t^{-8} + \frac{1867Y}{(465)}M_t + \frac{1354E}{(389)}t$	$R^2 = .9825$ $S = 1914$ $d = 1.02$

See last page of table for definitions of variables and other symbols.

Table 2 (cont'd)

8	$\hat{G}_t = \begin{matrix} ** & ** \\ -37,489 & + 90.5(H(8) + H(9) + H(10))_{t-9} \\ (3,236) & (30.7) \end{matrix} + \begin{matrix} ** \\ 1956Y_{Mt} \\ (375) \end{matrix} + \begin{matrix} ** \\ 1462E_t \\ (374) \end{matrix}$	$R^2 = .9841$ $S = 1823$ $d = 1.05$
9	$\hat{G}_t = \begin{matrix} ** & * \\ -40,151 & + 82.6(H(7) + H(3) + H(9))_{t-10} \\ (3,808) & (28.5) \end{matrix} + \begin{matrix} ** \\ 2101Y_{Mt} \\ (334) \end{matrix} + \begin{matrix} ** \\ 1613E_t \\ (388) \end{matrix}$	$R^2 = .9839$ $S = 1835$ $d = 1.07$
10	$\hat{G}_t = \begin{matrix} ** & * \\ -42,104 & + 79.5(H(6) + H(7) + H(8))_{t-11} \\ (4,432) & (28.7) \end{matrix} + \begin{matrix} ** \\ 2179Y_{Mt} \\ (321) \end{matrix} + \begin{matrix} ** \\ 1760E_t \\ (414) \end{matrix}$	$R^2 = .9834$ $S = 1863$ $d = 1.01$
11	$\hat{G}_t = \begin{matrix} ** & * \\ -42,599 & + 78.1(H(5) + H(6) + H(7))_{t-12} \\ (4,806) & (30.3) \end{matrix} + \begin{matrix} ** \\ 2205Y_{Mt} \\ (333) \end{matrix} + \begin{matrix} ** \\ 1784E_t \\ (431) \end{matrix}$	$R^2 = .9826$ $S = 1907$ $d = 1.01$
12	$\hat{G}_t = \begin{matrix} ** & * \\ -43,508 & + 80.7(H(4) + H(5) + H(6))_{t-13} \\ (5,163) & (31.8) \end{matrix} + \begin{matrix} ** \\ 2193Y_{Mt} \\ (344) \end{matrix} + \begin{matrix} ** \\ 1835E_t \\ (444) \end{matrix}$	$R^2 = .9824$ $S = 1918$ $d = 0.97$
13	$\hat{G}_t = \begin{matrix} ** & * \\ -42,582 & + 72.5(H(3) + H(4) + H(5))_{t-14} \\ (5,059) & (30.1) \end{matrix} + \begin{matrix} ** \\ 2289Y_{Mt} \\ (323) \end{matrix} + \begin{matrix} ** \\ 1727E_t \\ (434) \end{matrix}$	$R^2 = .9819$ $S = 1947$ $d = 1.00$
14	$\hat{G}_t = \begin{matrix} ** & * \\ -42,294 & + 68.5(H(2) + H(3) + H(4))_{t-15} \\ (5,128) & (29.8) \end{matrix} + \begin{matrix} ** \\ 2341Y_{Mt} \\ (315) \end{matrix} + \begin{matrix} ** \\ 1660E_t \\ (430) \end{matrix}$	$R^2 = .9814$ $S = 1970$ $d = 0.99$

See last page of table for definitions of variables and other symbols.

Table 2 (cont'd)

15	$\hat{G}_t = \overset{**}{-43,106} + \overset{*}{68.5}(H(1) + H(2) + H(3))_{t-16} + \overset{**}{2357Y}_{(300)t} + \overset{**}{1625E}_{(420)t}$	$R^2 = .9818$ $S = 1953$ $d = 1.03$
16	$\hat{G}_t = \overset{**}{-46,834} - \overset{**}{13.4P(5)}_{(6,017)t-17} + \overset{**}{120.4}(H(1) + H(2))_{(57.2)t-17} + \overset{**}{2417Y}_{(253)t} + \overset{**}{1666E}_{(425)t}$	$R^2 = .9835$ $S = 1923$ $d = 0.99$
17	$\hat{G}_t = \overset{**}{-48,240} + \overset{**}{32.7}(P(4) + P(5))_{(6,327)t-18} + \overset{**}{158.7H(1)}_{(89.2)t-18} + \overset{**}{2468Y}_{(233)t} + \overset{**}{1837E}_{(446)t}$	$R^2 = .9838$ $S = 1907$ $d = 0.84$
18	$\hat{G}_t = \overset{**}{-45,501} + \overset{*}{63.1}(P(3) + P(4) + P(5))_{(6,420)t-19} + \overset{**}{2555Y}_{(234)t} + \overset{**}{1983E}_{(505)t}$	$R^2 = .9812$ $S = 1981$ $d = 0.91$
19	$\hat{G}_t = \overset{**}{-45,447} + \overset{*}{63.8}(P(2) + P(3) + P(4))_{(6,404)t-20} + \overset{**}{2555Y}_{(234)t} + \overset{**}{1980E}_{(505)t}$	$R^2 = .9812$ $S = 1982$ $d = 0.91$
20	$\hat{G}_t = \overset{**}{-45,136} + \overset{*}{64.3}(P(1) + P(2) + P(3))_{(6,313)t-21} + \overset{**}{2546Y}_{(239)t} + \overset{**}{1993E}_{(510)t}$	$R^2 = .9812$ $S = 1985$ $d = 0.91$

See last page of table for definitions of variables and other symbols.

Table 2 (cont'd)

List of Symbols with Their Definitions

- a/ The numbers to the left of each equation indicate the number of years into the future the equations are designed to forecast. For example, if in fall 1973 one were to want a forecast for fall 1980, he would use equation 7 and set the subscript "t" equal to 1980.
- t : Year, 1951-69 for purposes of estimation.
- U_t : Michigan undergraduate enrollment in year t, in actual headcount figures (see appendix Table 26).
- \hat{U}_t : An estimate of Michigan undergraduate enrollment in year t obtained by the use of a regression equation, in actual headcount figures.
- G_t : Michigan graduate enrollment in year t, in actual headcount figures (see appendix Table 26).
- \hat{G}_t : An estimate of Michigan graduate enrollment in year t obtained by the use of a regression equation, in actual headcount figures.
- D_t : Sum of total discharges from the U.S. Armed Services in fiscal years t, t-1, t-2 and t-3, in millions of persons (see appendix Table 30).
- $H(A)_t$: Michigan enrollment in grade A in year t, in thousands of headcount students (see appendix Table 27).
- $P(B)_t$: Michigan population of age B in year t, in thousands of people (see appendix Table 28).
- Y_{P_t} : Real per capita income of Michigan residents in year t, in dollars (see appendix Table 31).
- Y_{M_t} : Total Michigan real personal income in year t, in billions of dollars (see appendix Table 31).
- E_t : U.S. unemployment rate in year t, in percentage terms (see appendix Table 31).
- *: The parameter below this is significantly different from zero at the 95% confidence level.
- ** : The parameter below this is significantly different from zero at the 99% confidence level.
- (): The number within the parenthesis is the standard error of the estimated parameter which appears immediately above the parenthesis.

Table 2 (cont'd)

- R^2 : Coefficient of determination.
S: Standard error of estimate.
d: Durbin Watson statistic.

forecaster would be ignoring known information about the relevant population cohort. Returning to the example, note that using equation 7 in 1973 to forecast undergraduate enrollments in 1980 requires knowledge of the number of students in the fifth through eighth grades in 1972. Use of equation 10 in 1973 for a 1980 forecast requires knowledge of the second through fifth grades in 1969, and thus ignores three years of information concerning those people most likely to attend college in 1980.

The coefficient of determination, R^2 , is consistently very high, and the standard error of estimate, S , is quite small relative to the magnitude of enrollments; both of these results are encouraging in a model to be used in forecasting. As is to be expected in an enrollment analysis, there is strong evidence of positive autocorrelation among the disturbances; however, it is not so extreme as to place major doubts on the utility of the model.⁸

The estimated parameters have the expected signs and tend to be very significant in a statistical sense and of reasonable size. In the case of undergraduates the model implies that about 0.9 to 1.3 percent of those discharged from the Armed Services are likely to enroll in Michigan higher education. The parameters associated with the

⁸The Durbin Watson statistic, d , is used to test for the presence of autocorrelated disturbances, i.e., the degree to which a random disturbance in one period affects the observation in the ensuing period. An enrollment series is very vulnerable in this respect; for example, if for some unexplained reason 5,000 students enter college in year t , we would expect to have an unexplained component in years $t+1$, $t+2$ and $t+3$ because it would take this long for a typical student to receive a degree. The greater the difference between two and d , the greater is the probability of autocorrelated disturbances—which is a violation of the assumptions underlying the regression technique. In this case we can reject the assumption of no autocorrelation with 95 percent assurance of being correct when d is about .90 or less.

population variables range from about .50 in the near term to about .60 for 10-20 year projections which is consistent with the percentage of students now going on to higher education. In the equations for 10-20 year forecasts the parameter corresponding to lower division students is greater than that corresponding to upper division students; this is to be expected since many students leave college after a period of less than four years, so upper division students represent a smaller proportion of the population cohort than do lower division students. It is not surprising that this pattern is not apparent in the near-term equations since high school drop-outs would tend to weaken it or even reverse it.⁹

The income variable is very important in a statistical and a decision-making sense; the results demonstrate the importance of financial factors in affecting how many people enter higher education. Choosing between the per capita income and total Michigan income measures was an interesting problem. Each yielded models which performed nearly identically on an overall statistical basis, but the set of equations containing per capita income gave greater weight to the population variables relative to the income variable. The hypothesized

⁹Eventual college enrollees as a percentage of their pre-college grade will tend to be greater for the higher grades because of high school drop-outs—all other things being equal. For example, assume there are 1000 students in the ninth grade of which 800 enroll as twelfth graders and 500 attend college. The college enrollees as a percentage of ninth and twelfth graders would be 50.0 and 62.5, respectively. Of course, the college drop-out phenomenon described in the text means all other things are not equal, and hence we have the high school and college drop-out phenomena working in opposite directions with respect to the relative size of the two population variables.

reason for the difference is in-migration. In-migration prior to 1950 but within the period of analysis would tend to inflate the parameters associated with the population variables in both models in equal fashion, e.g., if the number of eighth graders in 1945 is used to explain college enrollment in 1952 and there was substantial in-migration during the intervening years, it would appear that a higher proportion of the original eighthgraders were enrolled than had actually occurred. In the case of in-migration taking place after 1950 the above effect will again be present, but there is an additional factor. The in-migration will tend to raise total Michigan income but have an indeterminate effect on per capita income. Thus, in the model containing Michigan income the effects on in-migration will be present in both the parameters associated with the population variables and in the parameters of the income variable. However, the in-migration effect in the model containing per capita income will be concentrated entirely in the parameters of the population variables. Since it appears that future periods of economic prosperity are not likely to result in the scale of in-migration to northern industrial states, such as Michigan, which existed over the last two decades, the model containing per capita income was selected--to have done otherwise would have been to implicitly assume in-migration in future periods of prosperity.

A somewhat disturbing feature of the results of the undergraduate regressions is the relatively high value of the coefficient of income in equations 12-14. The unique feature of these three equations is that they each contain a mix of enrollment and population variables. Evidently the lack of consistency of these two series (see the discussion of the data in the previous section) is sufficient to cause

problems; the existence of errors in the population-related variables would be expected to depress the magnitude of these coefficients and raise those associated with highly-correlated variables, such as income. When the model is used for forecasting, it will be important to examine the results from equations 12-14 with a healthy skepticism, possibly also using subsequent equations to forecast the relevant periods so that a more "typical" result can be computed.

The results of the graduate enrollment regressions appear to demonstrate that economic considerations are of greater importance relative to population variables than is true in the case of undergraduate enrollments. The decision to use total Michigan income rather than per capita income was based on a general review of the relative statistical properties of the resulting models. Although the in-migration effect mentioned above undoubtedly also exists in the case of graduate enrollments, this effect appears to be overwhelmed by more influential factors, such as the possibility that the need for research has grown at a rate more comparable to the growth of the total Michigan economy than that of per capita growth.

The positive sign and significance of the unemployment variable indicate that when people are having difficulty finding jobs, more graduating college seniors enter graduate school—an example of a response to a declining opportunity cost. The U.S. unemployment variable is more significant than the Michigan unemployment rate when equations similar in all other respects are compared; indicating that college graduates tend to respond to a national, rather than a state, labor market. When the unemployment variable was inserted into the undergraduate model, its coefficient was of the expected sign

(positive) but too small to be statistically significant. Discharges from the Armed Services were included in trials of the graduate enrollment model, but were omitted from the final version due to a lack of significance and mixed signs. Similarly, attempts to disaggregate the population-related variables to correspond to different levels of instruction, as was done in the final version of the undergraduate model, did not improve the statistical properties of the model or yield a consistent pattern of coefficients.

Derivation Of Enrollment Projections¹⁰

It should be emphasized that the value of an enrollment model is not that it removes all uncertainty as to what enrollments will be in the future, for this is dependent on public and private decisions between now and that future date. Rather, its value lies in its power to assist those who make the decisions which will in large measure determine future enrollments. It helps us to gain greater insight into the possible outcomes of different policy alternatives.

The implications in terms of enrollments of five important dimensions of higher education policy will be explored in this section. Many others are of potential interest, but these five should be sufficient to demonstrate the broad range of possible outcomes. As

¹⁰ A similar set of enrollment projections based on this analytic model appeared in Financial Requirements of Public Baccalaureate Institutions and Public Community Colleges, Michigan Department of Education, Lansing, Michigan, 1971. The availability of new data on economic variables, armed forces discharges, school enrollment, and population justified—almost required—a revision. Note that the basic equations forming the foundation of the model were not revised.

mentioned in the introduction to this chapter, additional assumptions will be added to those implicit in the above statistical model in order to disaggregate the enrollments into three sectors—public four-year, public two-year, and private. The five alternative policies, which are each described in detail in the following pages are: (1) present policies, (2) uniform stabilization policy, (3) curtailed graduate enrollment policy, (4) nondiscriminatory policy, and (5) equal educational opportunity policy.

Present policies

The following assumptions are the basis for the projections of state-wide enrollments at the undergraduate and graduate levels.¹¹

Armed Services Discharges: Discharges from the Armed Services will continue to decline from a peak of 1.12 million men in 1970 until the peace-time level of 0.4 million discharges is reached in 1976. This latter figure is assumed to prevail throughout the remainder of the period.

Income and Population: Michigan real personal income will increase 5.9 percent from 1971 to 1972, 5.3 percent from 1972-1973, and 4.8 percent annually thereafter. Per capita income is forecast based on the assumption that the increase from 1971 to 1972 will be 4.9 percent, 4.3 percent from 1972 to 1973, and 3.8 percent annually thereafter. The difference between the two series implies a one percent annual rate of increase in population.

Unemployment: The unemployment rate in the United States will decline slightly to 5.6 percent in 1972. The decline will continue so that in 1975 and beyond a near full employment rate of 4.1 percent will exist.

Once these assumptions have been made and the necessary enrollment and population data collected, calculating the projections is simply a matter of using the relationships discussed in the previous section—or, to be more specific, of substituting the data into the regression

¹¹The detailed data assumed and the rationale for their choice are presented in Appendix B.

equations. In order to remove unrealistic year-to-year variations while preserving the trends the estimates were graphed and "smoothed" by visual inspection. This smoothing process was unambiguous except for two possible exceptions. First, those projections using lagged undergraduate enrollment appear to be indicating a higher level of future enrollments than those using primary and secondary enrollment. After examining the pattern of estimated coefficients (Table 2), the author judged that the lagged variables were weighted too heavily relative to the high school enrollment variables. This result causes the equations with the lagged variables to understate changes in trends, and so the projections derived from these equations were discounted somewhat. Second, the undergraduate forecasts for years 1982-84 which include both primary grade enrollments and population by age groupings as explanatory variables are inconsistent with the preceding and succeeding years. This problem was anticipated (see the comments in the sections on data and statistical results and Appendix A), and these results were largely ignored.

Several additional assumptions were made in order to project enrollments by type of institution.

Private Institutions: Undergraduate enrollment in the private insitutions will increase by 1590 students each year except in 1977-78 when total Michigan undergraduate enrollment stabilizes.¹² Graduate enrollment will grow by 160 students each year.

¹²Performing a time trend regression on total private enrollment from 1951 through 1969 yields

$$U_{p_t} = 19,291 + 1753(t-1950) \quad R^2 = .985 \text{ where}$$

U_{p_t} : total private enrollment in year t , in headcount students
 t : year.

Public Institutions: In future years 25 percent of the undergraduates will be upper division students (juniors or seniors). The percentage of lower division students (freshmen or sophomores) enrolled in the community college system is assumed to increase at a decreasing rate from 58.5 percent in 1971 to 70.0 percent in 1983.¹³ After 1983 the percentage is assumed to stabilize at 70.0 percent. The above assumptions imply that the public two-year colleges will contain 49.1 percent of the undergraduates enrolled in public higher education by 1977 and 52.5 percent by 1983, as compared with 43.9 in 1972.

The projections are presented in Table 3. The outstanding feature of the undergraduate projections is the relatively stable level of enrollments in the 1976-88 period; if it were not for the influence of rising incomes, the absolute decline from 1978 to the early 1980's would be much greater. Undergraduate enrollment in the public two-year institutions grows very slowly from 1976 to 1988 despite the fact that these colleges are assumed to increase their percentage of lower division enrollees. The public four-year colleges experience a decline in undergraduate students from 1976 to 1983 followed by several years of stable enrollments. If a public policy appropriate to a period of stable undergraduate enrollments has not been articulated and supported by the major actors in higher education by the mid-1970's, a fierce competition for undergraduates could develop among institutions.

The growth rate of four-year institutions will depend heavily on future trends in graduate education, which are very difficult to anticipate. Many uncertainties are besetting today's graduate schools

This would indicate that a "normal growth in this sector is 1753 students per year. In recent years about 8.8 percent of enrollment has consisted of graduate students.

¹³Specifically, the percentage is assumed to increase from 58.5 percent in 1971 to 61.5 in 1973 in two steps of 1.5, from 61.5 in 1973 to 68.5 in 1980 in seven steps of 1.0, and from 68.5 in 1980 to 70.0 in 1983 in three steps of 0.5.

Table 3

Present Policies Enrollment Projections by Student Level and Type of Institution, 1972-91*
(thousands)

Year	Public Four-Year			Public Two-Year	Private			All Institutions		
	Under- Grad	Grad- uate	Total		Under- Grad	Grad- uate	Total	Under- Grad	Grad- uate	Total
1972	172	60	232	140	50	5	55	362	65	427
1973	175	67	242	150	51	5	56	376	72	448
1974	178	72	250	157	53	5	58	388	77	465
1975	181	76	257	165	54	6	60	400	82	482
1976	183	81	264	172	56	6	62	411	87	498
1977	182	85	267	176	58	6	64	416	91	507
1978	179	89	268	179	58	6	64	416	95	511
1979	175	94	269	179	58	6	64	412	100	512
1980	170	99	269	179	58	6	64	407	105	512
1981	168	104	272	181	58	6	64	407	110	517
1982	167	108	275	182	58	7	65	407	115	522
1983	166	113	279	183	58	7	65	407	120	527
1984	166	119	285	183	58	7	65	407	126	533
1985	166	125	291	183	58	7	65	407	132	539
1986	166	132	298	184	58	7	65	408	139	547
1987	167	141	308	184	58	7	65	409	148	557
1988	168	148	316	186	58	8	66	412	156	568
1989	172	155	327	191	59	8	67	422	163	585
1990	180	162	342	200	61	8	69	441	170	611
1991	191	170	361	211	62	8	70	464	178	642

* See text for the assumptions used in calculating these projections.

and their degree recipients. These are sure to be exacerbated if undergraduate enrollments stabilize, thus decreasing the need for new college instructors. The model would lead one to believe that all will be well for those with advanced degrees if the economy is healthy. However, one is well advised to regard all projections of graduate enrollment with skepticism. A lower forecast will be presented in the third alternative to be explored, curtailed graduate enrollment policy.

Uniform stabilization policy

The above set of projections revealed that if the public two-year colleges continue to increase their percentage of lower division students there is likely to be a drop in undergraduate enrollments in the public four-year institutions of about 17,000 students from 1976 to 1983. Let us now examine a policy which is designed to avoid a large drop in undergraduate enrollments in either public sector. Stated more positively, the intent is to stabilize undergraduate enrollments in a uniform fashion with respect to the public two-year and public four-year sectors, rather than experience increases in the former which are approximately offset by decreases in the latter. All assumptions are identical to those stated in the case of the present policies projections except for the following change.

Public Institutions: In future years 25 percent of the undergraduates will be upper division students. The percentage of lower division students enrolled in the community college system is assumed to increase at a decreasing rate from 58.5 percent in 1971 to 60.0 percent in 1976.¹⁴ After 1976 the percentage is assumed to stabilize at 60.0 percent. The above assumptions imply that by 1976 the public two-year colleges will contain 45.0 percent of the undergraduates enrolled in public higher education, as compared with 43.9 in 1972.

¹⁴Specifically, the percentage is assumed to be 59.0, 59.4,

Note that it has been assumed the above change has no effect on the total number of students receiving higher education. This is certainly unrealistic to some degree, for a number of the students who attend a two-year college would not or could not attend a four-year institution. The magnitude of this lack of substitutability is unclear; it undoubtedly varies with the social setting and the relative size of the community college sector. What is being varied in this case is the nature of the system of higher education, i.e., the kind of institution within which the students receive their education. Exploring the many alternatives of this sort is an important part of the planning function.

Comparing the present policies projections with the uniform stabilization policy projections (Tables 3 and 4, respectively), in the latter case undergraduate enrollment in the public four-year institutions reaches a higher peak in the late 1970's and declines much less. Whereas the public two-year colleges exhibited slow but continuous growth in the case of the present policies assumptions, the second set of forecasts shows a small decline in enrollments from 1973 to 1980 followed by over five years of stable enrollment.

Curtailed graduate enrollment policy

As was mentioned earlier, graduate education is in a very unsettled state which makes all forecasts subject to a great deal of doubt. The key test of the continued validity of the econometric model presented earlier will come when the economy rebounds. If the hiring of those with graduate degrees increases and research and development

59.7, 59.9 and 60.0 in years 1972 through 1976, respectively.

Table 4

Uniform Stabilization Policy Enrollment Projections
by Student Level and Type of Institution, 1972-91*
(thousands)

<u>Year</u>	<u>Public Four-Year</u>			<u>Public Two-Year</u>
	<u>Under- grad</u>	<u>Grad- uate</u>	<u>Total</u>	
1972	174	60	234	138
1973	180	67	247	145
1974	185	72	257	150
1975	191	76	267	155
1976	195	81	276	160
1977	197	85	282	161
1978	197	89	286	161
1979	195	94	289	159
1980	192	99	291	157
1981	192	104	296	157
1982	192	108	300	157
1983	192	113	305	157
1984	192	119	311	157
1985	192	125	317	157
1986	192	132	324	158
1987	193	141	334	158
1988	195	148	343	159
1989	200	155	355	163
1990	209	162	371	171
1991	221	170	391	181

*See text for the assumptions used in calculating these projections.
See Table 3 for the enrollment figures for "private" and "all institutions."

outlays (especially federal) resume their growth, the present policies projection may be realized. However, the feeling that graduate enrollments will not and should not grow as fast in the future as in the past is so widespread that it seems appropriate to examine a more conservative forecast. This will allow us to examine systematically the consequence of alternative levels of graduate education.

The new assumption is that the absolute increase in graduate enrollment in future years will be equal to the average increase in the past, 2326 students per year.¹⁵ With this single exception, all other assumptions are identical to those stated in the case of the present policies projections. The results are presented in Table 5 and compared graphically with the present policies forecasts in Figure 2. The downward shift is of significant size and of particular importance in the public four-year sector since these institutions contain the overwhelming majority of the graduate students. Graduate enrollment in this sector is decreased by 7000 students in 1972 (12 percent), 17,000 students in 1975 (22 percent), and 28,000 students in 1980 (28 percent) relative to the present policies projections. Although undergraduate enrollment exceeds graduate enrollment in the public four-year sector, the above declines would also represent a significant

¹⁵Performing a time trend regression on total graduate enrollment from 1951 through 1971 yields

$$G_t = 8561 + 2326(t-1950) \quad R^2 = .9735 \text{ where}$$

G_t : graduate enrollment in year t , in headcount students

t : year

Table 5

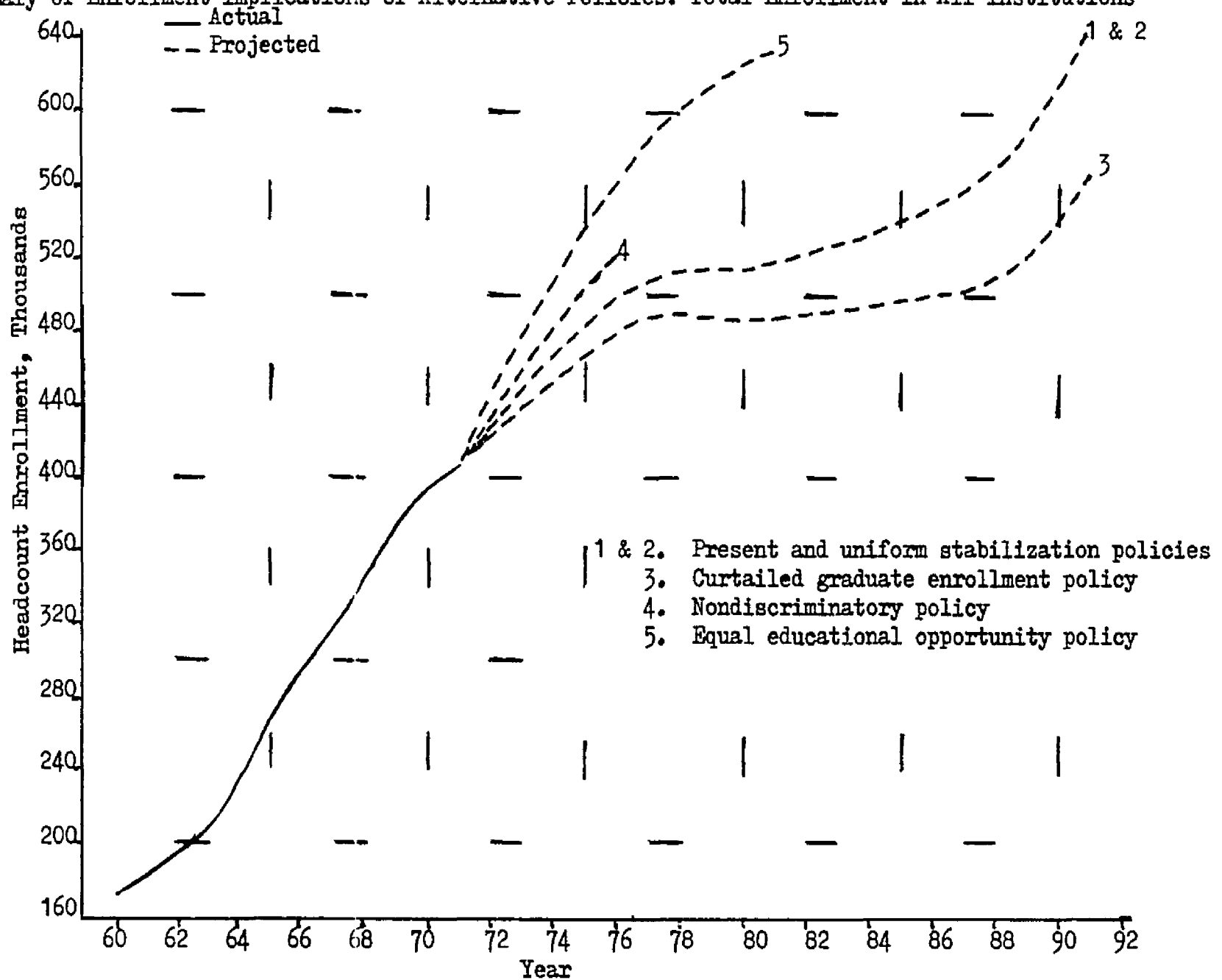
Curtailed Graduate Enrollment Policy Projections by Student Level and Type of Institution, 1972-91*
(thousands)

Year	Public Four-Year			Public Two-Year	Private			All Institutions		
	Under- Grad	Grad- uate	Total		Under- Grad	Grad- uate	Total	Under- Grad	Grad- uate	Total
1972	172	53	225	140	50	5	55	362	58	420
1973	175	56	231	150	51	5	56	376	61	437
1974	178	58	236	157	53	5	58	388	63	451
1975	181	59	240	165	54	6	60	400	65	465
1976	183	62	245	172	56	6	62	411	68	479
1977	182	64	246	176	58	6	64	416	70	486
1978	179	66	245	179	58	6	64	416	72	488
1979	175	69	244	179	58	6	64	412	75	487
1980	170	71	241	179	58	6	64	407	77	484
1981	168	73	241	181	58	6	64	407	79	486
1982	167	75	242	182	58	7	65	407	82	489
1983	166	77	243	183	58	7	65	407	84	491
1984	166	79	245	183	58	7	65	407	86	493
1985	166	82	248	183	58	7	65	407	89	496
1986	166	84	250	184	58	7	65	408	91	499
1987	167	86	253	184	58	7	65	409	93	502
1988	168	88	256	186	58	8	66	412	96	508
1989	172	90	262	191	59	8	67	422	98	520
1990	180	92	272	200	61	8	69	441	100	541
1991	191	94	285	211	62	8	70	464	102	566

*See text for the assumptions used in calculating these projections.

Figure 2

Summary of Enrollment Implications of Alternative Policies: Total Enrollment in All Institutions



decline in the sector's total enrollment—3, 7 and 10 percent, respectively.

Nondiscriminatory policy

A basic premise of our democratic society is that no one should be discriminated against because of his racial-ethnic background. However, we are painfully aware that a child's chances of success in this society are much greater if his skin color happens to be white. Part of this unjustified differential treatment is a result of publicly provided services failing to reach all citizens in equal quantity and quality. Higher education is no exception.

The United States Census of Population for 1970 indicated that slightly less than 13 percent of the population group which is now, or will soon be, entering the college age level in Michigan were non-white.¹⁶ The most recent data on minority enrollment in Michigan higher education were collected for fall, 1970 in the Civil Rights Compliance Report of Institutions of Higher Education.¹⁷ Although the best we have, these data are incomplete and imprecise in many respects; (1) coverage was limited to full-time students but some institutions may have ignored such a distinction, (2) methods for obtaining the information varied considerably among the institutions, (3) non-response rates were high in institutions dependent upon voluntary designations, and (4) foreign students may have been erroneously included. A summary

¹⁶U.S. Bureau of the Census, Census of Population: 1970, General Population Characteristics, Final Report PC(1)-B24 Michigan, U.S. Government Printing Office, Washington, D.C., 1971, Table 19, p. 65.

¹⁷Michigan Department of Education, "A Summary of Racial-Ethnic Enrollments in Michigan Institutions of Higher Education, Fall 1970," Planning Division, Bureau of Higher Education, Lansing, Michigan (undated).

of the survey results is presented in Table 6.

Table 6

Full-Time Minority Student Enrollment in Michigan as a Percent
of Full-Time Enrollment by Sector and Level, Fall 1970

<u>Type of Institution</u>	<u>Undergraduate</u>	<u>Graduate</u>	<u>Total</u>
Public Four-Year	6.6	9.6	7.0
Public Two-Year	10.6	n.a.	10.6
Private	7.1	5.6	7.0
All Institutions	7.6	9.5	7.8

n.a.: not applicable

Source: Michigan Department of Education, "A Summary of Racial-Ethnic Enrollments in Michigan Institutions of Higher Education, Fall 1970," Planning Division, Bureau of Higher Education, Lansing, Michigan (undated). See text for important qualifications associated with these data.

The set of nondiscriminatory enrollment projections is based on attaining at least a 12.8 percent minority enrollment in each sector of Michigan higher education by 1976 without displacing any person who would normally enroll. A reasonable plan for implementing this alternative would be to admit as close to 12.8 percent minority students as possible in 1972 and to admit 12.8 percent or more in 1973 and beyond; the normal turnover of students would insure that the institutions would reflect the composition of the entering classes after about four years, assuming no difference in the drop-out rate among the different racial-ethnic groups. The following assumptions were made in order to derive specific figures despite the lack of detailed data; the present policies projections were used as the base data.

The percentages of minority students implicit in the present policies projections are those shown in Table 6.¹⁸

¹⁸ A survey similar to that described for fall, 1970, was also

First-time students are 20, 40 and 27 percent of the undergraduate student bodies in the public four-year, public two-year, and private sectors, respectively.

Upper division students in the private sector are 35 percent of the undergraduate student body.

The percentages of minority students admitted in 1972 will be 9.7 among undergraduates and 11.2 among graduates in public four-year institutions, 11.7 in public two-year institutions, and 9.9 among undergraduates and 9.2 among graduates in private institutions. In 1973 and beyond entering student groups will contain 12.8 percent minority students. Students who transfer into a system will reflect the same percentage of minority students as the level they enter.

The nondiscriminatory enrollment projections are listed in Table 7 and graphed in Figure 2.¹⁹ Relative to present policies projections, the required increase is not extremely large. On a statewide basis, total enrollment must rise by an additional 17,000 students by 1974 and 24,000 students by 1976. Putting this another way, compared to a projected statewide annual growth rate of 4.2 percent from 1971 to 1976 under the present policies assumptions, there is now a need for a 5.2 percent annual rate of increase—certainly not an intimidating change, especially in view of the more rapid growth of the 1960's. One must be extremely cautious in comparisons among types of institutions not only because of data limitations but also because the indicated changes in enrollment may be a poor indicator of where maximum

conducted in fall, 1968. The data are so rough that comparisons are dangerous. The important point to be made here is that there is no indication of a clear upward trend in the percentage of minority students enrolled. The percentage in 1968 was the same in the private sector (7.0), higher in the public two-year sector (11.2), and lower in the public four-year sector (5.2).

¹⁹For a detailed explanation of the computing of these projections, see Appendix C.

Table 7

Nondiscriminatory Policy Enrollment Projections by Student Level and Type of Institution, 1972-76*
(thousands)

<u>Year</u>	<u>Public Four-Year</u>			<u>Public Two-Year</u>	<u>Private</u>			<u>All Institutions</u>		
	<u>Under- Grad</u>	<u>Grad- uate</u>	<u>Total</u>		<u>Under- Grad</u>	<u>Grad- uate</u>	<u>Total</u>	<u>Under- Grad</u>	<u>Grad- uate</u>	<u>Total</u>
1972	173	60	234	141	50	5	56	364	65	430
1973	180	68	247	153	52	5	58	385	73	458
1974	186	74	260	161	56	6	61	403	79	482
1975	192	78	271	169	57	6	63	419	84	503
1976	196	84	280	176	60	6	66	432	90	522

The sums of the components may differ from the totals due to rounding

*See text and Appendix C for the assumptions used in calculating these projections.

efforts must focus. If the public four-year and private institutions increase their minority enrollment by attracting members of minority groups who would otherwise have attended public two-year institutions, the brunt of the effort to increase the number of minority students in higher education will fall on the public two-year system as it strives to maintain and increase its service to minority communities (the data cited in footnote 18 are consistent with such a hypothesis). Thus, if this alternative were to be implemented, it would not be safe to assume that the public four-year sector would have the most difficult adjustment requiring the most attention and resources.

The problem of attaining a 12.8 percent minority enrollment is not so much one of inundating our present system of higher education with a flood of new students--for such would not be the case, but of bringing about a major transformation of attitudes and programs within education. In a 1971 survey of all public and private high schools in Michigan, of which 96.1 percent responded, the Department of Education found that only about 8.6 percent of the 1971 high school graduates were members of a minority group.²⁰ The survey also found that about 49 percent of white and 46 percent of nonwhite graduates planned to enroll in an institution of higher education. The importance of these figures is that if minority groups are to be 12.8 percent of the students in higher education but only 8.6 percent of the high school graduates and if 50 percent of the white graduates continue on to higher education, then 68 percent of the high school graduates who are members of minority groups must continue on to higher education if colleges

²⁰Michigan Department of Education, "Survey of Post-Secondary Educational Plans of Michigan High School Graduates," Student Financial Assistance Services, Lansing, Michigan, September, 1971.

recruit only from the pool of high school graduates. This appears to be highly unlikely.²¹ Thus, the policy of attaining a percentage of minority students in higher education equal to the percentage in the population is a realistic planning possibility only if high schools improve their retention rate and/or colleges improve their ability to handle students with a low academic rank in their graduating class and even those without a high school diploma.

Equal educational opportunity policy

The opportunity to receive higher education depends not only on one's racial-ethnic background, but also upon many other socio-economic factors such as income and home environment. It is not clear how many potential college students cannot attend because of such factors, but the study by Berls cited earlier provides a clue. He found that about 70 percent of the high school graduates in the top socio-economic quartile went to college; only 3.2 percent of this quartile failed to complete high school.²² Using this information, a final projection is computed which assumes:

By 1981 all socioeconomic groups attend colleges at the same rate. This rate will be such that undergraduate enrollment

²¹Robert H. Berls, in "Higher Education Opportunity and Achievement in the United States," The Economics and Financing of Higher Education in the United States (Joint Economic Committee, Congress of the United States), U.S. Government Printing Office, 1969, estimates that the ceiling on the percentage going to college is about 70 percent. This estimate is a result of considering how many students would attend college "if high school graduates from all socioeconomic categories went to college in the same proportion as high school graduates of the same ability level, but in the top socioeconomic quartile."

²²Ibid., p. 146.

will be equal to 70 percent of the population in the 18 through 21 age group; this percentage was approximately 51 in 1971 and will increase by 1.9 percentage points each year up to a maximum of 70 in 1981.

Although the assumption deals with total undergraduate enrollment rather than just first-time students as did Berls, the 70 percent figure is still realistic. The fact that many college students do not complete four years of higher education would tend to make a lower figure more reasonable, but the existence of many undergraduate students outside of the 18 through 21 age group argues for a higher figure; this analysis assumes that these two effects negate each other in the future as they now appear to do.

Attaining such a goal would require a determined effort by all sectors, but an especially heavy reliance is likely to rest on the community college sector. It will be assumed that undergraduate enrollment in the private sector grows throughout the period and that the percentage of lower division students enrolled in the community colleges increases at a more rapid pace than was the case in the other projections, i.e.:

Undergraduate enrollment in the private institutions will increase by 1590 students each year. The percentage of lower division students in the public sector enrolled in the community college system is assumed to increase from 58.5 percent in 1971 to 74.5 percent in 1981.²³

All other assumptions will remain identical to those used in deriving the present policies projections. The projections are presented in Table 8 and Figure 2.

²³Specifically, the percentage is assumed to increase from 58.5 percent in 1971 to 62.5 percent in 1973 in two steps of 2.0 and from 62.5 in 1973 to 74.5 in 1981 in eight steps of 1.5.

Table 8

Equal Educational Opportunity Policy Enrollment Projections
by Student Level and Type of Institution, 1972-81*
(thousands)

<u>Year</u>	<u>Public Four-Year</u>			<u>Public Two-Year</u>	<u>Private</u>			<u>All Institutions</u>		
	<u>Under- Grad</u>	<u>Grad- uate</u>	<u>Total</u>		<u>Under- Grad</u>	<u>Grad- uate</u>	<u>Total</u>	<u>Under- Grad</u>	<u>Grad- uate</u>	<u>Total</u>
1972	180	60	240	149	50	5	55	379	65	444
1973	187	67	254	165	51	5	56	403	72	475
1974	195	72	267	180	53	5	58	428	77	505
1975	203	76	279	196	54	6	60	453	82	535
1976	207	81	288	209	56	6	62	472	87	559
1977	210	85	295	223	58	6	64	491	91	582
1978	212	89	301	234	59	6	65	505	95	600
1979	209	94	303	242	61	6	67	512	100	612
1980	207	99	306	250	62	6	68	519	105	624
1981	202	104	306	257	64	6	70	523	110	633

*See text for the assumptions used in calculating these projections.

The population groups serving as the basis for these projections are from U.S. Bureau of the Census, Census of Population: 1970, General Population Characteristics, Final Report PC(1)-B24 Michigan, U.S. Government Printing Office, Washington, D.C., 1971, Table 19, p. 65; the 1970 age group 15-18 is the base for 1972, 14-17 for 1973, and so on up to 6-9 for 1981.

The forecasts using the equal educational opportunity assumptions are considerably greater than those derived from an extension of present policies. Total enrollment in all institutions is greater by 27,000 students in 1973, 53,000 students in 1975 and 116,000 students in 1981. A comparison of the nondiscriminatory undergraduate enrollment projections with the equal educational opportunity set is also useful because the latter is a generalization of the former, i.e., the latter assumes complete elimination of discrimination at the undergraduate level based upon socioeconomic criteria while the former is concerned with elimination of discrimination based only upon racial-ethnic considerations. As one would expect, the equal educational opportunity projections exceed the nondiscriminatory projections; in this case the differences in undergraduate enrollment for all institutions are 18,000 students in 1973 and 34,000 students in 1975. Thus, although providing equal access for all racial-ethnic groups is a major task, the provision of equal educational opportunities for all groups regardless of their socioeconomic status is a problem of even greater magnitude.

Summary

The process of building a quantitative model which can be used to analyze the implications of alternative higher education policies was begun in this chapter. Linkages were identified between enrollments and underlying causal factors. Understanding these relationships is important for many purposes, one of which is to improve our capability to forecast enrollments.

The statistical analysis used data on statewide undergraduate and graduate enrollments for the 1951-69 period. The independent, or explanatory, variables which were found to exert a significant influence on enrollments are the college-age population, number of discharges from the Armed Services, personal income, and the unemployment rate. Increases (decreases) in each of these factors tend to be associated with increases (decreases) in enrollment. The effect of tuition charges is not made explicit in this model; the implicit assumption is that there will not be any drastic changes in attitudes and policies concerning tuition. In the next chapter the results of this analysis and additional, more detailed data for a shorter time period will be used to examine the impact of tuition and student aid variables on enrollments.

The model was used to develop enrollment projections, disaggregated by type of institution with the aid of additional assumptions. An examination of five different policies revealed a broad range of possible enrollments. A continuation of present policies is likely to result in a declining rate of growth in undergraduate enrollment until the mid-1970's, followed by approximately ten years of stable enrollment. As a result, a policy of continuing to increase the percentage of lower-division students attending public two-year colleges, would probably result in decreases in undergraduate enrollment in four-year institutions. Attempts to avoid such decreases in four-year institutions would soon halt the growth of two-year colleges, which proceeded at a phenomenal rate in the 1960's. Graduate students will make up a larger share of total enrollments as the number of undergraduates tends to stabilize, but so many uncertainties are besetting graduate schools

and research programs that the forecasts based on this simple model are subject to a great deal of doubt.

Two policy alternatives were studied whose goals were to increase equality of access to higher education. In the first case, admitting minority students in a ratio equal to their representation in the population did not involve extremely large numbers--the problem appears to be primarily one of insuring that appropriate programs are available for the academically disadvantaged rather than one of expanding higher education considerably to handle a huge influx of students. Eliminating all biases associated with socio-economic background, however, is a much larger task requiring a major commitment of additional resources. Such a policy, if successful, would require annual increases in enrollment of approximately the same magnitude as occurred in the 1960's when the bulk of the post-war baby boom generation came of college-age.

Chapter V

Impact Of Student Financial Aid And Tuition On Enrollments

Student financial aid and tuition are policy variables whose impact is of great concern to all associated with higher education. Increases in student aid are advocated as a means of attaining greater equality of access to higher education, but many wonder if such claims are justified. The latter fear that much of the aid is granted to students who would have attended college, and even a specific college, regardless of the aid received. Another question centers on the impact of different types of aid, i.e., grants, loans, or work-study plans. Tuition is of concern because it is the most visible policy variable related to the financial barriers to higher education. Student aid and tuition are often considered simultaneously in the policy process in the hope that students who would otherwise be discouraged from attending college by increased tuition rates can be given sufficient additional student aid to offset the added tuition burden. Despite this high level of interest, almost no analytical work has been addressed to ascertaining the effect of changes in aid programs and tuition--leaving decision makers with no alternative but that of making crude estimates based on their own and their associates' impressions.

There are two important exceptions to the above characterization of the state of our research. The first is a series of three papers which derive estimates of the aggregate United States demand for higher education in the post-World War I period.¹ Two of these include a

¹Robert Campbell and Barry N. Siegel, "The Demand for Higher Education in the United States, 1919-1964," American Economic Review, Vol. 57, June 1967, pp. 482-494.

Harvey Galper and Robert M. Dunn, Jr., "A Short-Run Demand

tuition variable; none of the three models contain any consideration of student financial aid. The degree of aggregation and the quality of the older data place severe limitations on the use of the results. These authors have, however, developed conceptual frameworks that will aid our analysis, and they demonstrated that national trends in enrollment are affected by variables such as tuition levels and Armed Forces manpower policies.

The distinguishing feature of the other analytic approach is the use of cross-section samples to ascertain those variables which influence the probability of a high school graduate enrolling in college.² To the author's knowledge, only the work of Radner and Miller considers tuition disaggregated to the level of type of institution within a state; the remaining two papers cited here use state averages for their tuition data. Only one of these studies, that of Hoenack and Feldman,

Function for Higher Education in the United States," Journal of Political Economy, Vol. 77, Sept.-Oct. 1969, pp. 765-777.

Joseph E. Hight, "The Supply of Higher Education in the U.S.: The Public and Private Institutions Compared," Paper presented at the Allied Social Science Association Meetings, Detroit, Michigan, December 28-30, 1970.

²See A.J. Corazzini, D. Dugan, and H.G. Grabowski, "Determinants and Distributional Aspects of Enrollment in U.S. Higher Education," Paper presented at the Allied Social Science Association Meetings, Detroit, Michigan, December 28-30, 1970, and later published in Journal of Human Resources, Vol. VII, No. 1, Winter 1972, pp. 39-59.

Stephen A. Hoenack and Paul Feldman, "Private Demand for Higher Education in the United States," Research Paper P-649, Institute for Defense Analysis, Arlington, Virginia, 1969. This paper is essentially reprinted, except for the omission of detailed technical appendix material, in The Economics and Financing of Higher Education in the United States, a Compendium of Papers submitted to the Joint Economic Committee, Congress of the United States (Washington, D.C.; U.S. Government Printing Office, 1969), pp. 375-95.

R. Radner and L.S. Miller, "Demand and Supply in U.S. Higher Education: A Progress Report," American Economic Review, Vol. 60, May 1970, pp. 326-34.

includes a student financial aid variable, total funds granted in a state (as best as could be determined) divided by the seventeen-year-old population of the state. However, one can determine this only by reading the technical appendix material; Hoenack and Feldman do not discuss this aspect in their text and omit it entirely from the more widely available version of their work published by the Joint Economic Committee. Thus, it is very difficult to understand the results with regard to student aid or feel any confidence in them; an examination of the regression results reveals a mix of signs and a wide variation in the t statistic associated with the estimated parameters.

The analysis to be presented in this chapter differs in important respects from those cited above. Both tuition rates and student financial aid awards are included. The parameters estimated for the tuition variables are unique to the institution, the relevant decision-making unit; the parameters of the financial aid variables are unique to the program and the type of institution, reflecting the level at which most state and federal decisions are made. Another important property of the model is that the data required for its estimation are, for most states, publicly available---although usually in an unpublished form.

The following discussion of this investigation of the impact of tuition charges and student financial aid on enrollments in Michigan higher education is divided into five sections: 1) theoretical framework, 2) econometric model, 3) tuition and student aid data, 4) statistical results, and 5) conclusions.

Theoretical Framework

The theoretical framework is an extension of the demand-oriented statewide model (see Chapter IV) to individual institutions. Referring to Figure 3, an institution wholly subject to the demand for its form of higher education would experience a growth of $U_{t-1} - U_t$

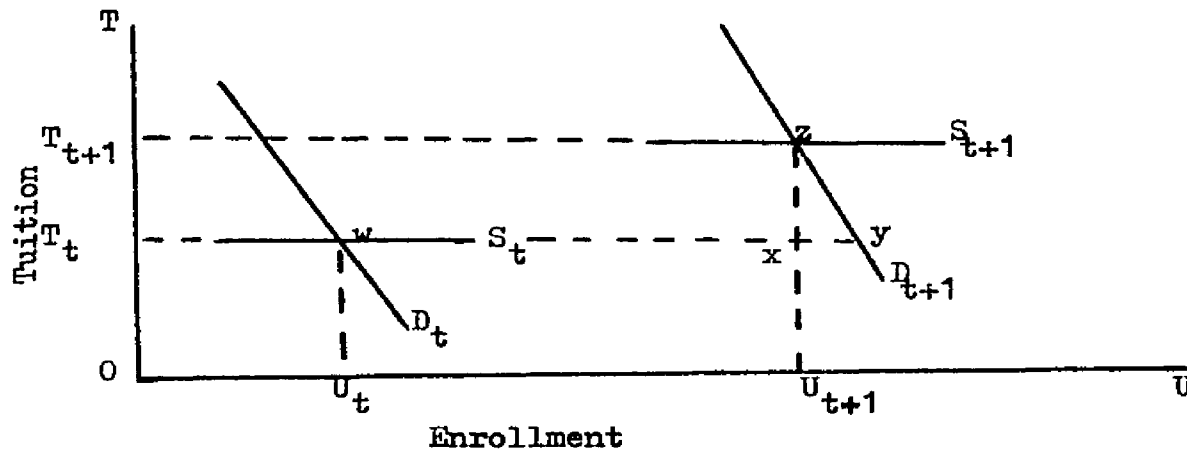


Figure 3
Illustration of the Forces Determining
Institutional Enrollments

in enrollment (U) from time t to $t+1$ and a rise of $T_{t+1} - T_t$ in tuition (T). These movements are the net result of an increase in demand of \overline{wy} and a shift in the supply of \overline{xz} . Those same factors which determine aggregate demand—real income, population changes and discharges from the Armed Services—are undoubtedly significant factors at the institutional level. In addition, financial aid funds shift demand in a fashion analogous to that of income, i.e., increased aid awards increase the ability of potential students to fund their education. The negative slope of the demand function reflects the usual expectation that as tuition increases fewer students will seek entrance into college. The lack of slope (perfect elasticity) of the supply function implies that

institutions do not vary the tuition charged within each year as a result of enrollments; the model does allow for changes in tuition from one year to another. This conceptualization of the supply, which appears to be a good representation of reality, has important implications for the econometric model to be outlined in the next section.

Some institutions appear to be relatively free of external demand factors in the sense that their desired enrollment is less than the demand for spaces at prevailing tuition rates, resulting in potential students who meet all basic qualifications being turned away. These colleges may exhibit a growth pattern quite unrelated to demand factors. To the extent that institutional policy with respect to growth remains constant over time, such an institution will grow at a regular pace (which may be zero).

Econometric Model

The model may be specified as

$$U_{n,i,t} = a_{n,i} + b_{n,i}\hat{U}_t + c_{n,i}t + d_{n,i}T_{n,i,t} + e_{n,i}S_{n,i,t} + f_{n,i}G_{n,i,t} \\ + g_{n,i}E_{n,i,t} + h_{n,i}W_{n,i,t} + k_{n,i}L_{n,i,t} + \epsilon_{n,i,t}$$

where

$n = 1, 2, 3$, to denote the type of institution, i.e., public four-year, public two-year, or private

$i = 1, \dots, 12$ if $n = 1$
 $= 1, \dots, 19$ if $n = 2$
 $= 1, \dots, 26$ if $n = 3$ to denote the specific institution

$t = 1, \dots, 6$ to denote the year of the observation, (1965/66 - 1970/71)

$U_{n,i,t}$ = observed undergraduate enrollment at institution i of type n in year t , actual fall headcount students

\hat{U}_t = estimated statewide demand for higher education in year t as revealed by the model developed in chapter IV, thousands of

fall headcount undergraduate students

$T_{n,i,t}$ = real tuition rate at institution i of type n in year t , dollars

$S_{n,i,t}$ = State Scholarship funds, in real terms, awarded to students at institution i of type n in year t , thousands of dollars

$G_{3,i,t}$ = Tuition Grant funds, in real terms, awarded to private institutions i in year t , thousands of dollars

$E_{n,i,t}$ = Educational Opportunity Grant funds, in real terms, awarded to institution i of type n in year t , thousands of dollars

$W_{n,i,t}$ = College Work-Study funds, in real terms, awarded to institution i of type n in year t , thousands of dollars

$L_{n,i,t}$ = National Defense Student Loan funds, in real terms, awarded to institution i of type n in year t , thousands of dollars

The deflator used to convert current monetary values to real terms is the Consumer Price Index, which is not ideal but adequate for these purposes. A model consisting of a single demand equation is sufficient since supply is perfectly elastic.³

The role of the tuition and student financial aid variables is obvious from the presentation of the theoretical model. The statewide demand pressure is represented in the form of \hat{U}_t rather than individual factors in order to preserve degrees of freedom. At a later date when more observations have become available it would be interesting to include real income, population changes, and discharges from the Armed Services as separate variables and thus discover how institutions respond differently to these pressures, e.g., the different implications for the private sector of an increase in statewide demand as a result of increased per capita income versus that due to increased numbers of young people. Inclusion of the individual demand factors rather than

³E. Malinvaud discusses this question in some detail in Statistical Methods of Econometrics (Chicago: Rand McNally & Co., 1966), pp. 497-511. He notes on page 510 that "the fitting of quantity to price is particularly well suited to the study of the demand for public services."

\hat{U}_t would also be preferable from a purely statistical viewpoint for, as pointed out in Chapter IV, the estimated parameters of the population and income variables are subject to an indeterminate bias. However, the possible influence of such a bias is probably relatively unimportant when compared to the larger problem of using a single time series to represent demand pressure across a wide variety of types and locations of institutions.

An estimate of statewide demand, \hat{U}_t , derived from the model presented in Chapter IV is used rather than actual statewide enrollment, U_t , since the former is a purer representative of the aggregate demand factors included in the model in Chapter IV than the latter. For example, if statewide enrollments grew by an unusual amount in one year due to an influx of student aid funds, an equation containing \hat{U}_t and aid variables would tend to indicate (correctly) that increases in aid were responsible. But an equation containing U_t and aid variables would erroneously attribute a portion of the increase due to increased aid to increased statewide demand. In other words, U_t itself reflects variations in tuition and student aid while such variations are reflected in \hat{U}_t only to the extent of the indeterminate bias noted above and explained more fully in Chapter IV. Technically, \hat{U}_t is an essentially exogenous variable since it is a linear combination of exogenous variables but U_t is endogenous and, therefore, use of U_t would result in an identification problem.

The inclusion of a time trend (t) is an attempt to discover the influence of stable institutional goals with respect to growth, which are expected to be the prime causal factor in those institutions referred to earlier as relatively free of external demand restraints. The

subscripts of the coefficients imply that the model assumes a unique parameter for each institution with regard to its intercept term, responsiveness to statewide demand, internal growth policy and tuition charges; but the effects of the financial aid programs will be evaluated by type of institution.

Summarizing the interpretation of the coefficients, e_n , f_3 , g_n , h_n and k_n reflect the increase in enrollment in each sector associated with an increase in student aid funds in the respective programs, all other things being equal. The coefficient of the tuition variable, $d_{n,i}$, is expected to have a negative sign, and it indicates the decrease in enrollment in each institution associated with an increase in tuition charges, all other things being equal. Similarly, $b_{n,i}$ reveals the increase in enrollment in each institution associated with an increase in statewide demand, *ceteris paribus*. Finally, $c_{n,i}$ represents the increase in enrollments in each institution which is due to internal plans which can be maintained despite variations in other factors.

Tuition And Student Aid Data

The period covered by this analysis contains six years, 1965-66 through 1970-71. Since this span of time is a subset of that used in estimating the enrollment parameters in Chapter IV, all of the data series used in that work are adequate for use in this subsequent analysis.⁴ In this case, however, the enrollment figures for individual institutions as well as for aggregates by type of institution are

⁴The data relative to 1970-71 became available after the work in Chapter IV was completed but before this analysis was done.

used. A section in the previous chapter analogous to this one discusses in some detail the nature of the data used in that model. Thus, in the following the emphasis will be placed on the two additional types of data needed, namely, tuition charges and student financial aid awards.

The tuition data were obtained from unpublished records kept by the Division of Student Financial Aids, Bureau of Higher Education, Michigan Department of Education.⁵ Both tuition and other fees are included so as to avoid most problems of differing definitions of student charges. The primary purpose governing the collection of these data is the need to arrive at an estimate of student expenses for each institution participating in state-sponsored programs, which included many—but not all—private colleges and universities. The figures appear to be very reliable, based on a few spot checks with alternative sources, such as college catalogs and the Higher Education General Information Survey (HEGIS), when these were readily available.

Data on student financial aid awarded by the State of Michigan were also obtained from unpublished records of the Division of Student Financial Aids, Bureau of Higher Education, Michigan Department of Education. These grants, and also the federal grants to be discussed next, are listed by program, institution, and year in Appendix D. The State of Michigan awards funds directly to Michigan students attending colleges or universities in Michigan through two programs, "Competitive Scholarships" and "Tuition Grants." The scholarships are awarded on the basis of a State Competitive Scholarship Examination,

⁵These data are available upon request.

high school record, and demonstrated financial need; they may be used in either public or private Michigan colleges. Although student applicants must also take the State Competitive Scholarship Examination, tuition grants are awarded on the basis of financial need and enrollment at a private Michigan college. In both the scholarship and grant programs the maximum award is limited to the cost of tuition and fees or to \$800 per year, whichever is lesser. The data used in this study are identified with respect to institution, i.e., the sum of the scholarships and the sum of the grants spent at each institution in each year are the basic units of observation. A third state program, the "Guaranteed Loan Program," involves almost no state funds and is not considered in the model; the state's financial stake is limited to reimbursing banks for defaults by students on approved loans, which occurs very infrequently.

Federal financial aid data are taken from "notifications to members of Congress" with regard to approved institutional grants; these source documents were obtained from the Division of Student Financial Aid, United States Office of Education. Several grants were often awarded during the course of the academic year which made it necessary to do a great deal of aggregating. Note that these data represent awards rather than expenditures, which was not true of the state-related data; awards will be greater than expenditures when an institution does not use the entire award, and thus must remit the unspent balance. Expenditure data are recorded, of course, but not in a manner that makes them available to researchers at a reasonable cost.

Three federal student financial aid programs are included in the analysis. Each is well-known and will be given only a brief review.

The "College Work-Study (CWS) Program" provides funds to colleges to hire students who demonstrate financial need. The "National Defense Student Loan (NDSL) Program" supplies institutions with money which is loaned to students at a low interest rate, three percent, that is not charged until after the student completes his education; repayments, extending over a maximum of ten years, go to the college or university, where they are lent again just as in the case of the original federal grant. The large element of subsidy to the student implies that the size of the loan fund in constant-value dollars would quickly shrink in the absence of new infusions from the federal government. Finally, the "Educational Opportunity Grants (EOG) Program" consists of scholarships awarded to students who demonstrate exceptional financial need, defined as cases where parents cannot be expected to provide \$600 or more toward the students' expenses; the only academic requirement is enrollment in a postsecondary institution. As is the case of CWS and NDSL, EOG funds are given to the colleges which in turn provide the grants to students. All of the federal programs require a small amount of matching institutional funds to be allocated to the program; the data used in this analysis include only the federal component.⁶

A few summary statistics of student aid are presented in Tables 9 and 10 in order to illustrate the trends with respect to some of the more important dimensions. The actual dollar awards are presented

⁶Those interested in more detail concerning student financial aid programs are referred to Financing a College Education: A Guide for Counselors, an annual publication available for a small charge from the College Entrance Examination Board, Publications Order Office, Box 592, Princeton, N.J. 08540.

Table 9

State and Federal Student Financial Aid in Michigan by Type of Institution, 1965-66 through 1970-71
(thousands of actual dollars)

<u>Type of Institution</u>	<u>1965-66</u>			<u>1966-67</u>			<u>1967-68</u>		
	<u>State</u>	<u>Federal</u>	<u>Total</u>	<u>State</u>	<u>Federal</u>	<u>Total</u>	<u>State</u>	<u>Federal</u>	<u>Total</u>
Public Four-Year	1,115	5,566	6,682	1,977	10,686	12,663	3,457	13,779	17,236
Public Two-Year	90	824	914	137	1,124	1,261	262	1,459	1,722
Private	797	1,337	2,135	2,219	2,586	4,805	3,976	3,275	7,250
All Institutions	2,002	7,727	9,730	4,333	14,396	18,729	7,695	18,513	26,208

<u>Type of Institution</u>	<u>1968-69</u>			<u>1969-70</u>			<u>1970-71</u>		
	<u>State</u>	<u>Federal</u>	<u>Total</u>	<u>State</u>	<u>Federal</u>	<u>Total</u>	<u>State</u>	<u>Federal</u>	<u>Total</u>
Public Four-Year	4,163	13,862	18,025	5,041	13,641	18,683	4,919	16,026	20,945
Public Two-Year	202	2,212	2,414	194	2,776	2,970	293	3,354	3,647
Private	5,173	3,884	9,057	6,877	4,071	10,948	7,008	4,879	11,887
All Institutions	9,538	19,958	29,496	12,112	20,488	32,600	12,220	24,259	36,478

Totals may not equal the sum of components due to rounding.

Source: Summary data obtained from Appendix D.

Table 10

State and Federal Student Financial Aid in Michigan by Type of Institution, 1965-66 through 1970-71
(thousands of 1970-71 dollars)

<u>Type of Institution</u>	<u>1965-66</u>			<u>1966-67</u>			<u>1967-68</u>		
	<u>State</u>	<u>Federal</u>	<u>Total</u>	<u>State</u>	<u>Federal</u>	<u>Total</u>	<u>State</u>	<u>Federal</u>	<u>Total</u>
Public Four-Year	1,390	6,950	8,340	2,390	12,910	15,290	4,050	16,150	20,200
Public Two-Year	110	1,030	1,140	160	1,360	1,520	310	1,710	2,020
Private	990	1,670	2,660	2,680	3,120	5,800	4,660	3,840	8,500
All Institutions	2,500	9,640	12,140	5,230	17,390	22,610	9,020	21,700	30,720

<u>Type of Institution</u>	<u>1968-69</u>			<u>1969-70</u>			<u>1970-71</u>		
	<u>State</u>	<u>Federal</u>	<u>Total</u>	<u>State</u>	<u>Federal</u>	<u>Total</u>	<u>State</u>	<u>Federal</u>	<u>Total</u>
Public Four-Year	4,660	15,520	20,180	5,320	14,390	19,710	4,920	16,030	20,950
Public Two-Year	230	2,480	2,700	200	2,930	3,130	290	3,350	3,650
Private	5,790	4,350	10,140	7,250	4,290	11,550	7,010	4,880	11,890
All Institutions	10,680	22,350	33,030	12,780	21,610	34,390	12,220	24,260	36,480

Totals may not equal the sum of components due to rounding.

Source: Derived from Table 9 by use of the Consumer Price Index.

in Table 9 while in Table 10 the figures are adjusted for changes in the price level; the following comments pertain to the adjusted series. The trends are quite surprising—at least to one who has had only a casual association with these programs. Financial aid awards grew much faster than undergraduate enrollments from 1965-66 to 1967-68. (All subsequent references to enrollments are based on undergraduate enrollments, the primary target group for the aid programs being discussed.) Since 1967-68 aid funds have increased at a much slower pace, usually less than the rate of increase in enrollments. State funds have increased nearly five-fold while federal funds have grown at about half this rate, resulting in an increase in the state share of aid from about one-fifth in 1965-66 to approximately one-third in 1970-71.

The trends in awards by type of institution also reveal interesting contrasts. Students in private institutions have experienced a 50 percent increase in their share of student aid, from 22 percent in 1965-66 to 33 percent in 1970-71, despite the fact that the share of enrollment they represent has dropped by 30 percent, from 20 percent in 1965-66 to 14 percent in 1970-71. Although the state tuition grant program, targeted specifically on the private sector, has played an important role in this trend, the private institutions and students have increased their share of both state and federal student aid. This, of course, implies a great increase in the average aid per undergraduate student—from about \$60 in 1965-66 to \$260 in 1970-71. On the other hand, the public two-year sector has steadily increased its share of students, from 26 percent to 37 percent over this period, but in 1970-71 it was recovering from a drop in its share of aid funds to the point where it was again receiving approximately the same share

as in 1965-66, about 10 percent. These institutions, often billed as "open door colleges" and described as embodying out best hopes for attaining equal educational opportunity, were awarding an average of only \$29 in aid per enrolled student in 1970-71. Finally, in the public four-year sector the shares of both student aid funds and undergraduate enrollment declined at a modest rate over this period. In 1970-71 these institutions enrolled 49 percent of the students, who received 57 percent of the aid; the result was \$127 in aid per enrolled student.

The interested reader will find many more fascinating aspects of student financial aid programs in the detailed material in Appendix D. For example, in 1970-71 two Michigan institutions each received more student aid funds than the sum total for all public two-year institutions. Such relationships are not well-known and need examination if future aid programs are to be designed and administered so as to reach the desired target group.

Student aid from institutional sources is not included in this analysis. This is an important omission since these funds are often of considerable size; a comprehensive study of student financial aid would have to include consideration of this aspect. Such an approach was not possible in this research because the necessary data were not available—at least not without a much greater expenditure of time, effort, and resources than was devoted to the project.⁷ However, since this work is focused primarily on public policy as reflected in state and federal decisions, the omission of the institutional

⁷The HEGIS data were rejected as much too inaccurate following spot checks and consultations.

decision-making area is not a crucial matter. The purpose of this chapter is to ascertain what impact governmental decisions with regard to student financial aid have had in the recent past.

After omitting the institutions for which a complete set of six years of data was not available, the available sample contained 57 colleges and universities—12 public four-year, 19 public two-year, and 26 private institutions.⁸ Most of the omissions were due to the college not existing in 1965-66 (in the case of public two-year colleges) or missing tuition data (in the case of private institutions). General Motors Institute, a part of the General Motors Corporation, was omitted because its enrollment and tuition charges are essentially tools of management policy rather than the result of market-like forces; this unique case accounts for approximately six percent of the students in the private sector. The institutions included in the analysis enrolled 97 percent of Michigan undergraduates in fall 1965; by sector the figures were 100 percent in the public four-year, 100 percent in the public two-year, and 83 percent in the private sector. By fall 1970 the total coverage had dropped to 90 percent—100 percent in the public four-year, 80 percent in the public two-year, and 81 percent in the private sector. The percentage of student financial aid included in the sample is higher—95 percent in 1970-71. Thus, ensuing conclusions are based on analysis of a recent six-year period for which data covering at least 90 percent of undergraduate

⁸ Lake Superior State College was combined with Michigan Technological University, reducing the number of public four-year institutions from fourteen to thirteen. Lake Superior State College was originally a branch of Michigan Technological University, and it proved to be impossible to allocate the student aid awards given early in the period used in this analysis.

enrollments and 95 percent of state and federal aid funds were available in suitable form.

Statistical Results

Coefficients were estimated independently for each of the three sectors of Michigan higher education, i.e., public four-year, public two-year, and private institutions. The first computations of the complete model were characterized by an obvious interaction between the statewide demand and time trend coefficients—the larger one was, the smaller the other tended to be. In most cases one was negative and the other positive. This was not unexpected. It merely confirmed earlier expectations that the data were too limited to distinguish the separate impacts of such highly correlated phenomena. Subsequent regressions described in more detail below included assumptions that some of the coefficients specified in the econometric model are zero.

The next step in the analysis assumed all institutions were subject to "market" forces and the ability to act independently of these influences was negligible. Under these conditions the coefficients of the time trend variables would be zero, so they can be omitted from the model. The results of these computations for the public four-year, public two-year, and private institutions are presented in Tables 11, 13 and 14, respectively.

Public four-year sector

Turning first to the public four-year sector (Table 11), we find the estimates to be quite consistent with our prior expectations. All but one of the institutions show a positive response to increases in

Table 11

Estimated Impact of Statewide Demand, Tuition Rates, and Financial Aid Programs on Enrollment in Public Four-Year Institutions, Assuming No Time Trends Effects; $R^2 = .9997$

Impact of Financial Aid Programs on Enrollment^{a/}
(individual variables measured in thousands of 1970-71 dollars)

<u>State Scholarships</u>	<u>Educ. Opportunity Grants</u>	<u>Nat'l Defense Student Loans</u>	<u>College Work-Study</u>
2.778** (0.734)	0.072 (0.413)	-0.475 (0.456)	0.106 (0.612)

Impact of Statewide Demand and Tuition Rates, plus Intercept Term, for Each Institution

<u>Institution</u>	<u>Statewide Demand (thousands)</u>	<u>Tuition Rate (1970-71 dollars)</u>	<u>Intercept</u>
1. Can. Mich. U.	45.161** (4.483)	-11.748** (4.167)	2693** (1238)
2. East. Mich. U.	72.931** (5.903)	-6.943 (12.779)	-4795 (3614)
3. Ferris S.C.	25.134** (3.667)	4.318 (9.956)	-895 (3056)
4. Gr. Val. S.C.	19.355** (3.686)	-4.218 (5.811)	-1763 (1996)
5. Mich. State U.	18.141* (10.587)	-9.263 (4.435)	22,045** (1838)
6. Mich. Tech. U.	12.704** (4.759)	-0.792 (4.053)	1854 (1193)
7. No. Mich. U.	15.090** (4.068)	-1.018 (4.329)	2627* (1362)
8. Oakland U.	29.866** (11.664)	-1.840 (4.591)	-3612** (1076)
9. Sag. Val. C.	16.802** (3.448)	1.136 (0.864)	-4419** (1194)
10. U. of Mich.	-2.087 (11.173)	5.548 (5.120)	18,753** (1385)

Table 11 (cont'd)

<u>Institution</u>	<u>Statewide Demand (thousands)</u>	<u>Tuition Rate (1970-71 dollars)</u>	<u>Intercept</u>
11. Wayne State U.	35.953** (4.994)	-3.310 (3.916)	14,069** (1102)
12. West. Mich. U.	31.646** (4.263)	6.739 (5.303)	4766** (1712)

The figures within parenthesis below the estimated parameters are the standard errors of the estimates.

*indicates the parameter is significantly different from zero at the 90 percent confidence level.

**indicates the parameter is significantly different from zero at the 95 percent confidence level.

a/ These variables are assumed to have a uniform effect on all institutions; see the section, "Econometric Model."

the statewide demand for higher education; the exception, to which we shall return, is not statistically significant. Rising tuition rates are associated with a decline in enrollment, holding other factors constant, in eight out of twelve cases—and again the exceptions are not statistically significant. The financial aid program which has a statistically significant coefficient, State Scholarships, has a positive impact on enrollments.

Several factors were considered in a closer examination of the four institutions whose estimated response to increases in tuition was positive. First, the discrepancy from the expected pattern of coefficients ranges from most to least severe in the order of the University of Michigan, Saginaw Valley College, Western Michigan University, and Ferris State College. Second, the results of the first regression (which included the time trend variable for each institution) showed that in the case of the first three of these four institutions the statewide demand coefficient was negative, the time trend coefficient positive, and tuition coefficient positive. Thus, only the time trend variable was having the expected impact. The Ferris State College enrollment revealed a positive response to all three variables. Third, there exists a general consensus that the University of Michigan exercises a great deal of internal control over the size of its student body since the number of well qualified applicants regularly exceeds those admitted. There is some feeling that in recent years Western Michigan has increasingly found itself in a similar position. Saginaw Valley and Ferris State enrollments, on the other hand, are not widely regarded as relatively insulated from the fluctuations in tuition or the demand for higher education. Finally,

Saginaw Valley changed from a private to a public institution during the period covered. Although the resulting drop in tuition could be regarded as a fine opportunity to discover the ~~impact~~ of tuition changes, one could also argue that such a drastic structural change could not be explained by a simple demand model.

After considering the above evidence, a third regression was computed in which the enrollments of the University of Michigan, Saginaw Valley College, and Western Michigan University were made a function of only time. All other institutions, including Ferris State College, were left exactly as before. It seemed clear that the University of Michigan enjoyed a great deal of control over its enrollment under a wide variety of tuition and external demand conditions. The case of Saginaw Valley also seemed clear—it had undergone a massive institutional change far beyond the explanatory capability of this simple model. Western Michigan was a more complex case, but on the basis of the combination of statistical and other supporting evidence it was regarded as exercising internal control over its enrollment growth. In the other borderline case, Ferris State, the evidence was much weaker and was rejected as inadequate. The results are presented in Table 12.

Comparing the estimated parameters in Tables 11 and 12 reveals several interesting developments. As expected, the time trend variables do such an excellent job of explaining the enrollments previously a function of statewide demand, tuition, and financial aid variables that R^2 has not fallen. Also encouraging because of its consistency with the theoretical basis of the model is the rise in the estimated value of three of the four financial aid parameters. Those universities

Table 12

Estimated Impact of Statewide Demand, Tuition Rates, and Financial Aid Programs on Enrollment in Public Four-Year Institutions, Assuming Selected Institutions Maintain Internal Control of Their Growth;
 $R^2 = .9997$

Impact of Financial Aid Programs on Enrollment^{a/b/}
 (individual variables measured in thousands of 1970-71 dollars)

<u>State Scholarships</u>	<u>Educ. Opportunity Grants</u>	<u>Nat'l Defense Student Loans</u>	<u>College Work-Study</u>
3.608** (0.741)	-0.216 (0.485)	0.838 (0.829)	0.400 (0.592)

Impact of Statewide Demand and Tuition Rates, plus Time Trend and Intercept Terms, for Each Institution

<u>Institution</u>	<u>Statewide Demand (thousands)</u>	<u>Tuition Rate (1970-71 dollars)</u>	<u>Time Trend</u>	<u>Intercept</u>
1. Cen. Mich. U.	43.034** (3.839)	-12.153** (3.532)	n.a.	2479** (1090)
2. East. Mich. U.	74.865** (5.497)	-16.135 (12.296)	n.a.	-2696 (3381)
3. Ferris S.C.	24.576** (3.100)	6.653 (8.523)	n.a.	-1902 (2654)
4. Gr. Val. S.C.	16.951** (3.269)	-4.362 (4.910)	n.a.	-1236 (1696)
5. Mich. State U.	18.760* (9.474)	-18.187** (5.384)	n.a.	30,169** (1606)
6. Mich. Tech. U.	13.880** (4.182)	-1.979 (3.454)	n.a.	1617 (1050)
7. No. Mich. U.	15.568** (3.496)	-1.951 (3.698)	n.a.	2366* (1174)
8. Oakland U.	26.831** (9.908)	-0.726 (3.915)	n.a.	-4020** (970)
9. Sag. Val. C.	n.a.	n.a.	340.89** (55.69)	-403* (217)
10. U. of Mich.	n.a.	n.a.	718.29** (55.69)	19,919** (217)

Table 12 (cont'd)

<u>Institution</u>	<u>Statewide Demand (thousands)</u>	<u>Tuition Rate (1970-71 dollars)</u>	<u>Time Trend</u>	<u>Intercept</u>
11. Wayne State U.	34.885** (4.247)	-6.605 (3.922)	n.a.	14,472** (982)
12. West. Mich. U.	n.a.	n.a.	919.89** (55.69)	13,626** (217)

The figures within parenthesis below the estimated parameters are the standard errors of the estimates.

n.a. indicates "not applicable," i.e., the parameter was assumed to be zero.

* indicates the parameter is significantly different from zero at the 90 percent confidence level.

** indicates the parameter is significantly different from zero at the 95 percent confidence level.

a/ These variables are assumed to have a uniform effect on all institutions; see the section, "Econometric Model."

b/ Excludes Saginaw Valley College, the University of Michigan, and Western Michigan University.

following their own institutional goals with regard to growth, such as the University of Michigan and Western Michigan, would not be expected to respond in terms of total enrollment to an increase in financial aid funds. Rather, well-to-do potential students would be "bumped out" by economically disadvantaged students as aid funds increased. Since this model is limited to measuring impacts on total enrollment, including such institutions biases the estimates downward if one is interested in more "typical" institutions.⁹ Finally, although most of the statewide demand parameters remaining in the model did not change a great deal, there was a marked tendency for the tuition rate parameters to decrease (to have larger negative values) and thus become more significant.

A detailed discussion of the conclusions will be developed after considering the statistical results for the public two-year and private sectors. At this juncture it is sufficient to note that total enrollments in at least two cases do not appear to be primarily a function of statewide demand for higher education and tuition, but that in most cases these two factors appear important. Those students receiving State Scholarships and attending public four-year colleges and universities appear to represent additions to enrollment rather than students who would have attended these colleges without this aid. The federal

⁹ Attempts to estimate the number of potential students "bumped out" of selective institutions by economically disadvantaged students were not successful. The method of estimation was to include an independent variable defined as the sum of the aid funds going to the selective universities; this assumes that as more aid funds are received by selective institutions, the displaced well-to-do students will attend elsewhere so total enrollment in the system will increase.

aid funds, which go to the college and then to the students, do not appear to have increased enrollments above what they would otherwise have been.

Public two-year sector

The estimates for the public two-year colleges, displayed in Table 13, are largely consistent with prior expectations. Only two of the nineteen coefficients of statewide demand are negative, and neither of these is statistically significant. Five (26 percent) of the tuition parameters appear with an unexpected positive sign, one of which is statistically significant. The significant exception, Henry Ford Community College, appears to be the result of an unusual set of forces. During the six year period under examination, and especially in the latter years, other colleges in the Detroit metropolitan area grew to offer increased competition to Henry Ford, whose enrollment growth slowed and then reversed. In an apparent effort to diminish the impact of the increased competition on its enrollment, Henry Ford reduced its tuition in real dollars over the entire period and even in current dollars from 1969-70 to 1970-71. There are limits to such a policy, however, and data for fall 1971 (not available at the time the statistical estimates were computed) show tuition rising by 63 percent and enrollment continuing to fall. One suspects that an up-date of the estimates would find the tuition coefficient of Henry Ford much smaller. There is, however, less of a tendency in this sector than in the public four-year group for the estimated coefficients to be statistically significant, despite their conforming to the expected pattern with regard to sign.

Table 13

Estimated Impact of Statewide Demand, Tuition Rates, and Financial Aid Programs on Enrollment in Public Two-Year Institutions, Assuming No Time Trend Effects; $R^2 = .9956$

Impact of Financial Aid Programs on Enrollment^{a/}
(individual variables measured in thousands of 1970-71 dollars)

<u>State Scholarships</u>	<u>Educ. Opportunity Grants</u>	<u>Nat'l Defense Student Loans</u>	<u>College Work-Study</u>
1.458 (10.410)	-7.788 (6.237)	16.638** (2.944)	4.206 (3.148)

Impact of Statewide Demand and Tuition Rates, plus Intercept Term, for Each Institution

<u>Institution</u>	<u>Statewide Demand (thousands)</u>	<u>Tuition Rate (1970-71 dollars)</u>	<u>Intercept</u>
1. Alpena CC	2.281 (8.293)	-3.365 (10.629)	521 (1407)
2. Bay de Noc CC	-4.719 (12.154)	13.661 (16.767)	-1939 (1774)
3. Delta Col.	26.326** (6.136)	0.283 (11.649)	-3527 (4243)
4. Genesee CC	21.699** (7.267)	13.760 (9.497)	-3820** (1847)
5. Gogebic CC	5.010 (6.072)	-1.915 (5.983)	-226 (1431)
6. Gr. Rapids JC	15.255* (7.686)	-11.301 (9.122)	3529* (2045)
7. H. Ford CC	42.882** (11.551)	70.444** (24.488)	-16,827 (8530)
8. High. Park Col.	12.460** (5.895)	-19.928* (10.263)	3157 (2430)
9. Jackson CC	15.845** (6.285)	-3.579 (3.840)	-43 (1140)
10. Kellogg CC	6.758 (6.682)	-1.065 (12.784)	1053 (3054)

Table 13 (cont'd)

<u>Institution</u>	<u>Statewide Demand (thousands)</u>	<u>Tuition Rate (1970-71 dollars)</u>	<u>Intercept</u>
11. Lake Mich. Col.	-4.826 (5.850)	-14.284 (12.207)	7336 (4424)
12. Lansing CC	42.488** (8.295)	-10.853 (12.736)	-3462 (2093)
13. Mac. Co. CC	89.610** (8.105)	72.210 (7.895)	-12,768** (1435)
14. Muskegon CC	10.310** (4.890)	-4.880 (6.453)	2053 (1889)
15. N. Cen. Mich. Col.	2.816 (3.899)	0.062 (6.516)	-312 (2450)
16. NW. Mich. Col.	7.000 (5.202)	-2.110 (7.423)	216 (2749)
17. Oakland CC	137.007** (12.224)	-3.659 (4.041)	-29,925** (2730)
18. St. Cl. Co. CC	0.694 (4.555)	-1.472 (5.068)	2602* (1459)
19. Schoolcraft Col.	25.287** (4.529)	-5.803 (14.723)	-1243 (5246)

The figures within parenthesis below the estimated parameters are the standard errors of the estimates.

* indicates the parameter is significantly different from zero at the 90 percent confidence level.

** indicates the parameter is significantly different from zero at the 95 percent confidence level.

a/ These variables are assumed to have a uniform effect on all institutions; see the section, "Econometric Model."

As in the case of the public four-year institutions, only one of the student financial aid programs has a statistically significant impact on total enrollments. But in this instance it is the NDSL program rather than the State Scholarship program. There is also some indication that the CWS program is having the desired effect, but the evidence is weak. The negative sign of the EOG parameter is of some concern since the estimate does exceed its standard error and this program also had a negative impact in the public four-year sector. (See Table 12.)

Little statistical or other evidence exists which would lead one to believe that any of these colleges operates sufficiently independent of demand and tuition factors to warrant the use of a time trend variable to describe their growth. In fact, they are quite proud of their reputation as "open door" institutions which stand ready to meet the needs of the community so far as their resources permit. Thus, no follow-up regressions were computed similar to those described for the public four-year colleges.

Private sector

The last set of results in Table 14, pertaining to the private sector, is the least satisfying in terms of yielding estimates consistent with the theoretical framework. Only eight colleges (31 percent) show the expected positive reaction to increases in the statewide demand for higher education, and only fourteen (54 percent) of the tuition parameters have the expected negative sign. In addition, all demand and tuition coefficients which are statistically significant have the "wrong" sign; of course since only 9 of the 52 estimates are significant some, and maybe most, of these instances are best regarded

Table 14

Estimated Impact of Statewide Demand, Tuition Rates, and Financial Aid Programs on Enrollment in Private Institutions, Assuming No Time Trend Effects; $R^2 = .9987$

Impact of Financial Aid Programs on Enrollment^{a/}
(individual variables measured in thousands of 1970-71 dollars)

<u>State Scholarships</u>	<u>State Tuition Grants</u>	<u>Educ. Opportunity Grants</u>	<u>Nat'l Defense Student Loans</u>	<u>College Work-Study</u>
-0.375 (0.514)	1.660** (0.246)	-0.909 (0.642)	-0.157 (0.522)	1.188 (0.724)

Impact of Statewide Demand and Tuition Rates, plus Intercept Term, for Each Institution

<u>Institution</u>	<u>Statewide Demand (thousands)</u>	<u>Tuition Rate (1970-71 dollars)</u>	<u>Intercept</u>
1. Adrian C.	6.567 (5.499)	-1.431 (1.098)	1670** (270)
2. Albion C.	1.637 (2.145)	-0.322 (0.517)	1750** (497)
3. Alma C.	-2.074 (2.750)	0.834 (1.015)	345 (893)
4. Andrews U.	-7.551 (7.384)	1.462 (1.985)	1607** (662)
5. Aquinas C.	-0.856 (2.195)	-0.546 (0.450)	2153** (283)
6. Calvin C.	3.916 (6.648)	-2.166 (1.503)	4356** (422)
7. Detr. C. of Bus.	-2.260* (1.143)	0.613 (0.582)	1164** (448)
8. Detr.Inst. of Tech.	-14.806** (1.336)	0.671 (0.494)	5078** (339)
9. Gr. Rap. Bapt.	3.131 (3.897)	-0.549 (1.767)	42 (536)
10. Hillsdale C.	0.009 (4.207)	-0.019 (0.595)	1165** (305)

Table 14 (cont'd)

<u>Institution</u>	<u>Statewide Demand (thousands)</u>	<u>Tuition Rate (1970-71 dollars)</u>	<u>Intercept</u>
11. Hope C.	0.164 (2.780)	0.200 (0.494)	1491** (305)
12. Kalamazoo C.	-1.525 (1.934)	0.109 (0.910)	1399 (968)
13. Law.Inst. of Tech.	-9.044** (2.236)	7.891** (1.748)	391 (862)
14. Madonna C.	-0.977 (1.394)	-0.006 (1.018)	773 (512)
15. Marygrove C.	-6.966** (1.196)	0.140 (0.411)	2620** (442)
16. Meroy C.	-6.427** (2.510)	3.550** (1.166)	-939 (660)
17. Mer.-Palm. Inst.	0.462 (1.091)	-0.071 (0.380)	-3 (246)
18. Mich. Chr. J.C.	-0.872 (0.930)	-0.215 (0.587)	659 (585)
19. Nazareth C.	-0.269 (1.733)	-0.565 (0.684)	1065** (384)
20. North. Inst.	0.307 (1.229)	0.346 (0.414)	441 (376)
21. Olivet C.	-9.013 (5.119)	-0.127 (1.155)	872** (387)
22. Owosso C.	-0.033 (2.011)	-0.341 (0.584)	498** (237)
23. Siena Hts. C.	-6.330** (2.526)	1.402 (0.875)	1383** (240)
24. Spr. Arbor C.	-0.622 (3.060)	-0.016 (0.826)	732** (332)
25. Suomi C.	-1.548 (3.500)	-0.094 (0.712)	793** (268)
26. U. of Detr.	-15.193** (4.120)	0.335 (0.528)	10,042** (709)

Table 14 (cont'd)

The figures within parenthesis below the estimated parameters are the standard errors of the estimates.

* indicates the parameter is significantly different from zero at the 90 percent confidence level.

** indicates the parameter is significantly different from zero at the 95 percent confidence level.

a/ These variables are assumed to have a uniform effect on all institutions; see the section, "Econometric Model."

as the products of random variation.

Part of the explanation for the above results is found in the nature of the data. In many cases enrollment has been quite stable while statewide demand and tuition have shifted, resulting in a significant intercept term and insignificant coefficients of demand and tuition variables. One suspects that the underlying relationship is not so much one of an independence of enrollment with respect to demand and tuition, but rather one of experienced administrators under financial pressure raising tuition at the maximum rate consistent with maintaining enrollments. Even when enrollment did vary substantially, the fact that demand and tuition were often both rising in roughly similar patterns causes difficulties in attempts to estimate their separate impacts. However, it is possible that enrollments in many private institutions are not affected by changes in tuition or statewide demand due to things such as the high incomes of the parents of potential students or a special appeal based on religion or alumni identification. Additional observations from future time periods, when it is expected that statewide demand will grow at a slower rate while cost pressures continue to press tuition rates higher, should be especially valuable in identifying and quantifying causal relationships within the private sector.

There is a danger, of course, in dismissing all "unexpected" coefficients as statistical perturbations. As the demand for higher education in general grows, the demand for the programs, sometimes rather unique, offered by some of the private institutions may fall. The results in Table 14 would indicate that such may be the case for institutes of technology and Catholic-affiliated institutions such as

Aquinas, Madonna, Marygrove, Mercy, Nazareth, and Siena Heights Colleges and the University of Detroit. Tuition and enrollment might rise simultaneously because of some influence such as a new program, but the author does not know of any such change at either the Lawrence Institute of Technology or Mercy College which would explain their coefficients.

The State Tuition Grant program has a larger impact on private college enrollments than any other aid program, as one would expect given its design. Its estimated impact was essentially identical, 1.681 as compared to 1.660, when the model included a time trend variable for each institution. Thus, the program's significance is not likely to be an artifact of the model's specification. Two of the remaining programs have coefficients which exceed their standard errors in absolute magnitude—CWS with a positive impact and EOG with a negative influence.

We will now turn to a more detailed discussion of the conclusions which can be drawn from these statistical results.

Conclusions

Aggregate demand and tuition

It seems quite clear that enrollments in public institutions have tended to rise as statewide demand for higher education has grown and to fall as tuition charges have increased. The net effect, of course, has been one of large gains in enrollment, but this should not be allowed to overshadow the fact that the burden of tuition has apparently discouraged some potential students. The impact of tuition appears to vary a great deal, as one would expect given the varying

size and character of the colleges. A highly selective institution, such as the University of Michigan, can maintain desired growth despite increases in student charges, while other large universities, such as Central Michigan, Eastern Michigan and Michigan State, apparently lost about twelve to eighteen students for each one dollar rise in tuition.¹⁰ Putting this another way, the \$65 increase in tuition (in 1970 dollars) at Central over this six year period discouraged approximately 780 students, the \$51 at Eastern about 820 students, and the \$224 at Michigan State about 4000 students. It is important to note, however, that this model is limited to identifying the impact on total enrollment in a particular institution. Thus, students discouraged from attending a given institution might attend another college—one cannot add the tuition coefficients to obtain a valid estimate of the effect of a uniform increase in tuition across a set of institutions. The public two-year colleges exhibit a similar range of variation.

As noted earlier, the demand and tuition coefficients estimated for the public two-year sector are slightly less likely to be statistically significant than those calculated for the public four-year sector. Several possible reasons can be postulated. Statewide demand may be the appropriate demand factor for four-year colleges not dominated by commuting students, but only a crude proxy for the demand relevant to a two-year college drawing almost exclusively from the local community. After identifying the trends in population and income in each community containing a public two-year college, one could then

¹⁰ This may partly reflect an unwillingness on the part of these institutions to lower admission standards below some given thresholds, i.e., they could have increased their enrollments despite increases in tuition by admitting applicants below normal standards but chose not to.

adjust the demand factor to better reflect the local demand. Another factor, closely related to the first, may be that the mobile student attracted to four-year institutions is much more likely to respond to small variations in tuition--i.e., attend Eastern rather than Michigan State if the latter raises its tuition more--than is the two-year college's community student--whose essential choice is one of attending the local college or not attending any college. Finally, if the community college sector contains many students whose first preference is attendance at a four-year institution but find themselves unable to qualify for or afford admission to such a college, then enrollment in public two-year colleges would be largely a function of the policy variables set in the four-year colleges--none of which are included here. The more sophisticated models which would allow such hypotheses to be tested were not formulated in this study, largely because of the limited data but also because of time and resource constraints.

For the reasons outlined in the previous section of this chapter, it is difficult to say anything based on this analysis about the impact of statewide demand and tuition on enrollments in private institutions. Intuitively, one suspects that the slow growth in enrollments while tuition rates soared was possible only because demand also grew rapidly. However, the limited nature of the data now available does not allow either confirmation or rejection of such a hypothesis.

Michigan student aid programs

The evidence does seem sufficient to warrant a firm conclusion that the Tuition Grant program designed to stimulate enrollments in private colleges is performing as planned. Based on the estimate

derived here, one student who would not otherwise have done so has been stimulated to attend a private college for each \$600 awarded in the Tuition Grant program. If this is correct, the \$5 million awarded in 1970-71 were responsible for increasing private college enrollments by about 8300 students over what would have been the case if all other factors were constant while Tuition Grant awards were reduced to zero. In 1970-71 the state appropriated \$330 million in operating funds to public institutions containing 343 thousand students, a ratio of about \$960 per student—indicating that the Tuition Grant program is not prohibitively expensive and may even save the state a small amount of money. The comparison is very crude, of course, ignoring such factors as physical plant costs in the public sector, on the one hand, and the mix of graduate and undergraduate students contained in the public figure, on the other hand.

The other state-sponsored program, State Scholarships, also appears to have been effective but in a very uneven fashion. Most of the funds, 67 percent in 1970-71, were spent by students attending public four-year institutions. Using the estimate in Table 12, it would appear that the average public four-year college has gained one additional student for each \$280 in Scholarship funds awarded to its students; for the sector as a whole, the result indicates that about 18,000 students enrolled in 1970-71 due to the Scholarship program. Since students attending public two-year colleges receive only a miniscule proportion (4 percent in 1970-71) of these awards, it is not surprising that the program does not have a significant impact on enrollments in these institutions. The remainder of the funds go to students in private colleges; the model did not detect any tendency for these

students to be additions beyond the numbers who would have attended in the absence of the program. In summary, the State Scholarship program which is designed to impact high achieving, needy students almost invariably benefits students in four-year institutions; in the case of those students attending public institutions there is strong evidence that they would not have enrolled in the absence of the award. The students receiving State Scholarships apparently have a personal preference for four-year programs and institutions which they can make operative once they receive the scholarship. If such a preference is widespread, a shift from institutional funding to individual vouchers would have a major impact on the relative importance of two-year and four-year institutions.

Federal student aid programs

Except for a single exception in one sector, there is little evidence that federal student aid is resulting in enrollments above what they would otherwise be. One of the major differences, mentioned earlier, between federal and state aid programs is that the former rely on colleges to identify recipients while the latter award funds directly to the target group. Thus, these results imply that financial aid officers in the colleges are primarily making awards to students who would remain in attendance without benefit of such aid. The exception is the NDSL program in the public two-year colleges; in both the regression reported in Table 13 and the original run of the complete model (containing time trend variables) the program is estimated to have had a strong impact. If the indicated leverage of one additional student per \$63 is correct (it seems high), the \$719,000 in NDSL funds

distributed in 1970-71 by public two-year colleges were responsible for adding about 11,000 students to the enrollment in this sector. There is some indication that the CWS program is having a positive impact on enrollments in the public two-year and private colleges, but the evidence is statistically weak (significant at the 0.19 and 0.11 levels, respectively). Remembering the preference for four-year institutions that seemed to be revealed by the State Scholarship program, it may be meaningful that the programs associated with an increase in enrollments in public two-year colleges are those tied to the college. In other words, it is possible that the only student aid programs which can be expected to cause large increases in enrollments in community colleges are programs which give funds to the colleges which then distribute grants to their students; programs which award grants directly to students would impact four-year colleges, assuming that the students prefer such institutions and that the grants enable students to realize their first preference.

One cannot disregard the tendency for the EOG program to have an estimated negative impact on total college enrollment. The statistical significance of the negative parameters for the three sectors, 0.66, 0.22 and 0.16, are not strong; one is tempted to dismiss them as the products of random chance, which might well be the case. However, if each is regarded as an independent estimate, the probability that such results would be obtained when EOG funds had no effect would be about 0.02, the product of the three estimates (the resulting probability would be even smaller if one assumed the "true" effect of EOG funds is positive). It does not seem unwarranted to speculate as to the circumstances which would give rise to a negative result.

Since the model is limited to a measure of impact in terms of total enrollment, a negative result might be a consequence of actions of either those directly involved in the EOG program or of potential students only indirectly affected by EOG funds. We would expect a zero coefficient if EOG money was being awarded to students who would otherwise have attended the college. A negative value would result if the students attracted by EOG funds repelled other students in even greater numbers; the fact that minority students are disproportionately represented among the economically disadvantaged and the current controversy surrounding integration of primary and secondary schools lend credence to this possibility. A different, but similar, phenomenon would be one in which the "near-poor" perceive those institutions with the most EOG funds as giving all of their aid money to the "poor"—so the "near-poor" attend other institutions where they expect to have a better chance of receiving aid. Another possibility is that if colleges look upon the economically disadvantaged student as less desirable than others, those institutions experiencing the most difficulty in achieving their desired enrollment may be the ones most likely to expend their allotted EOG funds and to seek more. Lastly, if the cost per student with EOG aid exceeds the cost per non-poor student because of the additional services required, an institution with a fixed budget from non-student sources would tend to admit fewer students as the mix shifted in favor of those receiving EOG funds—all other things being equal.

Finally, since these results pertaining to federal student aid programs are inconsistent with the stated aim of these programs (to give access to higher education to people who could not otherwise

enroll) and thus have major policy implications, it is important to explore in more detail the possible weaknesses of this analytic framework. The key question is, "Could federal student aid funds be increasing enrollment of poor students in such a way that this analysis would not detect the increase?" The reader will recall that this issue arose earlier in the context of the public four-year institutions. The conclusion was that in two institutions, the University of Michigan and Western Michigan University, there were good reasons for believing that nonpoor potential students would be "bumped out" by economically disadvantaged students due to an enrollment ceiling. Assuming that some of the nonpoor enroll elsewhere, enrollment in higher education would increase but not be detected by this model (see footnote 9 for an explanation of an attempt at detection which failed). Is it possible that such a phenomenon is widespread?

As mentioned previously, bumping is not likely to have been common in either the public two-year colleges or the private institutions. The commitment of the public two-year sector to provide a place for all who can pay the required tuition, from private or student aid funds, appears sufficiently strong that bumping is rare. In addition, the state appropriation to these colleges is based on an enrollment formula so additional students automatically attract more funds, i.e., the per student appropriation does not decrease if the institution's enrollment exceeds the level estimated by the state. In the case of the private sector, most colleges were concerned that their rapidly rising tuition levels would make it impossible for them to maintain their enrollments or grow at a slow pace; it seems improbable that many colleges were refusing admission to well-to-do, academically qualified

applicants. Thus, the author feels quite confident that little or no bumping was taking place in the public two-year and private sectors, with the possible exception of a few private colleges, and that the estimated parameters for the federal student aid programs are not under-estimates due to such a phenomenon.

The case of the public four-year colleges (other than the University of Michigan and Western Michigan University) may be more complex. The demand for higher education was growing very fast over the period analyzed, as were most of these institutions. The state legislature appropriated a given amount of funds to each college based on an expected enrollment, creating a situation where the colleges conceivably felt no incentive to enroll additional students after they had met the state's "expectation." However, the non-zero coefficients estimated for the statewide demand and tuition variables indicate that if rationing was occurring, it must have been carried out by individuals very cognizant of the natural forces at work.

Adding up the above facts on the public four-year colleges, we can state the following propositions. If enrollment ceilings were set higher in years when statewide demand was increasing faster (*ceteris paribus*), if tuitions were raised more in years when enrollment ceilings were increased less (*ceteris paribus*), if needy students receiving federal aid were admitted in such a manner that their admission did not push total enrollment over the ceiling, and if admissions of academically qualified students without aid were not permitted once the ceiling had been reached (and it must have been reached, in general), then the pattern of estimated coefficients presented in this chapter would appear and bumping would be occurring, i.e., enrollment in higher

education would be increasing due to increases in student aid but this model would not detect it. Each must judge for himself the probability of the above, at least until a "model of bumping" is hypothesized which is empirically testable.

The author's judgement is that while the above is plausible, especially if limited to a few cases, the simpler hypothesis that most of these institutions were responding to market forces in the manner outlined in the theoretical model is a more probable explanation. This implies, of course, that the conclusion that federal student aid did not have a significant impact on enrollment is substantially correct, although admitting the possibility of some downward bias due to bumping.

Chapter VI

The Financial Requirements Of Michigan Higher Education

This chapter has two major objectives, the first of which is to complete the modeling effort required for an evaluation of the implications of alternative financing proposals for Michigan higher education. Reviewing briefly, the development of this model began in Chapter IV with an analysis of some of the major factors influencing the level of enrollments, such as the size of the college-age population and economic conditions. Based largely on this analysis, the level of enrollments was forecast by sector assuming several different policies. Up to that point (the end of Chapter IV) two very important policy variables, tuition and student aid, had not entered into the analysis in explicit fashion, primarily due to the lack of data for a sufficient number of years. This omission was remedied in Chapter V by means of an econometric model using more detailed (institutional) data available for a shorter period than was the case in Chapter IV. The results provided strong evidence that increases in tuition have a major impact on enrollment decisions in the public four-year sector and a lesser impact in the public two-year sector, but an inconclusive effect in private institutions. The Michigan student aid programs seemed to be influencing the enrollment decisions of the recipients, but federal programs showed little or no tendency to do so. Thus, the research contained in Chapters IV and V provides a firm basis for evaluating the impacts of alternative policies on enrollments.

The final element needed to complete the model is a system of linkages between student enrollments, the financial requirements of

higher education, and the incidence of the costs. A conceptual framework is presented in the first section of this chapter, and the second section contains a quantitative description of existing relationships which will serve as a base for subsequent extrapolations and modifications of policy.

The second major objective of this chapter is to evaluate six alternative financing proposals. Extensive use is made of the model described above, of course, but the choice of the alternatives also reflects the differences in philosophy discussed in Chapter III. The six alternatives, to be taken up in the third section, are: a continuation of present patterns of support assuming 1) a rather conservative forecast of enrollments which provides a benchmark for the ensuing alternatives, 2) a larger forecast of enrollments consistent with the trends of the 1960's, 3) an increased student-faculty ratio, and 4) a decrease in the rate of increase in faculty salaries; and also 5) a vouchers policy which implies full-cost tuition and 6) a policy of increased federal aid in a pattern consistent to a great extent with existing grants.

Although in some cases rather detailed data will be presented as back-up material for the figures used and as an aid to readers who wish to explore alternatives of their own choosing, it must be emphasized that the relationships presented here are not adequate for use in the appropriations process. This model is a useful tool for exploring basic policy questions and may provide a base of ideas from which a more detailed analysis might proceed, but the actual allocation of funds should be based upon a framework which is more cognizant of institutional differences with respect to student body, faculty,

community, and programs.

Conceptual Framework

The financial requirements model contains several sequential steps, illustrated in Figure 4. Before discussing the detail, however, some general comments are appropriate. The model developed and used in this study is quite simple in most respects. Capital fund requirements, i.e., monies needed for the construction and furnishing of facilities, are entirely excluded from consideration. Of the remaining (operating) funds recorded by universities and colleges the auxiliary fund is also omitted. This portion of the budget, consisting primarily of food and housing services supplied by the college, is usually managed so as to be self-liquidating and is thus of little concern in most state and federal policy deliberations. The analysis focuses on 1) the general fund, those dollars necessary for maintaining the instructional program of the institution (often including some allowance for the time which faculty spend in complementary activities, such as research and college governance); 2) the restricted fund, primarily grants and contracts from a variety of sources which require rather specific activities and outputs as a condition of their receipt; and 3) student aid funds, which may or may not pass through the restricted fund of colleges on their way from state and federal treasuries to students. The instructional component will be dealt with in the greatest detail. For example, student-faculty ratios and faculty salaries will be explicit, but the number of other personnel and the quantity of physical supplies such as coal or paper will not be identified. The set of priorities outlined above reflects the degree to which

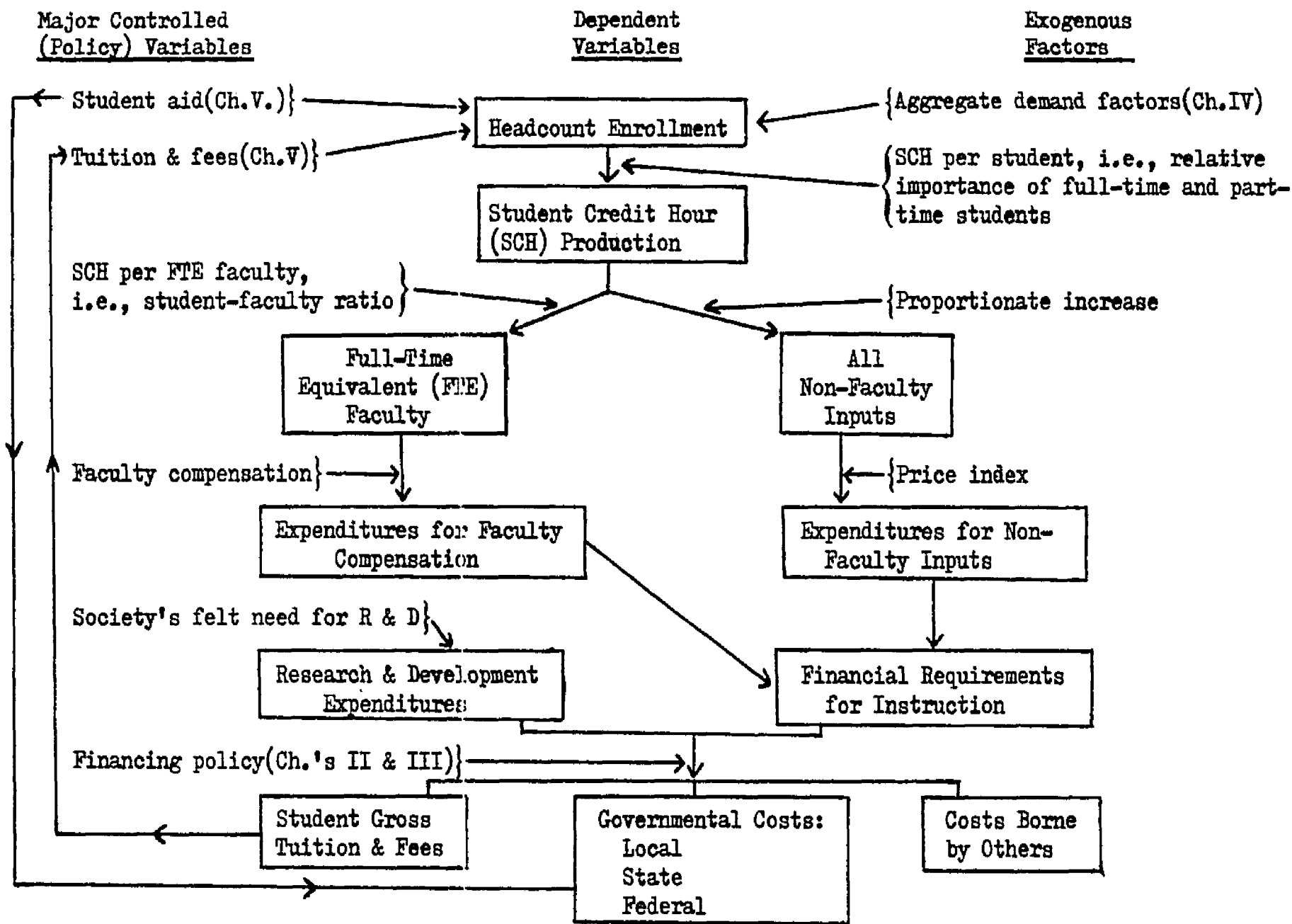


Figure 4
Schematic Representation of the Financial Requirements Model for Each Sector

elements are the subject of discussion and dispute in the policy process.

Most of the components of the model outlined in Figure 4 will be discussed in some detail in the next section, but a quick overview is probably useful before examining the data. The first dependent variable, headcount enrollment, is computed on the basis of the work done in Chapters IV and V. The next step is to convert the heterogeneous variable "students," into a more standardized measure, "student credit hours (SCH)," commonly used in higher education administration. Having done this, one can then determine the number of faculty needed—based on the important policy variable, the student-faculty ratio—and also the need for other inputs. After a decision is made on the next policy variable, faculty compensation, total expenditures for faculty compensation can be computed. Following the addition of expenditures for non-faculty inputs and for research and development programs, the total costs are allocated to participants on the basis of the assumed financing policy. These policies have their origins in the history and goals discussed in Chapters II and III. Finally, the portion of the costs borne by students is reflected in tuition charges, and one must be careful to add student aid costs to the direct educational costs supported by governmental units.

It may be surprising to some readers that we still have not touched upon the largest cost item, despite the fact that all variables usually considered in the policy process have been noted. The omitted entry is the value of the students' time. If the students were not in school, most could presumably be employed at jobs which would yield earnings well-above what they earn as students; the difference is their

opportunity cost, which will be estimated in this analysis. As will soon become evident, it is a major item whose almost total omission from policy discussions is completely unwarranted.

We will now turn to a brief consideration of the data which forms the foundation from which alternative financial requirements for the future will be calculated. The order of presentation will follow that of the overview, which is also that of Figure 4 reading from top to bottom.

Base Financial Requirements Data

The development of even the rather simple statistical description of Michigan higher education which follows was a tedious, time-consuming task—despite the fact that the author enjoyed access to data associated with a position in state government and the assistance of willing, competent state employees. Even recognizing the qualifications stated earlier in this chapter in relation to the model, it would appear that this framework is in many respects an improvement over that used in many analyses of higher education budgets. Quite clearly there is a tremendous need for better information systems on the inputs and outputs of higher education.

Most of the more important base data relating to the financial requirements of Michigan higher education are summarized in Table 15. The commitment of resources is indeed large; about \$1710 million in instruction and \$140 million in research and development, yielding a total of \$1850 million in 1969-70. A substantial majority of these costs, \$1240 million, is associated with the public four-year sector.

Table 15

Base Data Relating to the Total Financial Requirements of Michigan Higher Education by Type of Institution,
1969-70 Except Where Noted Otherwise

	<u>Public Four-Year</u>	<u>Public Two-Year</u>	<u>Private</u>	<u>All Institutions</u>
Instructional Costs by Source (mil. \$)				
Total <u>1/</u>	1097.8	358.6	255.8	1712.2
Cash Outlay	388.7	94.6	75.0	558.3
Students				
Total <u>1/</u>	807.2	287.1	222.6	1316.9
Cash Outlay <u>2/</u>	98.1	23.1	41.8	163.0
Gross Tuition & Fees <u>3/</u>	116.8	26.1	52.7	195.6
Governmental: Total <u>4/</u>	262.9	68.4	11.3	342.6
Local	—	19.7	—	19.7
State	249.3	42.7	4.1	296.1
Federal	13.6	6.0	7.2	26.8
Other	27.7	3.1	21.9	52.7
Research & Development Funds (mil. \$) <u>5/</u>	139.3	— <u>11/</u>	— <u>11/</u>	139.3
All Funds: Cash Outlay (mil. \$) <u>6/</u>	528.0	94.6	75.0	697.6
Ave. Tuition per Student Credit Hour(SCH) (\$) <u>7/</u>	20.8	11.9	35.8	21.1
Ave. Student Aid per SCH (\$) <u>8/</u>	3.3	1.4	7.4	3.5
Ave. SCH per Full-Time Equivalent(FTE) Faculty <u>9/</u>	550	610	n.a.	n.a.

Table 15 (cont'd)

	<u>Public Four-Year</u>	<u>Public Two-Year</u>	<u>Private</u>	<u>All Institutions</u>
Ave. FTE Faculty Compensation (1970-71 \$) <u>10/</u>	15,600	12,900	n.a.	n.a.

n.a. indicates "not available"

- 1/ Includes the opportunity cost to students as well as actual cash outlays.
- 2/ Students cash outlay is defined as gross tuition and fees minus all student aid funds from state and federal sources.
- 3/ Receipts of tuition and fees as recorded by the institutions in their financial reports.
- 4/ Includes grants to both institutions and students.
- 5/ Includes the overhead portion which is usually placed in the "general fund" portion of financial reports.
- 6/ Instructional plus research and development cash outlay costs; note that auxiliary funds, which include such things as food service and dormitory costs, are not included.
- 7/ Gross tuition and fees divided by total student credit hours (SCH).
- 8/ Total student aid funds from state and federal sources divided by total student credit hours (SCH).
- 9/ See Tables 16 and 17 for more detail.
- 10/ See Tables 18 and 19 for more detail.
- 11/ These figures are probably positive but extremely small relative to the research and development funds awarded to the public four-year institutions. The figures are assumed to be zero throughout the analysis which follows.

Sources: Audited financial reports for 1969-70.

Institutional Budget Requests for Fiscal Year 1971-72, Bureau of the Budget, State of Michigan.
Higher Education General Information Survey data.

Student aid data is from Appendix D.

Note that the portion of the funds represented by cash outlays, which receives nearly all the attention, is approximately \$700 million, only about 38 percent of the total cost to society.

Tuition charges and student aid awards

The pattern of average tuition per student credit hour (SCH) is consistent with prior expectations—the public two-year colleges are charging the least while the private colleges have the highest fees with the public four-year institutions falling between the other two. But note that the distribution of student aid funds tends to reduce these differences. Whereas the "before student aid" tuition per SCH at public two-year colleges is \$9 less than that charged by public four-year institutions and \$24 less than the tuition of private colleges, the differences drop to \$7 and \$18, respectively, when student aid awards are considered. Similarly, private institutions charge tuitions which exceed those in the public four-year sector by \$15 per SCH, but the differential decreases to \$11 when student aid is taken into account. Obviously, comparisons of student charges which ignore the ability of the institution and its students to attract outside financial aid may lead to incorrect conclusions with respect to student costs. It is important to remember that the above figures are averages and not actual charges or awards. An institution may, and often does, choose to charge certain groups, such as graduate students and out-of-state students, more than others and to concentrate the available student aid among the lower-income students.

Student credit hours per headcount student

The SCH is often a useful standard of comparison across institutions, as is evident in our discussion of tuition rates and student aid. We will continue to use it in several different contexts, so it is important that we explore the link between headcount enrollment and the production of SCH. A full-time undergraduate student is usually assumed to enroll for 31 (semester) SCH in a two-semester academic year and a graduate student for 24 SCH. Dividing the total number of SCH by the appropriate one of the above factors yields a quantity defined as "full-time equivalent" (FTE) enrollment. Headcount enrollment will usually exceed FTE enrollment due to the presence of part-time students, but the reverse does occur in some institutions where nearly all of the students are full-time and heavy coursework loads are common.

Records for 1969-70 in Michigan higher education reveal a varied pattern of enrollment.¹ The part-time student is an important factor in public community colleges, where only 1900 SCH were produced per 100 students enrolled in the fall term. Attrition following the fall term, of course, is partly responsible for the difference between 1900 SCH and the 3100 SCH defined as a full-time load for one academic year. In the public four-year sector the comparable figure for undergraduates was 2960 and for graduates 1880 SCH. It is clear that there are fewer part-time students at the undergraduate level in public four-year

¹All SCH figures are semester credit hours; quarter credit hours were multiplied by .666667 to convert them to a semester basis. The SCH figures are from Institutional Budget Requests for Fiscal Year 1971-72, Bureau of the Budget, State of Michigan. The headcount figures are from the Higher Education General Information Survey (HEGIS) for Fall 1969, Higher Education Planning and Coordination Services, State of Michigan.

institutions. The small difference between the observed figure of 2960 SCH and 3100 could easily be explained by attrition following the fall term, i.e., the typical undergraduate student is probably carrying a full-time load of 15-16 credit hours per term. No data were available on SCH produced in private institutions. Since these institutions resemble those in the public four-year sector more than those in the public two-year sector, it will be assumed that the average undergraduate enrolls for 30 SCH and the average graduate for 19 SCH.

Student-faculty ratios

The ratios of SCH to FTE faculty reported in Table 15 are summary figures which will be used as benchmarks in subsequent analysis. In this narrow sense, the two figures (550 SCH per FTE faculty in the public four-year institutions and 610 in the public two-year sector) provide an adequate base for all of the analysis in Chapters VI and VII. However, there is a great deal of variation in student-faculty ratios among institutions and programs. More detailed data are presented in Tables 16 and 17 which have important policy implications if particular programs or types of institutions are expected to expand or contract at a disproportionate rate.

Turning first to the public two-year colleges, the four program areas delineated in Table 16 are specified by the Michigan Bureau of the Budget, and it seems reasonable to assume that their definition is quite consistent in all of the institutions. The smallest size category contains 10 colleges which produce about 8 percent of the SCH, the middle category contains 15 institutions producing approximately 46 percent of the SCH, and the largest size category involves 4

Table 16

Student Credit Hours per Full-Time Equivalent Faculty by Program and Size of Institution in Michigan
Public Two-Year Colleges, 1969-70, 1970-71

Size of Institution (Student Credit Hours)	Programs				All Credit Courses
	<u>Liberal Arts</u>	<u>Business</u>	<u>Voc-Tech</u>	<u>Health</u>	
0-29,999					
1969-70	565 (66)	423 (106)	419 (141)	302 (139)	493 (30)
1970-71	552 (81)	421 (175)	423 (120)	362 (125)	491 (24)
30,000-164,999					
1969-70	602 (66)	613 (163)	514 (215)	388 (155)	577 (55)
1970-71	605 (78)	617 (132)	530 (145)	322 (162)	574 (54)
165,000 and Over					
1969-70	776 (14)	747 (56)	685 (92)	257 (75)	726 (56)
1970-71	787 (-)	795 (-)	644 (143)	430 (252)	734 (63)

Table 16 (cont'd)

Size of Institution (Student Credit Hours)	Programs				All Credit Courses
	<u>Liberal Arts</u>	<u>Business</u>	<u>Voc-Tech</u>	<u>Health</u>	
All Institutions					
1969-70	644 (96)	636 (165)	567 (191)	346 (150)	610 (94)
1970-71	658 (108)	651 (168)	562 (159)	352 (186)	612 (102)

The figures within parentheses are the standard deviations associated with the mean figure immediately above them. The standard deviations are computed from institutional averages, not from data for individual faculty.

Source: Institutional Budget Requests for Fiscal Year 1971-72, Bureau of the Budget, State of Michigan.

Table 17

Student Credit Hours per Full-Time Equivalent Faculty by Program and Undergraduate-Graduate Composition of Institution in Michigan Public Four-Year Colleges, 1970-71

<u>Programs</u>	<u>Percentage of Graduate Students in the Institution (Headcount)</u>			<u>All Institutions</u>
	<u>0-12.4</u>	<u>12.5-24.9</u>	<u>25.0 and Over</u>	
Arts & Sciences	663 (70)	658 (25)	607 (36)	631 (47)
Education	564 (137)	630 (107)	581 (79)	602 (102)
Business	698 (134)	677 (62)	742 (147)	710 (125)
Engineering	393 (34)	340 (one institution)	298 (36)	331 (56)
Human Medicine	-	-	201 (81)	201 (81)
Other Graduate & First Prof.	-	289 (one institution)	414 (129)	402 (128)
Other	456 (59)	415 (one institution)	282 (59)	314 (80)
All Credit Courses	589 (60)	637 (42)	497 (61)	550 (84)

The figures within parentheses are the standard deviations associated with the mean figure immediately above them. The standard deviations are computed from institutional averages, not from data for individual faculty.

Table 17 (cont'd)

Source: Institutional Budget Requests for Fiscal Year 1971-72, Bureau of the Budget, State of Michigan.

colleges producing about 46 percent of the SCH.

Despite the aggregate nature of the data, several conclusions about the student-faculty ratio in public two-year colleges seem warranted. Larger institutions tend to exhibit larger student-faculty ratios, but the magnitude of the difference varies a great deal among programs. Considering all credit courses, large institutions produce about 49 percent more SCH per FTE faculty than the small institutions. At least part of the reason for the relatively constant student-faculty ratio in the health programs probably lies in the control which the health professions exert over the instruction of prospective professionals. Focusing on programs for a moment, the averages for all institutions indicate that an FTE faculty member in liberal arts or business is likely to produce about 14 percent more SCH than his counterpart in health, but the difference varies a great deal by size of institution. Except in small institutions, the production of SCH per FTE faculty in the liberal arts is essentially identical to that in the business program.

Shifting to the public four-year sector and Table 17, one would ordinarily assume that the addition of an undergraduate-graduate distinction would imply that the analysis of student-faculty ratios must now contain three dimensions in order to be consistent with the previous discussion. The three dimensions would recognize differences in programs, size, and undergraduate-graduate mix. However, in the case of Michigan the size of the student body in public four-year institutions is so highly correlated with undergraduate-graduate mix that it is impossible to ascertain their separate effects without a much more detailed and sophisticated analysis than is developed in this

chapter.² The dimensions which will be used in the presentation of the data are percentage of graduate students and program categories; the reader should recall, however, that the former grouping could also be regarded as essentially a size classification.³

The figures in Table 17 must be interpreted even more cautiously than those presented for the public two-year institutions. In this case the 1969-70 data were so incomplete as to be useless, leaving

²If one groups the institutions, using fall 1970 headcount enrollment figures, into three size groupings of 0-14,999, 15,000-29,999, and 30,000 and over by total enrollment and then repeats the grouping using a criteria of 0-12.4, 12.5-24.9, and 25.0 and over percent graduate students, he obtains identical groups with a single exception. The exception is Oakland University which is in the 0-14,999 size class, but in the 12.5-24.9 percent graduate student category; this unique case is probably partly explained by noting that until very recently Oakland University was a branch campus of Michigan State University, an institution falling in the largest size class and the greatest percentage of graduate students category.

³There are many possible reasons for the linkage between size and graduate study. One is that the difference between undergraduate and graduate tuition is not large enough to reflect the actual differences in costs; one way the necessary resources for a graduate program can be obtained is by attaining sufficient size in the undergraduate program to attain economies of scale so that revenues per undergraduate comparable to those of other institutions will yield a surplus. Similarly, if state appropriations are made without a realistic differential for undergraduate and graduate students, realizing economies of scale in the undergraduate program is a conceivable method of freeing resources for the more expensive graduate program. Another possible cause for the observed relationship is that the presence of graduate students creates, nearly by definition, a pool of relatively inexpensive potential instructors of undergraduates. A large undergraduate student body is therefore complementary to a large number of graduate students—the undergraduates receive instruction, the graduates earn enough to support themselves, and the institution lowers per student costs in the undergraduate program. One more reason, which does not exhaust the possibilities, is that graduate education is specialized education which requires a specialized faculty (even within departments). Such a faculty can be attained over time only with increases in the size of the faculty which can be justified only by increases in the number of students.

only one set of observations. Another difficulty is that the public four-year institutions submit their budget requests to the State of Michigan using colleges, as defined by each institution, as the most detailed breakdown. There is a great deal of variation in the size and composition of the college-units; the author has attempted to be careful and consistent in the necessary decisions leading to the programs presented in Table 17, but many problems remain, most of which are insurmountable given the present data base. Finally, note that the percent of graduate students refers to the composition of the entire institution, not to each program.

Remembering the problems just noted and observing that large standard deviations are associated with the student-faculty ratios, only a few generalizations seem warranted. The business curriculum consistently shows a high student-faculty ratio; engineering, medicine, and the graduate and first professional programs isolated as a group are characterized by a low ratio. There is no clear tendency for the student-faculty ratio to rise or fall when size and percentage of graduate students increase simultaneously. A hypothesis that increasing the percentage of graduate students in the arts and sciences, education, or business has less of a tendency to decrease the over-all student-faculty ratio than does an increase in some other program would be consistent with this data, but not necessarily true.

No data on SCH and FTE faculty in the private sector exist which are comparable to those available for public institutions.

Faculty compensation

The situation with respect to faculty compensation is much like that of student-faculty ratios. The two summary figures in Table 15 can be appreciated only in the context of the more detailed data in Tables 18 and 19, whose format is analogous to that in Tables 16 and 17. The compensation figures do include fringe benefits.

Even a quick glance at the standard deviations of the figures for the public two-year sector in Table 18 should provide sufficient evidence to indicate that differences in faculty compensation must be analyzed with extreme caution, i.e., in most cases the differences could easily be explained merely by random variation in the data rather than by underlying causal relationships. However, there does appear to be a consistent tendency for the institutions in the smallest grouping to have a lower rate of compensation and for vocational-technical faculty to receive a higher-than-average compensation while health-related faculty receive a lower-than-average compensation.

One of the problems associated with using institutional averages is vividly illustrated in Table 18 in the "165,000 and Over" class of institutions. Note that the mean compensation appears to have fallen in both the liberal arts and vocational-technical programs from 1969-70 to 1970-71. A check of the components showed that the drop occurred in one college, Macomb, where both the liberal arts and vocational-technical faculties expanded a great deal, 20 and 43 percent, respectively. Although one cannot be sure without more detailed data, the apparent reason for the decrease in average compensation is that a great many new people were added at salaries lower than the 1969-70 average—which is not unusual since most colleges reward experienced

Table 18

Mean Full-Time Equivalent Faculty Compensation by Program and Size of Institution in Michigan Public Two-Year Colleges, 1969-70, 1970-71

Size of Institution (Student Credit Hours)	Programs				All Credit Courses
	<u>Liberal Arts</u>	<u>Business</u>	<u>Voc-Tech</u>	<u>Health</u>	
0-29,999					
1969-70	10,860 (1,940)	9,140 (1,840)	10,200 (1,580)	8,710 (640)	10,350 (1,690)
1970-71	11,090 (1,190)	10,590 (1,430)	11,450 (1,860)	9,540 (980)	10,950 (1,200)
30,000-164,999					
1969-70	12,170 (1,180)	12,560 (2,080)	14,040 (3,730)	11,670 (1,390)	12,400 (1,360)
1970-71	13,030 (1,380)	13,100 (1,510)	14,810 (2,880)	12,610 (1,400)	13,260 (1,420)
165,000 and Over					
1969-70	13,090 (530)	11,110 (2,450)	14,350 (2,520)	11,890 (2,440)	13,020 (260)
1970-71	12,880 (990)	12,940 (2,290)	13,130 (560)	13,590 (3,230)	12,960 (460)

Table 18 (cont'd)

Size of Institution (Student Credit Hours)	Programs				All Credit Courses
	<u>Liberal Arts</u>	<u>Business</u>	<u>Voc-Tech</u>	<u>Health</u>	
All Institutions					
1969-70	12,430 (1,250)	11,590 (2,460)	13,650 (3,250)=	11,290 (2,050)	12,450 (1,340)
1970-71	12,780 (1,350)	12,740 (1,970)	13,720 (2,480)	12,370 (2,280)	12,900 (1,350)

The figures within parentheses are the standard deviations associated with the mean figure immediately above them. The standard deviations are computed from institutional averages, not from data for individual faculty.

Source: Institutional Budget Requests for Fiscal Year 1971-72, Bureau of the Budget, State of Michigan.

Table 19

Mean Full-Time Equivalent Faculty Compensation by Program and Undergraduate-Graduate Composition of Institution in Michigan Public Four-Year Colleges, 1970-71

<u>Programs</u>	<u>Percentage of Graduate Students in the Institution (Headcount)</u>			<u>All Institutions</u>
	<u>0-12.4</u>	<u>12.5-24.9</u>	<u>25.0 and Over</u>	
Arts & Sciences	12,810 (1,970)	14,550 (310)	15,710 (1,680)	14,940 (1,740)
Education	12,740 (670)	14,660 (210)	15,200 (1,220)	14,750 (1,080)
Business	13,020 (2,690)	15,270 (650)	18,340 (2,640)	15,970 (3,090)
Engineering	14,020 (2,580)	16,400 (one institution)	18,310 (610)	16,750 (2,600)
Human Medicine	-	-	21,100 (820)	21,100 (820)
Other Graduate & First Prof.	-	14,510 (one institution)	19,960 (4,080)	19,470 (4,200)
Other	13,210 (1,870)	15,180 (130)	15,990= (1,740)	15,700 (1,720)
All Credit Courses	13,220 (1,980)	14,660 (220)	16,760 (1,410)	15,640 (1,900)

The figures within parentheses are the standard deviations associated with the mean figure immediately above them. The standard deviations are computed from institutional averages, not from data for individual faculty.

Table 19 (cont'd)

Source: Institutional Budget Requests for Fiscal Year 1971-72, Bureau of the Budget, State of Michigan.

instructors with higher salaries. Those faculty members who taught at Macomb College in both 1969-70 and 1970-71 almost certainly enjoyed an increase in compensation.

A very clear pattern emerges in the case of faculty compensation in the public four-year institutions, presented in Table 19. Those institutions which contain a greater percentage of graduate students (or, alternatively, have a larger student body) tend to provide a higher level of faculty compensation; this is true in every program identified. The faculty in those graduate and first professional programs isolated in this presentation receive the highest mean compensation. Arts and sciences and education faculty tend to receive the lowest compensation, regardless of the composition of the student body. The clear implication, of course, is that those faculty responsible for graduate instruction tend to be paid more than those engaged totally or primarily in undergraduate instruction; the data, however, are not sufficiently detailed to unequivocally confirm this hypothesis.

Data on faculty compensation in the private sector are not available, as was the case for SCH and FTE faculty figures. The procedure used to estimate faculty costs in this case (outlined at a later point) is very similar to that used to approximate nonfaculty expenses in each sector, to which we now turn.

Nonfaculty inputs and expenditures

The nonfaculty component of expenditures in the general fund budget will be estimated in the following manner. First, it is assumed that increases in the physical amount of nonfaculty resources required will be directly proportional to the increases in number of student

credit hours produced. For example, the requirement for administrators, maintenance personnel, secretaries, paper, computer time, and so on will increase by ten percent if the number of student credit hours produced goes up by ten percent. Second, the price of these nonfaculty goods and services will increase relative to the general price level at a rate consistent with recent trends. The price index used is a modification of one developed and presented by June O'Neill in Resource Use in Higher Education.⁴ O'Neill has combined various indexes which seem to be reasonable proxies for the resources used in higher education. The result, as she makes explicit in her presentation, is a very rough index whose potential biases are both negative and positive, with no clear indication of what the net bias might be. For our purposes of obtaining an approximate estimate of future financial requirements the index appears to be adequate, although its limitations should be kept in mind as the results are interpreted. The indexes developed by O'Neill are presented in Table 20. The figures in Table 21 are a modification of the indexes in Table 20, having been deflated by the consumer price index so as to yield an index of real costs for these inputs.

The data presented in Table 21 indicate that in the sixteen-year period from 1951-52 to 1967-68 the prices, in constant-value dollars, of all inputs increased at an annual rate of 2.33 percent per year and nonfaculty unit costs rose 1.32 percent per year. Thus, nonfaculty components have been a smaller factor than faculty inputs in the rise in the real unit costs of higher education.

⁴June O'Neill, Resource Use in Higher Education: Trends in Outputs and Inputs, 1930-to 1967 (Berkeley, Cal.: Carnegie Commission on Higher Education, 1971), Table B-1, p. 81.

Table 20

Deflator for Instructional Operating Expenditures for Colleges and Universities and Component Indexes,
Selected Years, 1951-52 Through 1967-68 (1957-59 = 100)

<u>Academic Year</u>	<u>Nonfaculty Components</u>			<u>Faculty Salaries</u>	<u>Overall Index</u>
	<u>Salaries</u>	<u>Supplies & Services</u>	<u>Aggregate</u>		
1951-52	74.5	88.9	81.8	77.5	80.0
1953-54	81.9	90.6	86.3	83.6	85.2
1955-56	89.2	95.9	92.6	87.2	90.3
1957-58	97.5	99.7	98.6	97.4	98.1
1959-60	106.6	100.8	103.6	108.9	105.9
1961-62	114.8	102.2	108.4	121.0	113.8
1963-64	123.2	101.8	112.3	133.9	121.6
1965-66	133.4	105.1	119.0	151.8	133.1
1966-67	140.6	107.6	123.8	161.7	140.1
1967-68	150.0	109.9	129.6	173.5	148.5

Source: June O'Neill, Resource Use in Higher Education: Trends in Outputs and Inputs, 1930 to 1967
(Berkeley, Cal.: Carnegie Commission on Higher Education, 1971), Table B-1, p. 81.

Table 21

Indexes Deflated by the Consumer Price Level for Instructional Operating Expenditures for Colleges and Universities, and Component Indexes, Selected Years 1951-52 Through 1967-68 (1957-59 = 100)

<u>Academic Year</u>	<u>Nonfaculty Components</u>			<u>Faculty Salaries</u>	<u>Overall Index</u>
	<u>Salaries</u>	<u>Supplies & Services</u>	<u>Aggregate</u>		
1951-52	82.4=	98.2	90.4	85.6=	88.4
1953-54	87.9	97.2	92.6	89.7	91.4
1955-56	95.6	102.8	99.2	93.5	96.8
1957-58	99.5	101.7	100.6	99.4	100.1
1959-60	105.0	99.3	102.1	107.3	104.3
1961-62	110.2	98.1	104.0	116.1	109.2
1963-64	115.5	95.4	105.2	125.5	114.0
1965-66	121.4	95.6	108.3	138.1	121.1
1966-67	124.3	95.1	109.5	143.0	123.9
1967-68	129.0	94.5	111.4	149.2	127.7

Source: The figures in Table 20 were deflated by the consumer price index in order to obtain the figures in Table 21.

An examination of institutional budget requests, audited financial reports, and Higher Education General Information Survey forms yielded the following estimates of the total general fund, faculty, and non-faculty components for each sector (millions): public four-year, \$400.3, \$157.2 and \$243.1; public two-year, \$94.6, \$44.8 and \$49.8; private, \$75, \$32 and \$43.

Turning to the matter of faculty compensation in the private sector, future requirements for faculty compensation will be based on two varying assumptions: 1) changes in student enrollment will be accompanied by an assumed proportionate change in the number of faculty and 2) average faculty compensation will increase by an assumed percentage. Note that this approach does not require knowledge of present student-faculty ratios and faculty compensation, but only of the total budget for faculty salaries in some base period, i.e., \$32 million in 1969-70.

Incidence of costs

Since such a large proportion of the total cost is the opportunity cost of the students, it is not surprising to observe in Table 15 that students bear the major share, 77 percent, of the total financial burden of college instruction. This is often not realized or remembered due to the general emphasis on cash outlay costs, to which students contribute 29 percent of the total. At this point two conclusions with important policy implications are already clear: 1) statements such as "students pay for only one-third of the cost of their college education" are false and misleading—they actually bear over three-fourths of the burden, and 2) educational alternatives which reduce

the time required for an education have great potential as a means of reducing the cost of higher education. The figures on opportunity cost, i.e., foregone earnings, are, of course, estimates which are subject to dispute. These estimates assume that the earnings foregone by a typical student are equal to the average gross weekly earnings in private nonagricultural industry, with downward adjustments for summer earnings, part-time students, and labor force participation rates (including male-female differences). The details are presented in Appendix E; this procedure yields estimates which are probably slightly higher than those of T.W. Schultz but markedly lower than those of Howard R. Bowen.⁵

Aside from students, the state government is the other main contributor to instructional costs, appropriating \$296 million which is 17 percent of total costs and 53 percent of cash outlays. Most of the research and development funds, \$94 million or 67 percent, originate with the federal government.

Summary

Given a forecast of enrollments, the above information provides a basis for computing a rough estimate of the operating funds required for Michigan higher education, with the exception of the auxiliary activities (primarily housing and food services) budget. After first

⁵See Theodore W. Schultz, Investment in Human Capital (N.Y.: The Free Press, 1971), pp. 82-90.

Howard R. Bowen, "Tuition and Student Loans in the Finance of Higher Education," in The Economics and Financing of Higher Education in the United States, a Compendium of Papers submitted to the Joint Economic Committee, Congress of the United States (Washington, D.C.: U.S. Government Printing Office, 1969), p. 619, especially footnote 1.

converting the headcount enrollment figures to SCH, the required number of faculty and total faculty compensation are calculated. The remainder of the budget, except for research and development monies, is also based on the enrollment estimate but no particular quantities or prices are identified. The estimate can be modified to reflect alternative policies concerning changes in the student-faculty ratio, faculty compensation, mix of institutions with respect to size, relative program emphasis, and many other factors. In the next section this framework will be used to evaluate the financial consequences of alternative proposals for the financing of higher education.

Financial Implications Of Alternative Financing Proposals

The interesting possibilities are so numerous that choosing a few cases for discussion is difficult. A virtually limitless number of variations exist in both the public policy and private demand dimensions, to say nothing of their possible interactions. In this section we will focus on six alternative projections which shed light on some of the more important policy avenues. In the next chapter, presenting the author's "conclusions and recommendations," two additional projections will be considered—making a total of eight.

Interpretation of concepts

The six sets of projections are presented in Table 22, accompanied by the 1969-70 figures used as a base year. Note that all figures are in terms of constant 1972-73 dollars. Using constant value dollars facilitates comparisons over time, but actual expenditures and growth rates in the future must, of course, be greater by a factor sufficient

Table 22

The Financial Implications for Michigan Higher Education of Alternative Financing Proposals
(1972-73 dollars)

	Base (1969-70)	Current Patterns- Curtailed Grad. Enroll.			Current Patterns- Present Enroll. Trends		
		72-73	75-76	80-81	72-73	75-76	80-81
Instructional Costs by Source (mil \$)							
Total ^{1/}	1913	2222	2576	2906	2262	2651	3014
Cash Outlay	624	725	854	997	747	888	1038
Students ^{1/}							
Total ^{1/}	14711	1709	1972	2200	1733	2023	2278
Cash Outlay ^{2/}	182	212	250	291	218	260	302
Gross Tuition & Fees	218	254	297	348	260	307	359
Governmental ^{3/}	383	446	525	612	460	547	640
Local	22	28	33	38	28	35	43
State	331	385	455	529	399	474	551
Federal	30	33	37	45	33	38	46
Other	59	67	79	94	69	81	96
Ave. Tuition per Student Credit Hour(SCH):Total(\$) ^{4/}	23.6	25	26	29	25	26	30
Public Four-Year	23.2	24	26	29	25	27	30
Public Two-Year	13.3	14	15	17	14	15	17
Private	40.0	43	45	50	43	45	50
Ave. Student Aid per SCH: Total (\$) ^{5/}	3.9	4.1	4.2	4.8	4.0	4.1	4.7
Public Four-Year	3.7	3.9	4.0	4.6	3.8	3.9	4.4
Public Two-Year	1.6	1.7	1.7	2.0	1.7	1.7	2.1
Private	8.3	8.5	8.7	10.3	8.6	8.9	10.8
General Fund: Total (\$) ^{6/}	624	725	854	997	747	888	1038
Public Four-Year	434	496	582	681	516	606	696
Public Two-Year	106	133	160	182	135	170	208
Private	84	96	112	134	96	112	134

Table 22 (cont'd)

	Base (1969-70)	Current Patterns- Curtailed Grad. Enroll.			Current Patterns- Present Enroll. Trends		
		72-73	75-76	80-81	72-73	75-76	80-81
Restricted Fund: Total (mil \$) ^{7/}	179	184	197	221	190	213	260
All Funds: Total (mil \$) ^{8/}	803	909	1051	1218	937	1101	1298
Public Four-Year	605	670	768	888	696	808	941
Public Two-Year	109	137	165	188	139	175	215
Private	89	102	118	142	102	118	142
Headcount Enrollment: Total (1000's)	374	420	465	484	427	482	512
Public Four-Year	208	227	250	263	232	257	269
Public Two-Year	115	138	155	157	140	165	179
Private	51	55	60	64	55	60	64

Table 22 (cont'd)

	Increase Student-Faculty Ratio by 5 Percent			Faculty Salaries Increase By 2% (in place of 3.5%)			Full-Cost Tuition & Vouchers		
	72-73	75-76	80-81	72-73	75-76	80-81	72-73	75-76	80-81
Instructional Costs (mil \$)									
Total ^{1/}	2207	2558	2885	2212	2550	2844	2317	2717	3102
Cash Outlay	710	836	976	715	828	935	763	904	1054
Students ^{1/}									
Total ^{1/}	1703	1966	2194	1705	1964	2180	1804	2113	2396
Cash Outlay ^{2/}	206	244	285	208	242	271	250	300	348
Gross Tuition & Fees	248	291	342	250	289	328	691	819	953
Governmental ^{3/}	437	514	600	440	509	577	446	525	612
Local	27	32	37	27	32	35	—	—	—
State	378	445	518	381	440	497	413	488	567
Federal	32	37	45	32	37	45	33	37	45
Other	67	78	91	67	77	87	67	79	94
Tuition per SCH: Total (\$) ^{4/}	24	25	29	24	25	28	64	68	76
Public Four-Year	24	25	29	24	25	28	77	82	92
Public Two-Year	14	15	16	14	15	16	47	51	57
Private	41	44	50	42	44	47	42	47	55
Stud. Aid per SCH: Total (\$) ^{5/}	4.1	4.2	4.8	4.1	4.2	4.8	41	43	48
Public Four-Year	3.9	4.0	4.6	3.9	4.0	4.6	41	43	50
Public Two-Year	1.7	1.7	2.0	1.7	1.7	2.0	45	47	51
Private	8.5	8.7	10.3	8.5	8.7	10.3	36	37	40
General Fund: Total (mil \$) ^{6/}	710	836	976	715	828	935	763	904	1054
Public Four-Year	486	571	667	490	565	640	527	607	670
Public Two-Year	130	156	178	130	154	169	139	172	202
Private	94	109	131	95	109	126	97	125	182
Restr. Fund: Total (mil \$) ^{7/}	184	197	221	184	197	221	184	197	221

Table 22 (cont'd)

	Increase Student-Faculty Ratio by 5 Percent			Faculty Salaries Increase By 2% (in place of 3.5%)			Full-Cost Tuition & Vouchers		
	72-73	75-76	80-81	72-73	75-76	80-81	72-73	75-76	80-81
All Funds: Total (mil \$) ^{8/}	894	1033	1197	899	1025	1156	947	1101	1275
Public Four-Year	660	757	874	664	751	847	701	793	877
Public Two-Year	134	161	184	134	159	175	143	177	208
Private	100	115	139	101	115	134	103	131	190
Edcnt. Enroll.: Total (1000's)	420	465	484	420	465	484	438	494	525
Public Four-Year	227	250	263	227	250	263	237	260	264
Public Two-Year	138	155	157	138	155	157	145	167	174
Private	55	60	64	55	60	64	56	67	87

Table 22 (cont'd)

	Increased Federal Aid In Existing Pattern		
	72-73	75-76	80-81
Instructional Costs (mil \$)			
Total ^{1/}	2222	2576	2906
Cash Outlay	725	854	997
Students ^{1/}			
Total ^{1/}	1677	1864	2035
Cash Outlay	180	142	126
Gross Tuition & Fees	243	272	311
Governmental ^{2/}	478	633	777
Local	27	32	35
State	373	424	486
Federal	78	177	256
Other	67	79	94
Tuition per SCH: Total (\$) ^{4/}	23	24	26
Public Four-Year	23	24	27
Public Two-Year	14	14	16
Private	39	39	41
Stud. Aid. per SCH: Total (\$) ^{5/}	6.1	11	16
Public Four-Year	7.5	13	18
Public Two-Year	2.8	5.9	8.2
Private	11	18	24
General Fund: Total (mil \$) ^{6/}	725	854	997
Public Four-Year	496	582	681
Public Two-Year	133	160	182
Private	96	112	134
Restr. Fund: Total (mil \$) ^{7/}	201	270	336

Table 22 (cont'd)

	Increased Federal Aid In Existing Pattern		
	72-73	75-76	80-81
All Funds: Total (mil \$) ^{8/}	926	1124	1333
Public Four-Year	684	822	971
Public Two-Year	136	168	194
Private	106	134	168
Hdnt. Enroll.: Total (1000's)	429	465	484
Public Four-Year	227	250	263
Public Two-Year	138	155	157
Private	55	60	64

Table 22 (cont'd)

- 1/ Includes the opportunity cost to students as well as actual cash outlays.
- 2/ Cash outlay is defined as gross tuition and fees minus all student aid funds from state and federal sources.
- 3/ Includes grants to both institutions and students.
- 4/ Gross tuition and fees divided by total student credit hours.
- 5/ Total student aid funds from state and federal sources divided by total student credit hours.
- 6/ Does not include the overhead portion of research and development funds, which is usually placed in this fund.
- 7/ Includes the overhead portion which is usually placed in the "general fund" portion of financial reports. In accordance with usual practice, federal student financial aid funds administered by the colleges are included as part of restricted funds; since a portion of these funds are used by students to pay tuition, the addition of the general and restricted fund figures involves an element of double-counting.
- 8/ General plus restricted funds; note that auxiliary funds, which include such things as food service and dormitory costs, are not included.

to neutralize the impact of inflation. Before examining the projections in some detail, let us first briefly examine some of the items in the table for their meaning and significance. Most are largely or completely self-explanatory, but a few probably warrant special comment.

Understanding the distinction between the different concepts of student costs lies at the core of this analysis. The item "gross tuition & fees" is the familiar entry denoting the amount which students must pay to the college in order to participate in the instructional program. Many students, of course, receive financial aid originating from state and federal sources; reflecting this, "cash outlay" is defined as gross tuition and fees minus all student aid funds from state and federal sources. However, the cash outlay costs of attending college are not the only costs borne by students—they forego substantial earnings, as pointed out earlier in this chapter. The "total" costs of students include this opportunity cost as well as actual cash outlays. Note that none of these cost concepts includes the living, i.e., room and board, expenses of students. In this analysis we are concentrating on the change in the level and incidence of costs as a result of shifts in public policy. Since people must sustain themselves regardless of their status, living expenses are not a cost of higher education. This, of course, in no way negates the argument that living costs should be a factor in the determination of aid to low-income students.

Understanding the above distinctions is a necessary, but not sufficient, condition for knowing the significance of the measures. The leverage of students (and/or their parents, in many cases) on the

institution is best represented by gross tuition and fees; one might expect that when this item is a larger proportion of an institution's budget that such a college must be more conscious of catering to the perceived needs of students and their parents, or risk severe financial pressure as a result of defections. Cash outlay costs reveal the additional cash expenses which students must cover from their private sources as a result of their decision to attend college. Although both of the above concepts are often used, relative to the general fund, as measures of the students' share of costs, neither is appropriate. In assessing the incidence of costs of higher education it is important that the measures be based on the total costs of students, i.e., opportunity costs should be included.

The remaining dimensions in Table 22 and their implications are self-evident, or will become so as the financing alternatives are discussed.

Policy assumptions

The first set of projections, entitled "current (financing) patterns--curtailed graduate enrollments," is an extension of current policies in conjunction with the lower of the two projections of graduate enrollment derived in Chapter IV. At the undergraduate level the students are distributed in accord with the "uniform stabilization" policy (see Chapter IV), so that public four-year and public two-year institutions each experience relatively stable undergraduate enrollments in the 1976-88 period. Each source of instructional funds contributes the same percentage to the cash outlays instructional budget in each sector as it did in the base period, with the exception of

student aid awards which grow 4 percent per year—a rate comparable to the potential growth in the real gross national product (GNP). Funds for research and development increase at a rate of only 2 percent per year, a pace actually faster than recent growth but consistent with the sluggish expansion assumed for graduate enrollments. Other key policy factors are no change in student-faculty ratios, a 3.5 percent annual increase in faculty compensation, a 1.32 percent annual increase in the unit cost of non-faculty inputs, and a continuation of the present differential rate of aid awards per undergraduate student in each of the three sectors. In summary, this first projection is an extension of present policies in conjunction with a rather conservative forecast of enrollments.

In the second set of projections, "current (financial) patterns—present enrollment trends," nearly all policy parameters are identical to those in the first set, but these policies are applied to a larger enrollment base, the present policies projections presented in Chapter IV. The only policy change is an increase from 2 to 4 percent in the annual rate of increase in funds for research and development, which is probably a necessary condition if graduate enrollments are to grow at the planned pace. Thus, this set of projections is also designed to illustrate the future impacts of a continuation of present policies but with a less conservative forecast of enrollments than was used in the first set.

Two of the remaining four alternatives in Table 22 also depict rather minor policy changes from the framework outlined under "current patterns—curtailed graduate enrollments." The two are designated as "increase student-faculty ratio by 5 percent" and "faculty salaries

increase by 2 percent (in place of 3.5 percent);" they entail exactly what their titles imply. All other factors are identical to those in the first projection. Although simple in conception, these two variables are always central in any discussion of possible economies in the educational process.

The "full-cost tuition & vouchers" policy is a much more dramatic shift away from present practices and consequently requires more changes in the basic model, which we continue to represent by the "current patterns--curtailed graduate enrollment" program. The following framework is based on the recommendations contained in the final report of the Wisconsin Governor's Commission on Education; thus, the plan is well beyond the "pipe-dream" phase, despite its more radical bent.⁶ The essence of the voucher policy is quite simple. Instead of giving funds to public colleges and universities, the state awards the funds directly to students admitted to any institution of higher education, giving priority to students from low-income families. In order to continue to pay for instructional inputs in the absence of a state subsidy, public institutions will find it necessary to raise their tuition charges. In this specific case total grants to students from state sources will equal the sum of the state and local appropriations to institutions and also the state student aid grants in the basic model, i.e., \$413, \$488 and \$567 million in 1972-73, 1975-76 and 1980-81, respectively. A flat grant of \$500 per FTE student is awarded to all undergraduates in 1972-73 (increased to \$535 in 1975-76 and \$600 in 1980-81). The Wisconsin commission recommends that

⁶Governor's Commission on Education, A Forward Look: Final Report, State of Wisconsin, November 1970, pp. 41-51, D1-D3.

professional and graduate students from Wisconsin be awarded grants covering the full cost of their education (including a maintenance, or living, allowance) in their second and third years of post-baccalaureate study.⁷ The twin factors of residency and year of study, plus the near--if not complete--impossibility of isolating graduate student costs from the other teaching and research endeavors, make it extremely difficult to ascertain the impact of this recommendation. Based on estimates that the relative SCH-FTE faculty ratio for undergraduates is 1.5 that of graduate students while graduate level faculty receive compensation 1.5 times that of undergraduate teachers, it is reasoned that the average graduate SCH is 2.25 times as costly as its undergraduate counterpart; including a maintenance allowance of \$1750, the full-cost grant is calculated to be \$5410, \$5530 and \$5470 in 1972-73, 1975-76 and 1980-81, respectively. Finally, it is assumed that one-third of the graduate students will be eligible for the grants.

The state funds which remain after the flat grants have been allocated to both undergraduate and graduate students would be available for supplemental grants to low-income students. In this particular case the remaining amounts would be \$168, \$189 and \$204 million in 1972-73, 1975-76 and 1980-81. The assumption as to which students receive aid is crucial to the analysis of the impact of vouchers on the different sectors of higher education. Students in two-year colleges presently tend to come from low-income families relative to other students,⁸ and it appears that these colleges would continue to

⁷Ibid., p. 49.

⁸Carnegie Commission on Higher Education, The Open-Door Colleges: Policies for Community Colleges (N.Y.: McGraw-Hill Book Company, 1970), especially p. 5.

be cheaper than public four-year institutions and more accessible than private colleges after the initiation of vouchers. For these reasons, in the analysis of this policy option it is assumed that the average aid per SCH (or FTE student) in the public two-year sector is twice the supplementary aid per SCH in the public four-year and private institutions.

Finally, the combination of full-cost tuition and vouchers will undoubtedly affect student enrollment. Fewer upper-income young people are likely to attend because of higher tuition charges (see Chapter V) while more lower-income youth would be encouraged to enroll because of greater student aid awards; the net effect is impossible to foretell. The Wisconsin Commission estimated that undergraduate enrollments would exceed present trend levels by 3.1 percent, which is what will be used here.⁹ The other modifications in the "current patterns--curtailed graduate enrollment" enrollments are 1) a faster rate of undergraduate growth, 6 percent per year, in the private sector and 2) undergraduate enrollments in the public sector are divided between two-year and four-year institutions on the basis of the present policies projection (this change places a heavier emphasis on the two-year institutions--see Chapter IV). The reasons for these changes will become clear when we examine the shifts in student costs which will take place.

The last set of projections, "increased federal aid in existing pattern," represents a policy of increased federal aid to students along lines of existing programs but with an additional "cost of

⁹Governor's Commission on Education, op. cit., p. D2.

education" institutional grant awarded to institutions in direct proportion to the aid received by students. As before, the base from which we begin is the first projection, "current patterns—curtailed graduate enrollment." The commitment of the federal government grows over time, being 10, 20 and 25 percent (\$73, \$171 and \$249 million) of the general fund budget in 1972-73, 1975-76 and 1980-81, respectively (in addition to other minor outlays); two-thirds of the funds are awarded to students while the remaining one-third is given directly to institutions for general instructional purposes. These proportions are items which would be negotiated in the political process; the Carnegie Commission on Higher Education recommended a formula which showed institutional aid of 28 percent in 1970-71, 38 percent in 1976-77, and 42 percent by 1979-80.¹⁰ The non-federal aid components of the general fund budget retain the same relative importance which now exists, e.g., the ratio of total tuition receipts to state appropriations remains the same.

We will now compare the implications of the above policies for the important parties concerned with Michigan higher education.

Policy implications

The results, displayed in Table 22, clearly indicate that there will be a continued expansion of the financial requirements of higher education under a wide variety of policies. This is true regardless of whether a measure of total costs or of cash outlays is used. There

¹⁰ Carnegie Commission on Higher Education, Quality and Equality: Revised Recommendations—New Levels of Federal Responsibility for Higher Education (New York, N.Y.: McGraw-Hill, 1970), pp. 32-33.

is a significant change from the 1960's, however, in that the rate of increase appears likely to slow to an average of about 3-4 percent per year in the 1970's. Since the long-term growth in real GNP is usually assumed to be about 4 percent per year, the resources necessary for higher education could be made available without an important shift in priorities—as reflected in the share of the GNP devoted to higher education. The most important factor behind this turn of events is the anticipated slow-down in enrollment growth as the last of the "baby-boom" generation completes college. Because this slow-down is still unfolding, we can expect the financial requirements to grow more than 4 percent in each of the next few years but significantly less than 4 percent in the late 1970's.

The easing of the financial crunch will be especially marked if the rate of increase in faculty salaries diminishes just as the growth in enrollments moderates. There is some reason to believe this will occur; the market for those with graduate degrees is presently depressed, and a stabilization of undergraduate enrollments should continue to dampen demand. In the 1970's and early 1980's colleges and universities may find themselves in a buyer's market as they hire faculty. The movement towards collective bargaining among faculty is, of course, designed to counteract such a tendency, and unionization would undoubtedly be stimulated by a trend towards lower increases. The net effect of these cross-currents is impossible to predict. But it is important to note that decreasing the annual rate of increase of real compensation by 1.5 percentage points (from 3.5 to 2.0) results in savings of \$26 million in 1975-76 and \$62 million in 1980-81, 3 and 6 percent of cash outlay costs, respectively.

Increasing the student-faculty ratio is usually the other "economy" move (in addition to lower faculty salaries) considered at the start of any budget process. Changes in the ratio may consist of larger numbers of students in each class while faculty teach no additional classes, a larger number of classes of a constant size taught by each faculty member, or some combination of the two. This model indicates that a policy of increasing the student-faculty ratio by 5 percent reduces cash outlay costs for instruction by 2.1 percent, all other things remaining constant.

The students will continue to bear most of the costs. Total students costs are about 76-77 percent of total costs in all cases except that of "increased federal aid in existing pattern" where the student share drops to 70 percent by 1980-81. Average figures, however, become very misleading as student aid becomes a significant factor, i.e., many students receive aid and thus pay less than the average while others who do not receive aid pay more than the average. This will become clear when tuition and student aid figures are considered explicitly. The total cash outlay of students for instruction is not as useful as some of the other figures for analytic purposes, and we will merely note that it rises in all cases except that of "increased federal aid in existing pattern."

The data on gross tuition and fees are very important; as noted above these funds are the most concrete form of leverage held by students and their parents. Gross tuition and fees account for 35 percent of institutional receipts for instructional purposes in the base period, and this pattern is maintained in four of the six sets of projections. The direct grants to institutions under a policy of

"increased federal aid in existing pattern" result in somewhat less dependence on tuition charges, so that these fall to 31 percent of the instructional budget by 1980-81. The really dramatic change occurs in the case of the "full-cost tuition and vouchers" policy. Fully 90 percent of instructional funds are now channeled through students. This reflects one of the central concerns of the proponents of vouchers, that institutions must respond to the desires of students and their parents if they are to receive any financial support for instructional purposes.

State appropriations for instructional costs, 86 percent of governmental funds in 1969-70, continue to dominate other levels of government in each of the policy alternatives examined. The most significant shift in pattern takes place with the "increase federal aid" option, in which the federal government assumes approximately 25 percent of the general fund obligations in 1980-81—which enables the state to gain some relief. By 1980-81 the federal share of governmental funds has risen to 33 percent while the state portion has dropped to 63 percent, although the latter increases from \$373 million to \$486 million from 1972-73 to 1980-81. The other change in pattern, less significant in monetary terms, is the state takeover of the local support of the community colleges under a "full-cost tuition and vouchers" policy. Such a takeover is not inherent in such a policy but is consistent with the ideal of directing funds to students instead of institutions.

Few people pay a great deal of attention to the above factors. Most are concerned with the level of tuition per student or SCH, the "cost" of college which seems to be the most obvious. The projections

in Table 22 indicate that if present policies are retained tuition will continue to rise. The rate of increase will be approximately 2-3 percent per year—tending to be less if faculty compensation rises at a slower rate in the future but greater in the public four-year sector if graduate student enrollments were to resume a more rapid rate of growth. The relative levels of tuition in the three sectors would be expected to remain quite constant in the 1970's if present policies were extended.

Tuition charges in the public sector would jump to over three times their present level under a policy of "full-cost tuition and vouchers." A full-time student without aid in 1975-76 would be paying tuition of about \$806 per year under present policies or \$2542 per year under the "full-cost tuition" policy in the public four-year sector; in the public two-year sector the analogous figures are \$465 and \$1581 per year. Since the private institutions do not receive any state appropriations under present policies, the shift to a "full-cost tuition" policy has little impact on their tuition charges; the small increase is due to the assumption that enrollment in the private sector would grow more rapidly due to higher costs in the public sector. Tuition charges in both the public four-year and public two-year sectors would rise above those in the private sector, thus moving the latter from a position of being most expensive to one of being least expensive. Such a change would obviously have tremendous implications for where students would choose to "cash in" their vouchers. Much of the higher cost in the public four-year sector is a result of the greater emphasis on graduate education. One might expect that public four-year institutions would charge undergraduates a tuition rate

comparable to that in the other two sectors and raise graduate tuition enough to cover the cost of the programs—probably most would fall between \$100 and \$200 per SCH but medicine and others would undoubtedly be higher. It would appear that the first year of graduate or professional school work in which a student would receive no state aid would represent a considerable financial barrier.

Since present federal student aid programs have a relatively greater impact on students enrolled in private and public four-year institutions, and the "cost of education" grant to the institution is proportional to the student aid awards, the "increased federal aid in existing pattern" policy has little impact on tuitions in the public two-year colleges. Comparing this policy option with the usual base, "current patterns—curtailed graduate enrollment," we find that private institutions benefit the most; the federal institutional grants enable them to hold their tuition charges to the 1969-70 level, or about \$9 per SCH less than the base projection in 1980-81. Tuition in the public four-year institutions is \$2 per SCH less than the base in the late 1970's, and that in the public two-year colleges is \$1 per SCH less in the same period.

Tuition charges, as was observed earlier in an examination of the base data, can be misleading when comparisons are made in the absence of student aid funds. Historically, the pattern of student aid grants has tended to narrow the actual differences in costs between the three sectors. The four projections presenting variations of present policy continue to exhibit this pattern. As the growth rate of enrollments slows, it is anticipated that the average student aid per SCH will rise, but hardly enough to cause any noticeable changes in

higher education (about \$1 per SCH from 1969-70 to 1980-81). In 1980-81 with present policies the tuition charges in the public two-year sector will be about \$12 less than those in the public four-year sector and \$33 less than the private sector; when student aid grants are subtracted from tuition charges, the respective differences fell to about \$9 and \$25. If the federal government was to increase aid as outlined in the last projection, the "after student aid" differences would fall to \$1 per SCH between public four-year and public two-year institutions and \$9 per SCH between public two-year and private colleges. Quite obviously, the present federal student aid programs are providing relatively more assistance to students entering institutions with higher tuition charges and expanding them would further compress the actual differences faced by students.

Once, again, the policy of "full-cost tuition and vouchers" is in a class all by itself. Reviewing briefly, all undergraduates would receive a flat grant of about \$550 per year, and all second and third year post-baccalaureate students receive a flat grant of about \$5500 each year. The remaining state funds are awarded as supplemental grants to low-income undergraduate students, who make up a larger proportion of the student body in the public two-year colleges than elsewhere. The resulting distribution of aid funds is not too surprising, given the above. The award per SCH is greatest in the public two-year colleges due to the presence of low-income students, but the public four-year sector is close behind in aid per SCH due to the large grants to graduate students. The private sector drops from first in aid per SCH under present policies to last under the voucher policy, but the absolute amount of aid per SCH jumps substantially—by a factor of 4.

Combining the tuition and student aid factors and using 1980-81 as an example, present policies imply that tuition charges minus student aid awards on a per SCH basis will be \$24, \$15 and \$40 in the public four-year, public two-year and private sectors respectively. The comparable figures for the "full-cost tuition and vouchers" policy, \$42, \$6 and \$15, reflect a dramatic shift. A combination of a very large tuition increase accompanied by an even larger input of student aid results in the average public two year student still paying the least per SCH from his own funds for his college education, and less than half what he would expect to pay given a continuation of present policies. In the case of students enrolled in private institutions, their tuition would rise very little while the average student would receive much more aid--giving a net cost of about 40 percent the expected net cost assuming present policies continued. Since the total input of public money is equal in both policies, it is not difficult to guess what happens to per SCH net costs in the public four-year sector--they skyrocket to nearly twice their previous level. This means the average full-time student in the public four-year sector would have a net tuition (minus aid) charge approximately seven times that of students in the public two-year colleges and three times that of those in the private sector. Such a development would result in a contraction of the public four-year colleges, or at least a drastic reorganization--and probably a combination of both. It is well to remind ourselves once again that when we speak of the "average student," we are dealing with the atypical case. Most students will either get no supplementary aid and pay the full tuition or will get an amount of aid which will more than cover their tuition costs. Nevertheless, these tuition and aid

figures do illustrate the constraints within which students and institutions will make their decisions.

The remaining financial figures in Table 22 show the impact of the alternative policies on higher education budgets as measured by the traditional general and restricted fund measures. While providing a useful comparison for some purposes, especially that of showing the relative size of the three sectors, little would be gained by a detailed discussion of these funds which has not been brought out earlier. The same remark applies to the enrollment data. One item which may warrant special notice is that increasing the rate of growth in research and development funds by 2 percentage points, from 2 to 4 percent per year, results in an additional \$16 million and \$39 million in 1975-76 and 1980-81, respectively, being made available for such purposes in Michigan higher education.

Summary

The financial requirements model developed and used in this chapter focuses on the instructional and research components of higher education. Student costs are commonly measured in at least four different ways—gross tuition and fees, tuition and fees net of student aid, total education costs including opportunity costs, and total costs including living costs. Understanding the importance and relevance of each is central to the financing question. The significance of opportunity costs, 60 percent of total instructional costs in 1969-70, is not commonly recognized; including these makes it clear that students bear most of the cost of their education in both the private and public sectors and that reducing the time which students devote to higher

education is potentially a very important means to reduce costs. In addition to the rather detailed discussion of student costs, the presentation of background data gives special emphasis to patterns of variation in student-faculty ratios and faculty compensation.

The future impacts of six alternative policies are examined in the main body of the chapter. There are strong indications that the rate of increase in total financial requirements in the remainder of the 1970's will be quite comparable to the rate of growth in the economy, as opposed to the 1960's when higher education consumed an ever increasing fraction of the GNP. An examination of two of the most common approaches to cost-cutting yields estimates that 1) increasing the student-faculty ratio by 5 percent would reduce cash outlay costs of instruction by 2.1 percent and 2) a decrease of 1.5 percentage points (from 3.5 to 2.0 percent) in the annual growth of faculty compensation would reduce cash outlay costs of instruction by 3 and 6 percent in 1975-76 and 1980-81, respectively.

Students, as a whole, are likely to continue to bear the great majority (slightly over three-quarters) of the costs associated with their education, although rather massive amounts of student aid would reduce this slightly. If present policies are continued, tuition charges will rise at a moderate but persistent rate of about 2-3 percent per year. Adoption of a full-cost tuition and vouchers policy would raise tuition levels by more than a factor of three in the public sector. Considering the vouchers as well as the tuition charges, the average student in the public sector is likely to experience a much larger net charge while those in private institutions would have much lower net costs; although still having the lowest net cost in

terms of tuition minus the value of the voucher for the average student, those in public two-year colleges gain less than those in the private sector. Expansion of existing federal student aid programs with the addition of a "cost of education" grant directly to the institution would benefit private institutions and their students most, public two-year colleges and students least, with public four-year institutions and students in an intermediate position.

Increasing the growth rate of research and development funds by 2 percentage points (assuming 4 rather than 2 percent per year, both of which are higher than recent rates) yields an extra \$16 million in 1975-76 and \$39 million in 1980-81 for these purposes.

Chapter VII

Conclusions and Recommendations

Up to this point the author has deliberately tried to minimize the influence of his values on the analysis. The original choice of the problem and the dimensions to emphasize imply a set of values, of course, in the sense that problem identification depends on an original determination of "what ought to be" before one can say "what is" is not "what ought to be." By and large, however, the problem of the financing of higher education and the facets of the question examined in this study have been debated by many people; this framework reflects the mix of values held by others in society at least as much as the values of the author. The intent in previous chapters has been to outline the historical development of the values and institutions in U.S. higher education, the views of those holding different positions, and the links between such factors as population trends, economic growth, tuition charges, enrollment, faculty compensation, and total financial requirements. The reader should now be in a better position to choose a policy consistent with his personal and state and national goals.

What follows is the author's statement of his own position, with recommendations for the future direction of policy. While not as essential to understanding the discussion of higher education finance as the preceeding material, it is hoped that this chapter will represent a specific, constructive addition to the continuing debate. The comprehensive proposal represents an attempt to develop a system of financial support which will extend the opportunity for a college education to more citizens while strengthening the critical role of those

in our institutions of higher education.

In the first section on "goals, values and general principles" the underlying beliefs upon which this recommendation is grounded are made explicit, using the terms and framework of the material in Chapter III on alternative philosophies of higher education. Specific policy recommendations are presented in the second section, labeled "a working plan." The third section on "future financial implications" is devoted to developing projections similar to those in Chapter VI, based on both a conservative and expansive set of enrollment assumptions. Finally, a brief "summary" recounts the highlights.

Goals, Values And General Principles

A viable philosophy of higher education must deal with and, I would argue, reflect the very real tension which exists between education's role as a service to the prevailing culture and as a stimulus to change. Solutions which go to either extreme are dangerous, even deadly, for both higher education and society. A society which does not provide for its own mechanisms of self-criticism and adjustment will soon find itself stagnant and doomed to live with existing evils—until its citizens in some manner revolt in hopes of creating something better. But a college or university which takes partisan stands in the political arena will soon find itself losing the very intellectual legitimacy upon which its moral role originally depended and will eventually lose its public support. Thus the tension is inevitable. One can only hope that it will be creative and understood as such, i.e., the individuals and institutions which have a vested interest in the status quo cannot be expected to be happy about criticisms of their

role or new technologies which destroy their comparative advantage, but they can be expected to take the route of refutation through dialogue or research rather than through the destruction of higher education—if they recognize higher education has a creative role which it acts out for the benefit of all mankind.

Research program

Moving to a more specific level, the system of support for scientific and humanistic research which we now have and which is outlined in Chapter III appears to be appropriate. Reviewing briefly, this entails a determination by society of the total funds to be allocated to scientific research, but the scientific community has the major responsibility for making allocative decisions.

The present system of funding all technological research through vested-interest groups, however, is akin to Russian roulette and is at the root of many of the problems of higher education and society. It would be foolish to ignore the comments of those critics who point to numerous examples of technological research being done in universities without adequate attention to their effects outside of the end sought by the funding agency, e.g., agriculturalists develop machinery and chemical products which lower private costs of production but largely ignore the public and private problems associated with the displaced labor, engineers perform large amounts of research on how to improve automobile transportation but little on mass transit, and economists study how to increase GNP oblivious to the detrimental effects of economic expansion.

An agency such as the Foundation for the Appraisal of Societal Change (FASC) outlined in Chapter III is needed; one might say it

allows society a peek into the chamber before a decision is made as to pulling the technological trigger. As mentioned earlier, the FASC would fund projects designed to evaluate the implications of both existing and proposed innovations, thus providing a counter-weight to research directed at ends defined by existing vested interests. The decision-making boards of the FASC should include a mix of scientists, humanists, technologists, and political representatives—for all can contribute to the assessment of what changes most need to be appraised. The FASC would receive direct governmental appropriations in a manner analogous to the National Science Foundation (NSF), National Institutes of Health (NIH), and so on. In view of the present interest in discovering the environmental and social impacts of new developments, there may be no need to take special measures to insure that the FASC is adequately funded. However, if it seemed an appropriate method of demonstrating the concern that our technological research program maintain a better balance in the future, the enabling legislation could contain a clause expressing the intent of our lawmakers that FASC funds should be equal to or greater than some percentage of the research and development funds administered by action agencies.

In addition to the direct impact it has through the sponsoring of projects, the existence of the FASC might encourage other agencies and researchers to investigate more fully the ramifications of their research with their own funds, for few investigators like it to be shown by others that they ignored many of the most important implications in their original work. It is also likely that if faculty were working on FASC-funded projects, they would be more conscious of the broad implications of technology and more inclined to include these in

the curriculum.

The influence of the FASC should not be one of consistently providing evidence for maintaining the status quo. The benefits of new developments and the problems inherent in existing practices should receive as much attention as the risks associated with change and the advantages of present arrangements. The important point is that the FASC be organized with the purpose of encouraging a more objective appraisal of changes than is likely to be forthcoming from vested interests, no matter what position they occupy in a liberal-conservative spectrum.

Although encouraging, the present efforts of the NSF and the Congress with respect to technology assessment do not preclude the value of an agency such as the FASC. The NSF has been rather isolated from political concerns, which is an asset in view of the major role it plays in funding basic, scientific research but which is a liability if analysis is to be relevant to policy. In addition, the NSF work has tended to over-emphasize impacts on the physical environment relative to social concerns. The newly authorized Office of Technology Assessment, which will be responsible to the Congress, is likely to devote most of its energies to the investigation of problems with immediate political impact.¹ The formation of the Office appears to be a response to Congressional concerns that members of Congress need their own assessment, independent of that of the executive branch, on such matters as the supersonic transport, anti-ballistic-missile

¹U.S. Congress, "Technology Assessment Act of 1972," Public Law 92-484, 92nd Congress, H.R. 10243, October 13, 1972.

system, and Alaskan oil pipeline.² Such an Office will undoubtedly be useful to the Congress, but an agency less dominated by political representatives and immediate problems is needed to serve the longer-run interests of society.

Another idea whose value is worth at least a trial is that of giving to disadvantaged groups grants specifically for hiring the research services of an institution of higher education. There is little doubt that the disadvantaged have not received service comparable to the powerful; researchers who have gone into poor communities under the guise of wanting to "help" and who have then done nothing more than interview people, often about personal matters, and then write a journal article or thesis have left a legacy of resentment and disillusionment. If leaders in these communities were able to bargain with colleges and universities from a position not unlike that of federal agencies and private corporations, they would probably find themselves listened to more closely—and hopefully both they and the researchers would gain new insights. This is not a proposal to finance all of our research dealing with the disadvantaged in the above fashion, merely a suggestion that we explore in several trials a relationship whose paternal and exploitive tendencies run counter to our past experience.

Instructional program

The instructional program should be financed from a variety of sources as is presently the case, both because a good instructional program produces a public good as well as a private good and because of the freedom it gives to the institution. The federal government

²See "Technology Assessment (Cont.)," Scientific American, May, 1972, p. 48.

should award grants based on enrollment to all recognized institutions of higher education; this would be consistent with both of the above principles. These grants should reflect the different costs at the different levels of instruction and in different programs. The above grants might be used to reduce support from other sources rather than to increase the quality of higher education by increasing the resources per student. Some will object to this and urge the adoption of a provision penalizing any institution, and thus state, not maintaining its own contribution; this argument should be rejected. A student should not be penalized by receiving less federal support merely because his state of origin gives higher education a lower priority relative to other states. Following the recommended approach would leave the primary burden for recognizing and rewarding quality where it now lies—with federal programs in the case of most research and with state and local governments and individuals in the case of instruction.

Not only should the faculty be free of the need to cater to vested interests, but so also should be the students. The present role of higher education in screening and certifying people for rather specific vocational and professional roles does appear destructive to a spirit of free, intellectual inquiry. In addition, there is little doubt that many faculty and administrators pay less heed to teaching responsibilities than to research interests. One change which appears appropriate is that of giving students increased opportunities to pass courses and blocks of courses by exam for a fee which recognizes the institutional savings in direct instructional costs. Another step with positive potential is freeing students from a specified curriculum except for a core in their major field of interest. Care must be taken

to insure that the freedom is not abused by overzealous departments and colleges which feel their students need a great many of their own course offerings, e.g., regulations limiting the credits required for a major field—or even stronger acts—might be needed.

Measures such as those just mentioned would allow a student greater freedom to follow his own interests and enable students to avoid poor instructors—either by not enrolling in their courses in any fashion or by taking them on an exam-only basis. Yet the institution would not be solely subject to students' desires for much of their funding would come from other sources, and departments and colleges would retain the right to require a given level of competence in a specialty.³ The primary component which is sacrificed is that of requiring students to sample a wide variety of courses in order to acquire a "liberal education." Although supportive of students who enroll with such a goal, the author is reluctant to force it upon others. The arguments of Ashby and Dewey (cited in Chapter III) that any subject is liberating, or humanizing, to the extent that it widens the student's knowledge of how his own interests and actions impact others in society are persuasive. The author believes that every effort should be made to insure that part of the competence required by departments and colleges includes a knowledge of the broad impacts of technology as outlined in the "critical of existing societal goals"

³If an institution would decide that it should increase its flexibility to adapt to changing student desires, there are many things it could do, such as require that vacated positions revert to a common pool to be reallocated by the central administration, reduce the proportion of tenured to non-tenured faculty, and give sabbaticals on a preferential basis to those who use them as vehicles for shifts in their areas of emphasis.

section of Chapter III; and he also feels that such an effort will often create an urge within students to gain additional background in the arts and humanities. However, without such internal motivation, albeit originally stimulated by external sources in a rather conscious fashion in many cases, students are unlikely to learn much of lasting value.

Serious consideration should be given to implementation of a pass-fail system in which only those courses passed would be entered on the student's transcripts. The transcript, which would also carry information as to any degree granted, would be the sole piece of information given to outside agencies by the institution—and this only at the student's request. The student would be free, of course, to request letters of recommendation from faculty as from others. These steps would eliminate the fine gradations used by many employers, thus forcing them to develop other measures. Much of the burden of certifying people as qualified for specific roles might shift from individual colleges and universities to other institutions, and fewer students would attend merely to gain certification. On the other hand, considerable significance would still be attached to which institution a student attended, i.e., the initial entrance criteria would continue to play an important role in sifting and certification. Another possible outcome is that employers would shift their attention from gradations in achievement (grade point averages) to differences in the time required to achieve certification. The problems of how to identify expertise and who should discharge this function are complex, and solutions are likely to consist of uneasy compromises.

Regardless of whether the specific measures noted above are enacted, two related concerns deserve strong support in the author's opinion. First, there should be a program of direct grants to financially disadvantaged students in order to eliminate differential financial barriers to higher education in so far as this is possible. Second, institutional diversity should be encouraged so students and others can find an environment suitable to their own interests, abilities, and ambitions. This implies that there will, and should, be differences among institutions as to sources of funds and levels of funding per student, faculty member, or any other input measure.

Concluding comment

Deciding upon a consistent set of goals and values is not an easy task, and conceptualizing an institutional framework to sustain and encourage those goals may be even more difficult. This is especially true if one views higher education as having multiple roles, including an obligation to criticize society and yet be of service to many of society's felt needs. The thoughts in this section are the result of the author's grappling with these issues; others will support different goals and even alternative means for attaining identical goals. The truly important point is that we reason carefully and be as explicit as possible about our underlying beliefs. Only in this way will we be able to understand and debate the full implications of specific financing proposals, such as the one to which we now turn.

A Working Plan

A significant change, and expansion, in the federal role lies at the heart of this proposal. One component is a system of federal aid to all institutions designed to provide for approximately 25 percent of cash outlay instructional costs by 1980-81. This institutional aid is to be based on a formula recognizing the number, level, and field of student credit hours (SCH) produced—but not including any other factors such as the type of institution or the cost of tuition. For the first time the nation would recognize in comprehensive fashion the national benefits of higher education; the federal presence, however, would be neutral as to types of institutions and sufficiently limited so as to ~~make~~ federal domination of higher education unlikely. Raising the federal contribution above 25 percent would increase the influence of national interests relative to state, local, and private concerns, while lowering it would have the opposite effect. The figure of 25 percent reflects the author's judgment that such a commitment would enhance the independence of most public institutions from state sources but not in any way eliminate the state influence, especially in the public four-year colleges; it also provides significant fiscal relief to the private sector while leaving private sources in a clearly dominant role. (These points will become clearer at a later point.)

Another facet of the federal involvement is a complete revamping of the student aid program—shifting from grants to institutions for aid purposes to variable grants to students based on a formula, including factors such as family income in recent years, family assets, and the number of other children and their ages. Students should be

made aware of the program late in their junior year and throughout their senior year in high school; state departments of education, with their existing connections to secondary schools, would thus be a logical choice for the unit to publicize and administer the aid program. Since their aid could easily be determined by applying the formula, students in high school would have full knowledge of the federal aid they would receive if and when they attended college and could plan accordingly—as could college officials who might wish to offer supplements from institutional funds. This program would almost certainly do more to extend equal educational opportunity than the present mix described and analyzed in Chapter V.

Finally, the federal government should also provide the necessary guarantees so that all students would have access to loans. No subsidy would be involved, merely a facilitating function to compensate for the unique properties of human capital. A repayment schedule based on a proportion of the students' future incomes might be a useful but not necessary alternative.

The above provisions are the major policy changes embodied in this proposal. In the following paragraphs specific parameters will be added to flesh out this skeleton. As was the practice in Chapter VI, the "current (financial) patterns--curtailed graduate enrollment" policy assumptions will serve as a base; everything not specifically mentioned below is identical to the base conditions. Largely because of the student aid program but also for purposes of analyzing the sensitivity of other program parameters to enrollment changes, the proposed policy will be examined assuming two alternative conditions: a relatively small student aid program and increase in enrollment, and a

larger student aid program with a substantial increment in total enrollment. The detailed policy assumptions will be dealt with in the following order: (1) federal institutional aid, (2) non-federal institutional aid, and (3) student aid.

Federal institutional aid

Deriving an appropriate formula for federal institutional aid presents many difficulties. Different levels and programs of instruction have different costs, which it would seem appropriate to reflect in the formula. On the other hand, a college or university education is probably best regarded as a joint product arising from many inter-related processes which makes the allocation of costs meaningless and arbitrary. In addition, as more dimensions are included in the formula, the regulatory problems become more severe; institutions have an incentive to classify their students in the higher-paying categories, and some agency must review existing practices to insure that all are being treated equitably. The compromise adopted here is to recognize three levels of instruction—lower division, upper division, and post-baccalaureate—but no program distinctions; a few of the latter might well be included in the actual program. A comparison of the cost data for different levels and types of institutions in Chapter VI led to a choice of an upper division and post-baccalaureate SCH being 1.75 and 2.9 times as costly to produce as a lower division SCH. Using the base data indicated above and the goal of providing 25 percent of cash outlay instructional costs by 1980-81 (with interim targets of about 10 and 20 percent in 1972-73 and 1975-76, respectively), the aid formula presented in Table 23 was derived.

Table 23

Proposed Institutional Aid Per Student Credit Hour from Federal Sources, 1972-73, 1975-76, 1980-81 (1972 dollars)

Year	Level of Student Credit Hour		
	Undergraduate		Post-Baccalaureate
	Lower Division	Upper Division	
1972-73	\$ 6.25	\$10.94	\$18.12
1975-76	12.50	21.88	36.25
1980-81	15.60	27.30	45.24

Non-federal institutional aid

After determining the amount of institutional aid from federal sources, the next step is to choose policy parameters for the traditional sources of funds which are consistent with the change in federal policy. In the public sector it is recommended that state officials choose the following targets with regard to tuition: in the public four-year sector gross tuition and fees should continue to account for 30 percent of general fund receipts, but in the public two-year sector an effort should be made to reduce gross tuition and fees from the present 28 percent to about 25 percent of the general fund budget in order to lower the costs to students of attending community colleges. Local governments should be encouraged to continue to provide 20 percent of the general fund requirements of the public two-year colleges, so as to preserve their influence on the program of these institutions.⁴

⁴Ideally, these local funds should be raised in such a way that equal tax effort would result in equal revenue per person, i.e., the state would play an equalizing role by subsidizing the tax yield in poor districts and/or absorbing a portion of the receipts in the richer districts. For a discussion of such a policy, see John E. Coons, William H. Clune III and Stephen D. Sugarman, Private Wealth and Public Education (Cambridge, Mass: Harvard University Press, 1970).

We will assume that the non-student and nongovernmental funds will continue to account for only a small percentage of the general fund budgets in the public sector, 5 percent in the case of four-year institutions and 3 percent in two-year colleges. Finally, the residual need remaining in the public institutions after all of the above sources are considered should continue to be met by the state government--much as it is now. We would expect this need to be about 40 percent and 25 percent of the general fund budgets of the public four-year and public two-year sectors, respectively, by 1980-81, a considerable drop from current patterns (see Table 15 in Chapter VI).

Institutions in the private sector would receive funds based on the formula in Table 23, but they would receive no other general fund appropriations from public sources. In this case we first assume that other non-tuition sources will fall as a percentage of general fund receipts from about 29 percent in 1969-70 to 20 percent in 1980-81. This appears to be a conservative estimate of the funds available from these sources. Student tuition and fees are the logical choice for the residual category. The expectation, under the proposed policy, would be that these student charges would decline as a percentage of general fund receipts from 70 percent in 1969-70 to 50-55 percent in 1980-81, reflecting the net impact of increased federal aid and a relative decline in "other" sources.

Student aid

We now come to the student aid grants and the two variations mentioned earlier. In both cases student aid from state sources will total the same as in the base, current patterns--curtailed graduate

enrollment, and will be awarded in the same pattern. The difference is limited to federal student aid policies and the associated enrollment projections.

In the first case federal student aid is assumed to be \$41, \$63 and \$100 million in 1972-73, 1975-76 and 1980-81, respectively, as compared to \$26 million in 1970-71 (all figures in 1972-73 dollars). In a fashion similar, but not identical, to that of assigning the supplemental grants in the case of vouchers (see Chapter VI), we assume that the most needy students will tend to continue to enroll in public two-year colleges and the least needy in private institutions. As a result, average aid per SCH in the public two-year and four-year institutions is projected to be 1.8 and 1.4 times, respectively, that of average aid per SCH in the private sector. The public four-year colleges retain more of their attractiveness to low-income students under this policy as compared to vouchers because their tuition costs do not rise so much, as we shall see later. Enrollment is assumed identical to that in the base projection, which may be an underestimate in view of the aid funds being targeted more effectively on the needy.

In the second case the implications of an expanded student aid program accompanied by a large increase in enrollments are explored. Federal student aid is placed at \$61, \$113 and \$200 million in 1972-73, 1975-76 and 1980-81, respectively. The distribution among sectors is assumed to follow the same proportions as outlined in the above paragraph. Undergraduate enrollment exceeds the present policies projection by an amount equal to one-half the difference between the present policies and equal educational opportunity policy projections (see Chapter IV). The relatively lower tuition costs in the private sector

due to the federal institutional aid program cause undergraduate enrollments to grow at an estimated 5 percent per year; the remainder of the undergraduate students are allocated within the public sector using the parameters outlined for the equal educational opportunity policy in Chapter IV. Graduate enrollment is projected to increase at the rate of the present policies projection rather than the "curtailed" rate used in the base; as in Chapter VI, internal consistency is preserved by adopting a policy of a more rapid growth in research and development funds, i.e., 4 percent per year in place of 2 percent per year.

Concluding comments

In summary, the working plan consists of a federal formula for institutional aid which recognizes the different costs associated with different levels of instruction and a federal student aid program targeted directly on students from low-income families. Other traditional sources of funds behave much as they do now, with most of the financial relief flowing from increased federal involvement accruing to the state in the public sector and to students in the private sector. Since enrollment projections are often imprecise even when done with care, the proposed policy is examined under conditions of both a conservative and a liberal forecast of enrollments, which allows us to determine what parameters and burdens are particularly sensitive to changes in enrollment. In the next section these and other matters are presented in detail.

Future Financial Implications

The results of applying the financial requirements model to the proposed policy are displayed in Table 24, accompanied by the results for the other policies examined in Chapter VI in order to facilitate comparisons. More detailed data pertaining to the proposal and its impact on each sector are presented in Table 25 of this chapter; comparable details for the 1969-70 base period are shown in Table 15 in Chapter VI. Note that all figures are in terms of 1972-73 dollars, as was the case in Chapter VI. Using constant value dollars facilitates comparisons over time, but actual expenditures and growth rates in the future must, of course, be greater by a factor sufficient to neutralize the impact of inflation. In the following examination of these data and their implications we will first consider the absolute magnitude of the required resources, then look at the student aid program, and lastly, explore the distribution of costs.

Magnitude of the required resources

The increase in total instructional costs in the case of the conservative enrollment projection ("curtailed enrollment" in Table 24) is identical to that of the first, or base, projection since the enrollments and other cost parameters are identical. Assuming the liberal, or more expansive, enrollment projection raises total costs considerably, \$306 million in 1980-81 (of which \$132 million is an increase in cash outlay costs). But it is important to note that even in this most extreme case, the rate of increase in financial requirements in the second half of the 1970's is comparable to that of real GNP, i.e., about 4 percent per year. This is encouraging for it indicates that

Table 24

The Financial Implications for Michigan Higher Education of Alternative Financing Proposals, Including the Author's Recommendations (1972-73 dollars)

	Current Patterns-				Current Patterns-		
	Base (1969-70)	Curtailed 72-73	Grad. Enroll. 75-76	Enroll. 80-81	Present 72-73	Enroll. Trends 75-76	80-81
Instructional Costs by Source (mil \$)							
Total ^{1/}	1913	2222	2576	2906	2262	2651	3014
Cash Outlay	624	725	854	997	747	888	1038
Students ^{1/}							
Total ^{1/}	1471	1709	1972	2200	1733	2023	2278
Cash Outlay ^{2/}	182	212	250	291	218	260	302
Gross Tuition & Fees	218	254	297	348	260	307	359
Governmental ^{3/}	383	446	525	612	460	547	640
Local	22	28	33	38	28	35	43
State	331	385	455	529	399	474	551
Federal	30	33	37	45	33	38	46
Other	59	67	79	94	69	81	96
Ave. Tuition per Student Credit Hour(SCH):Total(\$) ^{4/}	23.6	25	26	29	25	26	30
Public Four-Year	23.2	24	26	29	25	27	30
Public Two-Year	13.3	14	15	17	14	15	17
Private	40.0	43	45	50	43	45	50
Ave. Student Aid per SCH: Total (\$) ^{5/}	3.9	4.1	4.2	4.8	4.0	4.1	4.7
Public Four-Year	3.7	3.9	4.0	4.6	3.8	3.9	4.4
Public Two-Year	1.6	1.7	1.7	2.0	1.7	1.7	2.1
Private	8.3	8.5	8.7	10.3	8.6	8.9	10.8
General Fund: Total (mil \$) ^{6/}	624	725	854	997	747	888	1038
Public Four-Year	434	496	582	681	516	606	696
Public Two-Year	106	133	160	182	135	170	208
Private	84	96	112	134	96	112	134

Table 24 (cont'd)

	Base (1969-70)	Current Patterns- Curtailed Grad. Enroll.			Current Patterns- Present Enroll. Trends		
		72-73	75-76	80-81	72-73	75-76	80-81
Restricted Fund: Total (mil \$) ^{7/}	179	184	197	221	190	213	260
All Funds: Total (mil \$) ^{8/}	803	909	1051	1218	937	1101	1298
Public Four-Year	605	670	768	888	696	808	941
Public Two-Year	109	137	165	188	139	175	215
Private	89	102	118	142	102	118	142
Headcount Enrollment: Total (1000's)	374	420	465	484	427	482	512
Public Four-Year	208	227	250	263	232	257	269
Public Two-Year	115	138	155	157	140	165	179
Private	51	55	60	64	55	60	64

Table 24 (cont'd)

	Increase Student-Faculty Ratio by 5 Percent			Faculty Salaries Increase By 2% (in place of 3.5%)			Full-Cost Tuition & Vouchers		
	72-73	75-76	80-81	72-73	75-76	80-81	72-73	75-76	80-81
Instructional Costs (mil \$)									
Total ^{1/}	2207	2558	2885	2212	2550	2844	2317	2717	3102
Cash Outlay	710	836	976	715	828	935	763	904	1054
Students ^{1/}									
Total ^{1/}	1703	1966	2194	1705	1964	2180	1804	2113	2396
Cash Outlay ^{2/}	206	244	285	208	242	271	250	300	348
Gross Tuition & Fees	248	291	342	250	289	328	691	819	953
Governmental ^{3/}	437	514	600	440	509	577	446	525	612
Local	27	32	37	27	32	35	—	—	—
State	378	445	518	381	440	497	413	488	567
Federal	32	37	45	32	37	45	33	37	45
Other	67	78	91	67	77	87	67	79	94
Tuition per SCH: Total (\$) ^{4/}	24	25	29	24	25	28	64	68	76
Public Four-Year	24	25	29	24	25	28	77	82	92
Public Two-Year	14	15	16	14	15	16	47	51	57
Private	41	44	50	42	44	47	42	47	55
Stud. Aid per SCH: Total (\$) ^{5/}	4.1	4.2	4.8	4.1	4.2	4.8	41	43	48
Public Four-Year	3.9	4.0	4.6	3.9	4.0	4.6	41	43	50
Public Two-Year	1.7	1.7	2.0	1.7	1.7	2.0	45	47	51
Private	8.5	8.7	10.3	8.5	8.7	10.3	36	37	40
General Fund: Total (mil \$) ^{6/}	710	836	976	715	828	935	763	904	1054
Public Four-Year	486	571	667	490	565	640	527	607	670
Public Two-Year	130	156	178	130	154	169	139	172	202
Private	94	109	131	95	109	126	97	125	182
Restr. Fund: Total (mil \$) ^{7/}	184	197	221	184=	197	221	184	197	221

Table 24 (cont'd)

	Increase Student-Faculty Ratio by 5 Percent			Faculty Salaries Increase By 2% (in place of 3.5%)			Full-Cost Tuition & Vouchers		
	72-73	75-76	80-81	72-73	75-76	80-81	72-73	75-76	80-81
All Funds: Total (mil \$) ^{8/}	894	1033	1197	899	1025	1156	947	1101	1275
Public Four-Year	660	757	874	664	751	847	701	793	877
Public Two-Year	134	161	184	134	159	175	143	177	208
Private	100	115	139	101	115	134	103	131	190
Hdnt. Enroll.: Total (1000's)	420	465	484	420	465	484	438	494	525
Public Four-Year	227	250	263	227	250	263	237	260	264
Public Two-Year	138	155	157	138	155	157	145	167	174
Private	55	60	64	55	60	64	56	67	87

Table 24 (cont'd)

	Increased Federal Aid			Recommended Policy					
	In Existing Pattern			Curtailed Enrollment			Expanded Enrollment		
	72-73	75-76	80-81	72-73	75-76	80-81	72-73	75-76	80-81
Instructional Costs (mil \$)									
Total ^{1/}	2222	2576	2906	2222	2576	2906	2300	2781	3312
Cash Outlay	725	854	997	725	854	997	759	928	1129
Students ^{1/}									
Total ^{1/}	1677	1864	2035	1684	1915	2107	1719	2021	2327
Cash Outlay ^{2/}	180	142	126	187	193	198	178	168	144
Gross Tuition & Fees	243	272	311	242	272	317	253	297	363
Governmental ^{3/}	478	633	777	480	597	732	522	692	909
Local	27	32	35	27	32	36	28	37	49
State	373	424	486	326	311	344	338	320	349
Federal	78	177	256	127	254	352	156	335	511
Other	67	179	94	58	64	67	59	68	76
Tuition per SCH: Total (\$) ^{4/}	23	24	26	23	24	27	24	24	27
Public Four-Year	23	24	27	24	26	29	25	27	30
Public Two-Year	14	14	16	14	14	15	14	14	15
Private	39	39	41	36	33	37	36	33	37
Stud. Aid per SCH: Total (\$) ^{5/}	6.1	11	16	5.3	6.9	10.1	7.0	10.5	16
Public Four-Year	7.5	13	18	4.5	5.9	8.6	6.0	8.9	13
Public Two-Year	2.8	5.9	8.2	5.6	7.8	12.1	8.1	13.1	22
Private	11	18	24	7.8	9.1	12.3	9.2	11.8	17
General Fund: Total (mil \$) ^{6/}	725	854	997	725	854	997	759	928	1129
Public Four-Year	496	582	681	496	582	681	524	622	714
Public Two-Year	133	160	182	133	160	182	139	187	246
Private	96	112	134	96	112	134	96	119	169
Restr. Fund: Total (mil \$) ^{7/}	201	270	336	156	165	182	162	182	222

Table 24 (cont'd)

	Increased Federal Aid In Existing Pattern			Recommended Policy					
	72-73	75-76	80-81	Curtailed Enrollment			Expanded Enrollment		
	72-73	75-76	80-81	72-73	75-76	80-81	72-73	75-76	80-81
All Funds: Total (mil \$) ^{8/}	926	1124	1333	851	1019	1179	921	1110	1351
Public Four-Year	684	822	971	652	747	863	686	804	936
Public Two-Year	136	168	194	133	160	182	139	187	246
Private	106	134	168	96	112	134	96	119	169
Hdent. Enroll.: Total (1000's)	420	465	484	420	465	484	435	508	568
Public Four-Year	227	250	263	227	250	263	235	263	275
Public Two-Year	138	155	157	138	155	157	145	181	212
Private	55	60	64	55	60	64	55	64	81

Table 24 (cont'd)

- 1/ Includes the opportunity cost to students as well as actual cash outlays.
- 2/ Cash outlay is defined as gross tuition and fees minus all student aid funds from state and federal sources.
- 3/ Includes grants to both institutions and students.
- 4/ Gross tuition and fees divided by total student credit hours.
- 5/ Total student aid funds from state and federal sources divided by total student credit hours.
- 6/ Does not include the overhead portion of research and development funds, which is usually placed in this fund.
- 7/ Includes the overhead portion which is usually placed in the "general fund" portion of financial reports. In accordance with usual practice, federal student financial aid funds administered by the colleges are included as part of restricted funds; since a portion of these funds are used by students to pay tuition, the addition of the general and restricted fund figures involves an element of double-counting.
- 8/ General plus restricted funds; note that auxiliary funds, which include such things as food service and dormitory costs, are not included.

the opportunity for higher education can be extended to an increasing proportion of the next generation without a major re-ordering of society's priorities, as was necessary in the 1960's when the "baby boom" generation became of college age. As noted in Chapter VI, the slow-down in the rate of increase will be especially significant if faculty compensation ceases to rise at the pace of the 1960's. Both of the projections for the proposed policy are based on a continuation of the 1960's trend, and may be generous in terms of faculty rewards.

In addition to total costs, we are also interested in the absolute level of support from the various contributors. Comparing the base period of 1969-70 with the proposed policy in Table 24, every source except state government expands its commitment. State outlays remain at approximately the same level throughout the 1970's, with some tendency for a slight decline in the first part of the decade followed by a slow rise. This is in marked contrast to the other alternatives, which imply a continued growth in state costs. Thus, federal intervention along the recommended lines would give major fiscal relief to the state.

The costs to the federal treasury are somewhat dependent on the degree of expansion in enrollments due to the revamped and expanded student aid program. Based on the assumptions of this analysis, reasonable estimates of federal outlays in Michigan are \$125-155 million in the initial year (1972-73 in this case) and \$350-510 million by 1980-81; these are about \$100 million and \$300-450 million more than would be allocated for instructional ends with a continuation of present policies.

Local government obligations would expand in the future much as they have in the recent past. These units would share in the increased costs resulting from expanded enrollments, but their responsibility would be in line with their present relative commitment. Students and the federal and state governments would also be providing support for increases in the size of the community college system.

Student costs, as measured by tuition levels (aid will be considered in a moment), exhibit trends different from those of the other policy alternatives. In the public four-year sector tuition charges increase at a rate identical to that anticipated with a continuation of present policies. The charges do not vary with the level of enrollment since public appropriations alter in response to enrollment changes; the slight increase in tuition in the public four-year sector which occurs in response to the "expanded enrollment" assumption is a result of an increase in the proportion of graduate students, whose education is more costly than that of undergraduates. Student charges in the public two-year colleges are essentially stable under the proposed policy, while they would continue to increase under present policies. But the greatest amount of relief is found in the private sector. The recommended policy would enable private institutions to decrease immediately tuition slightly from present levels and to continue a slow downward trend into the mid-1970's, after which student charges would resume their upward climb. Note, however, that although the decrease is of significant size it still leaves the private sector as the most expensive source of higher education; this would be especially true if graduate students in the public four-year sector pay a higher tuition than undergraduates, so that the average figures in Table 24

are an overstatement of undergraduate charges. In summary, tuition charges under the proposed policy would increase in the public four-year sector, remain stable in the public two-year colleges, and fall slightly in the private sector. Although the public two-year colleges would continue to be the least expensive and private colleges the most expensive, the costs of both would decline relative to those of public four-year institutions. These conclusions are strictly true only for those students not receiving student aid, the topic to which we now turn.

Student aid program

Both the level and the distribution of the aid are important considerations. The decision as to level is easy to understand and its implications are clear. Either of the two variations of the proposed policy represent a significantly larger commitment to student aid than would be expected from an extrapolation of current policies. On the other hand, neither even approaches the scale of the grants under a voucher scheme where essentially all public funds for instruction are funneled through students. The distribution of student aid funds is a more subtle question and one which is not understood by many. As was mentioned earlier and is clearly shown in Table 24, present practices tend to direct the aid towards students in private colleges to the greatest degree, to those in public four-year colleges to a somewhat lesser degree, and to community college students least of all—despite the tendency for low-income students to be in attendance in the reverse order. The recommended policy would match federal aid much more closely with needy students, resulting in a much improved position for

the low-income community college student. If one subtracts the aid figures from the tuition charges, the result shows that the student aid program does not change the ranking of the sectors with regard to student costs, private colleges being most expensive and public two-year least expensive. Finally, it is well to remind ourselves that the state student aid programs would continue to operate as they do now, giving preference to a combination of academic ability and financial need through the state scholarship program and to students in the private sector through the tuition grant program (see Chapter V).

Distribution of costs

Students continue, on the average, to pay the bulk of instructional costs, although the expanded federal student aid program tends to reduce this percentage a few points from its present mid-70's range. This slight decrease seems appropriate, for the low-income students receiving the aid are not, and should not be, expected to pay as high a percentage of their costs as more well-to-do students. The average is once again misleading, of course. The higher income students with no aid would probably be bearing close to 80 percent of the total costs of their education, while the percentage would fall as the students' available resources fell and the size of their aid increased. This proposal leaves the higher-income student in much the same position as he currently occupies, and offers significant help to those from disadvantaged backgrounds. Implicit in this proposal and current policies is an assumption that the well-to-do student is the major beneficiary of his education and he should bear most of the costs (over three-fourths), but that significant public good is also derived from

increasing the level of education which should be encouraged by public funds—especially in the case of lower-income citizens. The belief that greater public benefit accrues from the education of lower-income people is based on a variety of assumptions, each of which is accepted by some and rejected by others. Examples of such underlying assumptions are: 1) the marginal utility of income is greater for low-income than high-income people, so transfers result in a benefit to the former which exceeds the cost to the latter; 2) higher income people are distressed by the relative poverty of others, so a transfer yields a benefit to both parties; 3) education is a human right, just as is legal justice, and the state has a responsibility to see that such rights are furnished to those who could not otherwise afford them.

Students do not financially dominate the institutions of higher education within the framework of this proposal, as they do in the context of a voucher scheme. As a percentage of cash outlay costs for instruction, their contribution in the form of tuition and fees is about 32 percent—certainly enough to enable appreciable leverage but not sufficient to drown out other voices. A major theme running throughout this study is the importance of the pattern of financial support of higher education, with the author preferring pluralism rather than domination by any one influence. The proposed policy reflects this concern; Table 25 contains a more detailed examination of the recommended policy.

The first thing to note is that the distribution of support differs by sector, reflecting a healthy diversity which has been characteristic of United States higher education. On the other hand, no sector is completely dominated by a single source. Another important

Table 25

Detailed Financial Implications for Michigan Higher Education of the Recommended Policy
(millions of 1972-73 dollars)

Sector	Curtailed Enrollment						Expanded Enrollment					
	1972-73		1975-76		1980-81		1972-73		1975-76		1980-81	
	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%
Public Four-Year: Total	652	n.a.	747	n.a.	863	n.a.	686	n.a.	804	n.a.	936	n.a.
General Fund: Total ^{1/}	496	100	582	100	681	100	524	100	622	100	714	100
Tuition: Total	148	30	174	30	203	30	157	30	188	30	214	30
Gross per SCH ^{2/}	24.1	n.a.	25.7	n.a.	28.9	n.a.	24.9	n.a.	27.0	n.a.	30.3	n.a.
Net: Total ^{3/}	120	(24)	134	(23)	143	(21)	119	(23)	126	(20)	121	(17)
Net per SCH ^{2/}	19.5	n.a.	19.8	n.a.	20.4	n.a.	18.9	n.a.	18.1	n.a.	17.1	n.a.
Federal ^{4/}	56	11	124	21	166	24	64	12	147	24	199	28
State ^{4/}	262	53	249	43	278	41	272	52	250	40	265	37
Other	30	6	35	6	34	5	31	6	37	6	36	5
Restricted Fund: Total ^{5/}	156	100	165	100	182	100	162	100	182	100	222	100
Federal	105	68	112	68	123	68	110	68	123	68	151	68
State	14	9	14	9	16	9	14	9	16	9	19	9
Private	30	19	32	19	35	19	31	19	35	19	42	19
Other	7	4	7	4	8	4	7	4	8	4	10	4
Public Two-Year: Total	133	n.a.	160	n.a.	182	n.a.	139	n.a.	187	n.a.	246	n.a.
General Fund: Total	133	100	160	100	182	100	139	100	187	100	246	100
Tuition: Total	36	27	40	25	46	25	38	27	47	25	62	25
Gross per SCH ^{2/}	14	n.a.	14	n.a.	15	n.a.	14	n.a.	14	n.a.	15	n.a.
Net: Total ^{3/}	21	(16)	17	(11)	10	(5)	16	(12)	2	(1)	-25	—
Net per SCH ^{2/}	8	n.a.	6	n.a.	3	n.a.	6	n.a.	0.6	n.a.	-6	n.a.
Federal ^{4/}	16	12	37	23	47	26	17	12	43	23	63	26
State ^{4/}	50	38	46	29	47	26	52	38	54	29	65	26
Local	27	20	32	20	36	20	28	20	37	20	49	20
Other	4	3	5	3	6	3	4	3	6	3	7	3
Restricted Fund: Total	—	—	—	—	—	—	—	—	—	—	—	—

Table 25 (cont'd)

Sector	Curtailed Enrollment						Expanded Enrollment					
	1972-73		1975-76		1980-81		1972-73		1975-76		1980-81	
	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%
Private: Total	96	n.a.	112	n.a.	134	n.a.	96	n.a.	119	n.a.	169	n.a.
General Fund: Total	96	100	112	100	134	100	96	100	119	100	169	100
Tuition: Total	58	60	58	52	68	51	58	60	62	52	87	51
Gross per SCH ^{2/}	36	n.a.	33	n.a.	37	n.a.	36	n.a.	33	n.a.	37	n.a.
Net: Total ^{3/}	46	(48)	42	(38)	45	(34)	43	(45)	40	(34)	48	(28)
Net per SCH ^{2/}	29	n.a.	24	n.a.	24	n.a.	27	n.a.	22	n.a.	20	n.a.
Federal ^{4/}	14	15	30	27	39	29	14	15	32	27	49	29
Private	18	19	18	16	20	15	18	19	19	16	25	15
Other	6	6	6	5	7	5	6	6	6	5	8	5
Restricted Fund: Total	—	—	—	—	—	—	—	—	—	—	—	—

n.a. indicates "not applicable"

^{1/} Does not include the overhead portion of research and development funds, which is usually placed in this fund.

^{2/} SCH refers to "student credit hour."

^{3/} Net tuition is defined as gross tuition and fees minus all student aid funds from state and federal sources.

^{4/} Does not include grants made directly to students.

^{5/} Includes the overhead portion which is usually placed in the general fund.

point concerning the general pattern is the high degree of stability in the face of enrollment changes, i.e., this policy would share the burden of unexpected, or expected, increases in enrollment among all of the funding agents rather than placing the entire load on one or two participants.

The state continues to be the major supporter of public four-year institutions, but part of its responsibility is gradually shifted to the federal government. Student tuition charges continue to provide 30 percent of the general fund receipts, with only minor amounts coming from sources other than these three. The instructional program of these colleges would still be dependent on student and state support, as is true now, but the federal government would also be expected to have an influence in the form of criteria associated with its aid.

Public two-year colleges would receive major support from four sources, one more than in either of the other two sectors. Receipts from student tuition decline slightly, in relative terms, to about 25 percent of the general fund, in accord with the policy objectives of keeping tuition charges low in this sector. Local sources continue to provide 20 percent of the budget, which is also a "target" figure in the proposed policy. As was true in the public four-year sector, the major change is a shift of a portion of the state burden to the federal government; by 1980-81 each level of government contributes an equal share, 26 percent of general fund monies. Thus, to the degree that budgets do reflect influence, these local colleges would find themselves responding to the needs of their students and three levels of government--local, state and federal. One would hope that the local component would be sufficiently strong to produce in these institutions a

responsiveness to local problems and people not normally expected or found in the four-year colleges, public or private.

The private sector exhibits a distinctly different pattern, in keeping with its important tradition of providing a home for endeavors which may lack broad public support. The bulk of the funds would still come from students and other private groups, e.g., 51 percent and 20 percent, respectively, in 1980-81. This should, it is hoped, be sufficient to insure that special interest groups now exerting a major influence on these institutions will continue to be the dominant force. For example, religious groups would still have a special, close relationship with some institutions and those students looking for a good liberal arts education in a small college atmosphere would continue to be able to find such an experience. The balance of the funds, 29 percent in 1980-81, originate with the federal government. These federal dollars will help to reduce the cost to special interest groups of realizing their preference, but will undoubtedly carry restrictions which will limit the recipients to some extent. Exactly how this trade-off would be resolved is impossible to foresee, but the author hopes it would be in the direction of continued, and even expanded, diversity in private colleges due to relatively lower student costs (as compared to other colleges in the system) and few federal restrictions.

Summary

The proposed policy for the financing of higher education strives for a balance between providing a service to existing society and being a stimulus for change. It would be incorrect to look upon the desired neutrality as derived from a detachment from society. A more accurate

view would be one of higher education as the focus of a variety of forces, some strong and others weak, but none sufficiently powerful to dictate policy. The situation is like that of a satellite in a stationary orbit above a point on the earth's surface, whose apparent stability is the result of a carefully balanced set of forces.

Each sector receives support from a variety of sources, each with its own viewpoint of the world and its problems. In addition, and equally important, the pattern of financing differs from one sector to another. This plan would not destroy, but instead encourage, diversity among our colleges and universities.

The federal government retains its central role in the promotion of research and development and expands its commitment to instruction. All federal student aid programs are combined into one grant program which would focus on aiding low-income students directly, rather than through the colleges. A non-subsidized loan program would be available to all who required additional funds for their education. Institutions, both public and private, would receive aid on a formula basis recognizing differences in levels—and possibly fields—of instruction.

State and local governments would continue to have a major responsibility for recognizing and supporting good instructional programs in the public colleges. Their functions would change very little with the adoption of the proposed policy, although the federal institutional aid would provide a significant measure of fiscal relief to the state.

The bulk of the costs of instruction, 70 percent or more (including opportunity costs), would be borne by students, just as they are now. Students would be an important source of cash funds in all sectors, but they—in combination with other private interests—would

be most dominant in the private colleges. The private sector would remain distinct in its distribution of financial support, as well as in other dimensions such as governance.

Students from higher-income families would find themselves facing an array of tuition costs much like the present one, except for a slight decline in the relative cost of public two-year and private colleges. Low-income students would have an increased probability of receiving aid and a great deal of latitude as to where they used it.

Chapter VIII

Summary

The research on the financing of higher education which is the basis for this report had three prime objectives:

- 1) Identify the relationships between the goals recommended for higher education and the alternative methods of finance.
- 2) Develop a model which specifies in quantitative terms the causal links between the physical variables of primary concern.
- 3) Evaluate several policy alternatives in order to assist those who are making public policy decisions and to demonstrate the use of the frameworks developed under objectives 1) and 2).

The major results of the analysis are summarized in this chapter.

American higher education must be understood in dynamic, rather than static, terms. The first institutions represented attempts to copy English colleges. Education in this period was not to focus narrowly on the intellect but on the whole person, which was accomplished best in residential colleges. The curriculum, consisting primarily of the classical languages and literatures, was designed to develop men who would preserve culture—not reconstruct society. The English-based model, although challenged, dominated the scene until the Civil War, a period of approximately 200 years. The other important foreign influence, the German university, rose in importance throughout the 1800's. This model centered on a concept of the university as a place where truth would be pursued through original scientific investigation by free agents.

Neither the English nor German influence was transplanted without change, however. Ideals distinctly American in their origin gained increasing importance in the nineteenth and twentieth centuries. American higher education is more democratic, both in its large student body from diverse backgrounds and its wide-ranging curriculum. The American college or university is more dedicated to service to society; those expecting, and often obtaining, service range from small farmers to corporate heads, from county commissioners to the President. In most cases the growth in the scope and magnitude of higher education in this country has come in response to external pressures from a wide variety of sources, with little attention paid to broader issues. The resulting lack of a comprehensive philosophy or understanding as to the proper role of higher education is at the root of the present crisis in higher education, which encompasses financial concerns as well as many other dimensions.

The main points of view differ in many respects, but disagreements related to the role of the higher education community as critics of society appear to be at the core of much of the conflict. Many people expect the colleges and universities to facilitate the endeavors of others, not criticize them. The important decisions concerning the goals of education should be left to those with economic power, political power, the faculty or students—depending on the values of the particular writer. A different group maintains that a detached pursuit of knowledge leads to the best formulation of problems and solutions; they argue the aim of those in higher education should be to insulate themselves as much as possible from the contemporary concerns of mankind. Others urge those in higher education to be active

critics of society, maintaining a careful balance between responding to the wishes of those served and simultaneously offering advice as to alternative goals and means. Finally, there are those who believe that the higher education community, both individuals and institutions, should play a leading role in overthrowing existing centers of power.

The importance of giving careful consideration to these differences in role orientation is that many organizational and financial implications flow from each. Those who expect higher education to assume a passive role of responding to the needs of individuals and other institutions tend to favor clearly defined, responsive linkages between higher education and those to be served. Such linkages insure that a lack of responsiveness on the part of educational institutions is met by a cut-off in support so severe that the institutions must adjust quickly if they are to survive. The people who prefer that higher education maintain a detached perspective abhor linkages such as the above; ideally, they favor sources of funds completely within institutional control such as endowment funds, but where this is impossible they tend to favor a diverse set of sources so no one influence can dominate. Such diversity is also supported by those who urge higher education to play a critical role, as a means of insuring that higher education be relevant to current problems while limiting the power of any single force to retaliate. Those who argue that higher education serve a counter-culture find it difficult to identify a viable system of finance, but they do condemn the use of funds from established powers such as corporate business and many of the action agencies within the federal government.

While essential, knowledge of the relationships between the goals of higher education and the alternative methods of finance is not adequate for planning purposes. A framework, i.e., model, is needed which allows decision makers to estimate the resource requirements of alternative goal (policy) choices.

Statistical analysis of aggregate undergraduate and graduate (analyzed separately) enrollments in Michigan over the last two decades indicates that changes are associated with variations in the college-age population, number of people discharged from the Armed Services, income, and unemployment. Projections based in part on the statistically estimated parameters and in part on supplementary policy assumptions indicate that substantial differences in enrollment can be expected as a result of variations in economic growth and higher education policy. However, there is very strong evidence that the growth in undergraduate, and to a large extent total, enrollments will slow to a very small rate by the late 1970's.

Using the results of the analysis of aggregate undergraduate enrollments plus much more detailed data for a shorter period (six years, 1965/66-70/71), the impacts of tuition and student aid variables on enrollments were investigated. Increases in tuition at the public four-year institutions did appear to have a negative impact on enrollments; the evidence was inconclusive elsewhere. The two student aid programs administered by the State of Michigan, which both award grants to students who then have considerable flexibility with regard to their choice of college, did appear to be affecting enrollment patterns and possibly levels. There is very little evidence, however, that federal student aid programs had an impact on enrollments. The

federal funds are given to colleges which are responsible for selecting recipients. In the case of two universities it seems probable that students receiving federal aid replace other students, with the result that enrollment in each university is unaffected but total enrollment in higher education may increase. This "bumping" may also be occurring in other institutions; it was impossible to determine the scale of such displacement with this analytic model. In the author's judgment, the analytic results imply that in many instances financial aid officers in the colleges are primarily making awards to students who would remain in attendance without benefit of such aid.

The final modeling effort required before policy alternatives could be analyzed was the development of a rather simple framework which enables estimates of future financial requirements to be computed, assuming alternative public policies and enrollments. After first converting the headcount enrollment figures to student credit hours, the required number of faculty and total faculty compensation are calculated. The remainder of the budget, except for research and development monies, is also based on the enrollment estimate but no particular quantities or prices are identified. The estimate can be modified to reflect alternative policies concerning changes in the student-faculty ratio, faculty compensation, mix of institutions with respect to size, relative program emphasis, and many other factors.

Turning to the policy implications, there are strong indications that the rate of increase in total financial requirements in the remainder of the 1970's will be quite comparable to the rate of growth in the economy, as opposed to the 1960's when higher education consumed an ever increasing fraction of the gross national product. An

examination of two of the most common approaches to cost-cutting yields estimates that 1) increasing the student-faculty ratio by 5 percent would reduce cash outlay costs of instruction by 2.1 percent and 2) a decrease of 1.5 percentage points (from 3.5 to 2.0 percent) in the annual growth of faculty compensation would reduce cash outlay costs of instruction by 3 and 6 percent in 1975-76 and 1980-81, respectively.

Students, as a whole, will continue to bear the great majority (slightly over three-quarters) of the total costs—including opportunity costs—associated with their education, although rather massive amounts of student aid would reduce this slightly. This is not often realized or remembered due to the excessive emphasis on cash outlay costs, to which students contribute 29 percent of the total. If present policies are continued, tuition charges will rise at a moderate but persistent rate of about 2-3 percent per year. Adoption of a full-cost tuition and vouchers policy would raise tuition levels by more than a factor of three in the public sector. Considering the vouchers as well as the tuition charges, the average student in the public sector is likely to experience a much larger net charge while those in private institutions would have much lower net costs; although still having the lowest net cost in terms of tuition minus the value of the voucher for the average student, those in public two-year colleges gain less than those in the private sector. Expansion of existing federal student aid programs with the addition of a "cost of education" grant directly to the institution would benefit private institutions and their students most, public two-year colleges and students least, with public four-year institutions and students in an intermediate position.

Increasing the growth rate of research and development funds by 2 percentage points (assuming 4 rather than 2 percent per year, both of which are higher than recent rates) yields an extra \$16 million in 1975-76 and \$39 million in 1980-81 for these purposes in Michigan higher education.

The author recommends a system in which financial support comes from a variety of sources. The aim is, on the one hand, to keep the higher education community cognizant of a wide range of current and future problems while, on the other hand, to insure that no single outside force is sufficiently powerful to dictate higher education policy.

APPENDICES

Appendix A

Data Base For The Aggregate Demand Model

Appendix A contains all data used in the estimation of the parameters of the aggregate demand model presented in Table 2 of the text. The data are accompanied by a detailed listing of the sources and a comment by the author as to their characteristics.

Table 26

Fall Headcount Enrollment in Michigan by Student Level and Type of Institution, 1951-71

Year	Public Four-Year			Public Two- Year	Private			All Institutions		
	Under- grad	Grad- uate	Total		Under- grad	Grad- uate	Total	Under- grad	Grad- uate	Total
1959	54,395	14,311	68,706	4,900	21,536	1,593	23,129	80,831	15,904	96,735
1952	54,834	14,661	69,495	6,854	21,367	1,589	22,956	83,055	16,250	99,305
1953	56,600	14,958	71,558	8,102	21,766	1,598	23,364	86,468	16,556	103,024
1954	61,439	16,097	77,536	9,739	24,000	1,773	25,773	95,178	17,870	113,048
1955	68,642	17,239	85,881	13,652	26,857	1,911	28,768	109,151	19,150	128,301
1956	75,046	19,687	94,733	16,176	28,227	1,816	30,043	119,449	21,503	140,952
1957	78,165	21,473	99,638	19,837	28,999	1,929	30,928	127,001	23,402	150,403
1958	78,447	23,525	101,972	22,784	30,541	2,251	32,792	131,772	25,776	157,548
1959	78,789	24,274	103,063	24,592	31,763	2,350	34,113	135,144	26,624	161,768
1960	80,653	27,005	107,658	27,229	34,065	2,333	36,398	141,947	29,338	171,285
1961	83,290	28,792	112,082	31,619	35,184	3,094	38,278	150,093	31,886	181,979
1962	89,374	30,560	119,834	34,356	36,436	3,264	39,700	160,066	33,824	193,890
1963	97,023	32,090	129,113	38,001	37,015	3,596	40,611	172,039	35,686	207,725
1964	107,528	35,586	143,114	46,123	39,697	3,775	43,472	193,348	39,361	232,709
1965	122,632	39,680	162,312	58,216	43,766	4,130	47,896	224,614	43,810	268,424
1966	132,677	43,810	176,487	69,496	45,060	4,402	49,462	247,233	48,212	295,445
1967	141,203	46,505	187,708	79,698	45,979	4,482 ^{1/}	50,461	266,880	50,987	317,867
1968	149,841	48,578	198,419	95,065	46,297	4,480 ^{1/}	50,777	291,203	53,058	344,261
1969	158,639	49,684	208,323	115,299	46,282	4,477	50,759	320,220	54,161	374,381
1970	164,525	53,277	217,802	125,553	47,861	4,487	52,348	337,939	57,764	395,703
1971	169,080	51,085	220,165	132,059	48,039	4,889	52,928	349,178	55,974	405,152

^{1/} Estimate

Table 26 (cont'd)

Sources

1969-71, ALL CATEGORIES: Michigan Department of Education, "Analysis of Opening Fall Enrollment of Resident and Extension Students at Colleges and Universities in Michigan, Headcount Basis, by Type of Institution, 1967-1971," 1971; undergraduate and graduate enrollments obtained from unpublished data collected by the Higher Education Planning and Coordination Services, Michigan Department of Education.

1968, ALL CATEGORIES: Michigan Department of Education, Enrollments in Michigan Colleges and Universities, Fall 1968, 1969.

1960-67, ALL CATEGORIES: Michigan Department of Education, A Report on Enrollments in Michigan Colleges and Universities, June 1968.

1951-59, PUBLIC FOUR-YEAR: Michigan Council of State College Presidents, Historical Enrollment Counts for Council Institutions 1950-51 to 1964-65, (Lansing, Michigan), April 1966.

1951-59, PUBLIC TWO-YEAR: Michigan Department of Public Instruction, Biennial Report of the Superintendent of Public Instruction, all issues during the 1952-61 period.

1951-59, PRIVATE: Michigan Department of Public Instruction, Biennial Report of the Superintendent of Public Instruction, all issues during the 1952-61 period; Michigan Association of Collegiate Registrars and Admissions Officers (MACRAO), MACRAO Enrollment Report for the years 1955-59. It was necessary to subtract the enrollments in some of the proprietary schools in order to make the 1951-59 series consistent with the 1960-69 data. Missing observations were completed by referring to either MACRAO or U.S. Office of Education data. The procedure used to separate graduate and undergraduate enrollments in the private sector for 1951-59 is as follows: The Biennial Reports were the source of total enrollment for all years. Graduate enrollments in 1955-59 were obtained from the MACRAO Report by subtracting undergraduate enrollment from total enrollment; the undergraduate enrollment in the above table was then obtained by subtracting the MACRAO graduate enrollment from the total enrollment figure in the Biennial Report. The rationale for this approach is that the Biennial Report contains no breakdown by level and that the MACRAO figures for graduate enrollment are likely to be more consistent with our intent of including both degree and non-degree credit enrollments than the MACRAO figures for undergraduate enrollment, i.e., probably few, if any, graduate students enrolled in private institutions were excluded from the MACRAO count by virtue of being enrolled in courses for which credit toward a degree was not normally granted. No figures for enrollment by graduate and undergraduate level are available for the private sector during 1951-54. Thus, it was necessary to extrapolate in this period using the observed values in 1955-59; to the degree that the relative percentage of graduate and undergraduate students changed in this period there will be some error.

Table 26 (cont'd)

1951-59, ALL INSTITUTIONS: Calculated by summing public four-year, public two-year and private.

Discussion of the Data in Table 26

The figures for all categories in the 1960-71 period appear to be quite accurate and consistent. The data for the public four-year institutions in the 1951-59 period also seem to be good, having undergone scrutiny by the institutions themselves as well as by a central collecting agency. Thus, the bulk of the data is very reliable since the public four-year colleges contained over 60 percent of the students in the 1951-59 period.

The public two-year enrollment figures prior to 1960 have not been submitted to the same degree of review as those of the public four-year institutions. However, they appear to be quite good. These figures tend to be slightly higher than those recorded by the Michigan Association of Collegiate Registrars and Admissions Officers (MACRAO), but this is to be expected since the MACRAO figures include "only students enrolled in courses for which credit toward a degree is normally granted." The MACRAO series extends only as far back as 1955.

The figures for enrollments in the private colleges in 1951-59 are probably reasonably accurate, although to a lesser degree than the public sector data. The weaknesses are quite obvious from the explanation of sources and derivation given earlier. Since total state enrollment is the variable which was used in the estimating procedure and the private sector contained less than one-fourth of total enrollment, small errors in this series are not particularly worrisome.

Table 27

Sum Of Public And Private Enrollments In Michigan Primary and Secondary Schools by Grades For Selected Years, 1933-67

Year	Grade					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
1933	104,114	96,742	96,741	97,344	93,212	91,306
1934	102,549	98,893	96,790	97,177	97,457	92,781
1935	102,560	93,914	95,748	95,479	95,914	95,172
1936	102,229	94,348	92,428	94,540	94,492	94,240
1937	99,631	94,806	93,090	92,409	93,924	93,213
1938	95,291	91,103	92,520	91,868	91,046	92,172
1939	91,998	88,173	89,425	91,219	91,018	89,800
1940	93,978	85,576	86,644	88,964	90,354	89,759
1941	97,704	87,518	84,180	85,997	87,997	88,711
1942	99,941	91,180	85,785	83,310	84,610	90,776
1943	105,103	94,152	90,959	86,144	83,908	85,034
1944	110,649	96,627	92,461	89,269	84,285	81,953
1945	108,816	100,867	94,072	90,064	86,665	82,089
1946	111,319	100,152	98,476	92,067	87,937	85,152
1947	118,830	103,082	98,782	97,166	90,596	87,140
1948	132,140	109,948	101,578	96,899	95,810	89,456
1949	133,540	124,440	109,119	101,759	97,283	96,045
1950	122,452	126,839	121,589	107,579	100,056	95,991
1951	123,372	117,874	126,213	121,040	107,380	99,838
1952	146,366	117,835	116,509	124,328	119,048	105,523
1953	171,413	140,331	118,149	117,359	125,395	119,840
1954	169,143	164,587	139,527	118,868	117,429	125,591
1955	173,688	162,365	163,508	138,578	118,412	117,475
1956	176,611	164,713	161,104	161,470	137,089	117,627
1957	185,329	165,983	161,645	157,898	158,584	134,830
1958	188,271	173,900	162,465	157,934	154,830	155,856
1959	188,988	177,711	170,670	159,285	155,446	152,638
1960	195,300	178,971	175,547	167,940	157,688	153,408
1961	198,006	185,262	176,375	173,340	166,304	156,199
1962	204,054	188,273	183,393	175,212	171,451	165,169

Table 27 (cont'd)

<u>Year</u>	<u>Grade</u>					
	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
1939	91,673	90,410	84,336	76,684	63,954	57,212
1940	89,700	88,909	82,692	75,243	64,870	56,923
1941	89,368	86,160	80,350	72,189	62,010	56,123
1942	87,869	84,293	77,372	67,573	54,931	50,901
1943	87,140	85,732	76,503	65,376	54,578	45,331
1944	84,058	83,145	78,131	67,088	53,821	45,877
1945	81,545	79,849	76,047	69,405	57,023	47,788
1946	81,795	77,688	73,370	67,889	59,276	52,536
1947	85,235	78,797	73,431	65,800	58,512	53,865
1948	87,286	82,332	75,069	66,682	57,400	53,299
1949	91,197	86,014	80,141	68,958	59,043	54,121
1950	95,560	87,869	80,989	70,373	58,328	52,075
1951	96,906	93,142	84,154	73,666	62,597	53,436
1952	98,770	92,958	87,834	74,643	62,798	56,115
1953	107,302	98,044	90,213	81,488	65,934	57,802
1954	121,261	105,311	95,236	83,077	71,992	60,974
1955	126,874	119,263	102,098	87,577	72,833	66,168
1956	118,435	123,951	115,215	94,733	77,318	66,586
1957	118,151	114,876	120,913	107,836	84,968	70,835
1958	134,476	114,211	111,337	112,842	96,736	77,813
1959	155,581	130,940	110,658	103,308	99,586	88,270
1960	153,810	152,325	128,079	104,830	93,580	92,888
1961	154,638	150,488	150,654	122,535	95,803	86,532
1962	158,595	152,456	146,167	140,695	111,425	88,502
1963	166,745	157,191	153,889	149,439	138,647	106,582
1964	168,973	161,376	154,135	149,336	135,074	126,255
1965	173,245	168,829	163,532	155,218	138,004	125,469
1966	181,806	174,543	171,744	164,240	143,863	128,191
1967	185,761	179,484	173,150	170,283	151,211	131,631

Sources

ALL PUBLIC SCHOOL DATA: "Enrollments By Grades For Selected Years,"
Bureau of Administrative Services, Department of Education.

1964-67, PRIVATE: Bureau of Research, Michigan Department of Education.

1949-63, PRIVATE: Michigan Department of Public Instruction, Biennial Report of the Superintendent of Public Instruction, all issues in the 1950-64 period.

Table 27 (cont'd)

Derivation of total enrollment in 1933-48:

Since there is no data by grade for the private sector prior to 1949, it was necessary to estimate the sum of the public and private from the public school data. Using data available in the Bureau of Research on the total enrollment in the private system in selected years prior to 1950, it was determined that the private enrollment was a slowly increasing proportion of the public enrollment.

A slight complicating factor is the apparent practice of many students taking their first eight years of schooling in the private sector and then transferring to the public system for grades nine through twelve. This manifests itself in the data as a drop in the proportion of private to public students after the eighth grade. It is assumed that the factors used to convert the public school data to an estimate of total enrollment.

<u>Year</u>	<u>Grade</u>	
	<u>1-8</u>	<u>9-12</u>
1933-42	1.18	1.135
1943-46	1.19	1.145
1947-48	1.20	1.155

Discussion of the Data in Table 27

Including private enrollment is very important because of the recent decline in the percentage of students in the private sector; if this percentage was constant and was expected to remain constant, public school enrollment would have exactly the same predictive powers as total enrollment when the regression technique is used. However, in present circumstances a model including only public school enrollments would contain a misleading upward trend attributable to a transfer of students from the private to the public sector.

These data are probably an accurate measure of year-to-year variation. However, they are inconsistent with the population data which casts some doubt on the general level of the figures. This point is covered in greater detail in the discussion of the population data in Table 28.

Table 28

Michigan Population By Single Years of Age for Ages 0-5 For Selected Years, 1930-56

Year	Age					
	0	1	2	3	4	5
1930	88,909	89,251	94,753	96,141		
1931	85,243	89,897	94,155	95,740	96,141	
1932	79,110	86,190	94,836	95,136	95,740	99,114
1933	74,581	79,989	90,925	95,824	95,136	98,701
1934	73,992	75,410	84,384	91,873	95,824	98,078
1935	77,106	74,814	79,553	85,263	91,873	98,788
1936	78,687	77,963	78,924	80,382	85,263	94,714
1937	81,010	80,016	82,247	79,747	80,382	87,900
1938	84,838	81,911	84,413	83,104	79,747	82,868
1939	86,127	85,780	86,412	85,292	83,104	82,213
1940	87,092	87,084	90,493	87,312	85,292	85,674
1941	92,972	88,060	91,869	91,436	87,312	87,930
1942	104,205	94,005	92,898	92,826	91,436	90,012
1943	113,526	106,520	99,170	93,866	92,826	94,264
1944	108,758	114,774	111,152	100,203	93,866	95,697
1945	103,566	111,148	119,764	112,310	100,203	96,769
1946	115,059	104,692	114,733	121,011	112,310	103,302
1947	138,964	117,560	108,069	115,929	121,011	115,783
1948	146,010	140,459	120,061	109,195	115,929	124,754
1949	145,792	149,150	143,447	121,312	109,195	119,514
1950	148,766	147,343	150,720	144,941	121,312	112,572
1951	156,278	150,349	148,894	152,290	144,941	125,064
1952	166,386	159,603	151,932	150,445	152,290	149,424
1953	171,382	168,137	159,603	153,514	150,445	157,000
1954	178,159	173,186	168,137	161,265	153,514	155,098
1955	184,489	180,035	173,186	169,889	161,265	158,262
1956						166,253

Sources

Michigan Department of Public Health, Michigan Population Handbook 1965, November 1965.

U.S. Department of Commerce, Census Reports for 1930, 1940, 1950 and 1960, Bureau of the Census.

Table 28 (cont'd)

Derivation

Data on the population by single years of age are published for only the census years. Thus, it was necessary to do a great deal of interpolating using the number of live births to estimate the above data. The figures in the above table should be regarded as approximate indicators of the general level of population and not as "exact" in any sense of the word.

In order to estimate the potential number of 0 year-olds on July 1 (to correspond with census estimates) in year t , the number of live births in year $t-1$ plus the number of live births in year t is divided by 2. This number is the basic figure from which all survival ratios are calculated using census data, i.e., the number of 0 year-olds is compared with the potential number in the current year, the number of 1 year-olds with the potential number of 0 year-olds in the previous year, etc. The following survival ratios are the result of this exercise.

<u>Year</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1930-42	.90	.91	.96	.97	.97	1.00
1943-44	.91	.92	.96	.97	.97	1.00
1945-46	.92	.93	.96	.97	.97	1.00
1947-48	.93	.94	.96	.97	.97	1.00
1949-51	.94	.95	.96	.97	.97	1.00
1952-55	.95	.96	.96	.97	.97	1.00
1956	.96	.97	.97	.97	.97	1.00

Two factors appear to be implicit in the above pattern: 1) declining infant mortality and 2) declining importance of in-migration. Both of these are reasonable trends.

Discussion of the Data in Table 28

The author considers this set of data to be the weakest link in the chain of support for the analysis. This conclusion stems not only from the method of derivation, but also from certain tests of consistency with the data on enrollments by grade.

The problem in the data appears to be one of the general level of the figures and not one of faulty year-to-year variation. In 1940 census figures indicate there were 78,286 six year-olds while enrollment figures showed 93,978 students in the first grade; in 1950 the respective figures are 118,365 and 122,452; in 1960 the respective figures are 181,638 and 195,300. To the degree that the census figures and/or the enrollment figures err in a consistent percentage fashion, the predictive power of a regression model will not be affected. However, a fluctuating or changing percentage of coverage might have significant effects.

Taking a more optimistic view, the data on population by single years of age are used only in developing the long-term projections, i.e., for 1982 and beyond. These long-term projections should be interpreted only as very general indications of level; for this purpose we might be willing to tolerate a greater degree of error in the data than we would in the short and intermediate-term.

Table 29

Apparent Size of the Armed Forces,* 1943-70 (thousands)

1943	9,240
1944	11,689
1945	12,355
1946	3,004
1947	1,560
1948	1,463
1949	1,610
1950	1,572
1951	2,384
1952	2,498
1953	3,543
1954	3,436
1955	3,209
1956	2,916
1957	2,821
1958	2,671
1959	2,616
1960	2,536
1961	2,546
1962	2,851
1963	2,732
1964	2,726
1965	2,711
1966	2,905
1967	3,380
1968	3,449
1969	3,472
1970	3,386

* Total population including Armed Forces overseas minus civilian resident population.

Sources: 1943-49 figures are for July 1 and are calculated from U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 223.

1950-70 figures are for January 1 and are calculated from U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 439.

Table 30

Discharges from the Armed Forces, Fiscal Years 1946-70 (thousands)

1946	9,000
1947	1,700
1948	600
1949	390
1950	430
1951	240
1952	710
1953	1,140
1954	1,000
1955	1,160
1956	800
1957	670
1958	730
1959	620
1960	530
1961	500
1962	470
1963	620
1964	610
1965	540
1966	550
1967	600
1968	810
1969	1,000
1970	over 1,000*

* Opinion of Clayton Thompson

Source: Unpublished data from the Department of Defense; obtained 1946-67 from Dr. Harvey Galper and 1968-70 from Mr. Clayton Thompson.

Table 31

Selected Economic Indicators, 1951-69

<u>Year</u>	<u>Michigan Real Personal Income (Millions)^{1/}</u>	<u>Michigan Real Per Capita Income^{2/}</u>	<u>Michigan Insured Unemployment Rate^{3/}</u>	<u>U.S. Unemployment Rate^{4/}</u>
1951	13,454	2,071	2.7	3.3
1952	14,078	2,117	3.2	3.0
1953	15,649	2,294	2.2	2.9
1954	15,173	2,147	6.2	5.5
1955	16,825	2,310	2.9	4.4
1956	17,164	2,299	5.3	4.1
1957	17,023	2,249	4.8	4.3
1958	16,396	2,138	11.2	6.8
1959	17,412	2,242	5.3	5.5
1960	17,969	2,294	5.3	5.5
1961	17,842	2,256	7.3	6.7
1962	18,904	2,386	4.5	5.5
1963	20,142	2,507	3.5	5.7
1964	21,828	2,675	2.9	5.2
1965	23,870	2,864	2.0	4.5
1966	24,914	2,932	2.0	3.8
1967	25,332	2,943	2.7	3.8
1968	26,811	3,068	2.4	3.6
1969	27,534	3,141	2.2	3.5

Sources

1/ and 2/ Executive Office of the Governor, Economic Report of the Governor 1970, State of Michigan, February 1970.

3/ Graduate School of Business Administration, Michigan Statistical Abstract, Eighth Edition, Michigan State University, 1970.

4/ U.S. Department of Labor, Manpower Report of the President, "Table A-12. Unemployed Persons 16 Years and Over and Unemployment Rates, by Sex and Color: Annual Averages, 1947-69," U.S. Government Printing Office, March 1970.

Appendix B

Table 32

Base Data Used In Calculating The Enrollment Projections

<u>Year</u>	<u>Armed Forces Discharges (1000's)^{1/}</u>	<u>Michigan Real Personal Income (Millions)^{2/}</u>	<u>Michigan Real Per Capita Income^{3/}</u>	<u>U.S. Unemployment Rate^{4/}</u>	<u>Year-Age</u>	<u>Population By Age-Group^{5/}</u>
1970	1,120	26,779	3,009	4.9	1973-0	177,268
1971	1,014	28,032	3,116	5.9	1972-0	172,470
1972	900	29,606	3,270	5.6	1971-0	167,819
1973	750	31,175	3,411	4.7	1970-0	162,375
1974	600	32,671	3,540	4.2	1970-1	158,355
1975	500	34,240	3,675	4.1	1970-2	155,355
1976	400	35,883	3,814	4.1	1970-4	166,858
1977	400	37,606	3,959	4.1	1970-5	176,499
1978	400	39,411	4,110	4.1		
1979	400	41,302	4,266	4.1		1970-71
1980	400	43,285	4,428	4.1	<u>Grade</u>	<u>Enrollments by Grade^{6/}</u>
1981	400	45,362	4,596	4.1		
1982	400	47,540	4,771	4.1	1	191,373
1983	400	49,822	4,952	4.1	2	190,917
1984	400	52,213	5,140	4.1	3	189,368
					4	193,331
1985	400	54,719	5,336	4.1	5	190,222
1986	400	57,346	5,539	4.1	6	189,641
1987	400	60,099	5,749	4.1	7	195,475
1988	400	62,983	5,968	4.1	8	191,965
1989	400	66,007	6,194	4.1	9	188,450
					10	181,673

Table 32 (cont'd)

<u>Year</u>	<u>Armed Forces Discharges (1000's)^{1/}</u>	<u>Michigan Real Personal Income (Millions)^{2/}</u>	<u>Michigan Real Per Capita Income^{3/}</u>	<u>U.S. Unemployment Rate^{4/}</u>	<u>Grade</u>	<u>1970-71 Enrollments by Grade^{6/}</u>
1990	400	69,175	6,430	4.1	11	163,675
1991	400	72,495	6,674	4.1	12	144,695

1/ Morris Janowitz, "Toward An All-Volunteer Military," The Public Interest, No. 27, Spring 1972, p. 105 suggests that the size of the Armed Services will fall within the range of 1.5 to 2.0 million men by about 1975. Past experience would indicate that the assumed discharge figures are roughly consistent with this trend; initiation of an all-volunteer force might change the rate of turn-over, of course.

2/ 1970-71: Executive Office of the Governor, Economic Report of the Governor 1972, State of Michigan, 1972, Table X, p. 31; figures adjusted to a 1957-59 base.

1972: Ibid., p. 30.

This series is forecast based on the assumption that the increase from 1971 to 1972 will be 5.9 percent (as forecast in the Economic Report of the Governor 1972), 5.3 percent from 1972 to 1973, and 4.8 percent annually thereafter. The historical annual rates of increase are 3.7 percent from 1951 to 1971 and 4.6 percent from 1961 to 1971 but 5.6 percent from 1961 to 1969. The difference between this series and the per capita income series implies a 1 percent annual rate of increase in population which is less than historical rates but consistent with present birth and death rates.

3/ 1970-72: see footnote 2/.

Per capita income is forecast based on the assumption that the increase from 1971 to 1972 will be 4.9 percent (as forecast in the Economic Report of the Governor 1972), 4.3 percent from 1972 to 1973, and 3.8 percent annually thereafter. The historical annual rates of increase are 2.1 percent from 1951 to 1971 and 3.3 percent from 1961 to 1971 but 4.2 percent from 1961 to 1969. The difference between this series and the per capita income series implies a 1 percent annual rate of increase in population which is less than historical rates but consistent with present birth and death rates.

Table 32 (cont'd)

- 4/ 1970-71: U.S. Department of Labor, Employment and Earnings, Vol. 18, No. 10, Bureau of Labor Statistics, April 1972, Table A-1, p. 22. The assumption of a 4.1 percent unemployment in the long-run assumes that the economy will be operating at near full employment.
- 5/ 1970-0 through 1970-5: U.S. Bureau of the Census, Census of Population: 1970, General Population Characteristics, Final Report PC(1)-B24 Michigan, U.S. Government Printing Office, Washington, D.C., 1971, Table 20, p. 66.
- 1971-0 through 1973-0: Projections computed in the mid-1960's were multiplied by a factor of .86; the adjustment factor was derived by comparing the actual 1970 census data with the projections for 1970.
- 6/ Unpublished data from the Bureau of Administrative Services, Michigan Department of Education, Lansing, Michigan.

Appendix C

Computing The Nondiscriminatory Enrollment Projections

As mentioned in the text, the data used as a base for these computations are those in Table 3, the present policies enrollment projections. Deriving the nondiscriminatory projections is a simple process which makes use of the following relationship:

$$E_N = \frac{(100-P_p)}{(100-P_n)} E_p$$

where

E_N = Enrollment which is consistent with the nondiscriminatory policy assumptions.

E_p = Enrollment which is consistent with the present policies assumptions.

P_N = Percentage of minority students which is consistent with the nondiscriminatory policy assumptions.

P_p = Percentage of minority students which is consistent with the present policies assumptions.

In order to illustrate the use of this formula, consider enrollment in the public four-year institutions, in 1974. Using the assumptions in the text we determine that the "present policies" figures consist of 35,600 first-time students, 58,600 other lower division students, 83,800 upper division students and 72,000 graduate students; another assumption is that 6.6 percent of the undergraduates are minority students and 9.6 percent of the graduate students are minority students.

Turning to the nondiscriminatory projections, from the assumptions we know that the following are the percentages of minority students by student level: first time students, 12.8 percent; other lower division

students, 12.8 percent (assuming these entered in 1973 or transferred in); upper division students, one-half contains 9.7 percent and the other half contains 6.6 percent (assuming these are students admitted in 1972 and 1971, respectively, or who transferred in); graduate, half contains 12.8 percent, one-fourth contains 11.2 percent and the remaining fourth contains 9.6 percent (assuming these are students admitted in 1973-74, 1972 and 1971, respectively).

Now the formula can be applied. For example, in the case of first-time students the total enrollment required under the nondiscriminatory assumptions is

$$\frac{(100-6.6)}{(100-12.8)} 35,600 = 38,100$$

or in the case of graduate students

$$\frac{(100-9.6)}{(100-12.8)} 36,000 + \frac{(100-9.6)}{(100-11.2)} 18,000 + 18,000 = 73,600.$$

This method yields an approximation, of course. However, it should be sufficiently accurate for most state-wide policy decisions; it certainly reflects a more accurate picture than that obtained by completely ignoring the normal progression of students through higher education, i.e., using total enrollment figures without making reference to the composition by student level.

Appendix D

State And Federal Financial Assistance
For Students In Michigan Institutions Of Higher Education
By Program And Institution, 1965/66-1970/71

Table 33

State and Federal Financial Assistance for Students in Michigan Institutions of Higher Education by Program and Institution, 1965-66

<u>Institution</u>	State <u>Scholarships</u> ^{1/}	Federal ^{2/}		<u>Total</u>	All <u>Programs</u>
		<u>National Defense Student Loans (NDSL)</u>	<u>College Work-Study (CWS)</u>		
<u>Public Four-Year</u>					
Central Michigan	113,217	388,575	67,068	455,643	568,860
Eastern Michigan	39,695	426,219	307,864	734,083	773,778
Ferris State	18,394	138,600	38,378	176,978	195,372
Grand Valley	3,650	—	24,081	24,081	27,731
Lake Superior	11,575	3/	3/	3/	11,575 ^{3/}
Michigan State	357,562	1,115,695	92,263	1,207,958	1,565,520
Michigan Tech.	59,766	191,995	89,808	281,803	341,569
Northern Michigan	39,234	222,300	73,481	295,781	335,015
Oakland University	48,470	294,930	29,086	324,016	372,486
Saginaw Valley	—	9,000	—	9,000	9,000
Univ. of Michigan	244,767	1,082,500	25,966	1,108,466	1,353,233
Wayne State	93,035	492,300	252,166	744,466	837,501
Western Michigan	86,005	121,351	82,585	203,936	289,941
Total	1,115,370	4,483,465	1,082,746	5,566,211	6,681,581
<u>Public Two-Year</u>					
Alpena	3,240	18,672	29,503	48,175	51,415
Bay de Noc	490	—	11,010	11,010	11,500
Delta	7,338	21,420	—	21,420	28,758
Genessee (Flint C.C.)	11,784	28,935	83,488	112,423	124,207
Gogebic	1,720	—	1,530	1,530	3,250
Grand Rapids Jr.	15,706	18,225	13,646	31,871	47,577
Henry Ford	6,761	13,990	—	13,990	20,751
Highland Park	1,092	—	69,255	69,255	70,347

Table 33 (cont'd)

<u>Institutions</u>	<u>State Schlrshps</u>	<u>Federal</u>		<u>Total</u>	<u>All Programs</u>
		<u>NDSL</u>	<u>CWS</u>		
<u>Public Two-Year (cont'd)</u>					
Jackson	4,558	—	12,059	12,059	16,617
Kellogg	4,230	3,196	66,116	69,312	73,542
Lake Michigan	3,615	4,500	4,547	9,047	12,662
Lansing	3,638	28,682	13,285	41,967	45,605
Macomb	—	—	100,164	100,164	100,164
Muskegon	9,646	—	—	—	9,646
North Central	4,362	4,269	—	4,269	8,631
Northwestern Michigan	7,097	18,000	2,430	20,430	27,527
Oakland C.C.	207	44,000	76,140	220,140	220,347
St. Clair	3,753	—	18,900	18,900	22,653
Schoolcraft	501	—	17,982	17,982	18,483
Total	89,738	303,889	520,055	823,944	913,682
<u>Private Colleges</u>					
Adrian	26,410	33,300	—	33,300	59,710
Albion	57,491	—	—	—	57,491
Alma	41,085	—	19,646	19,646	60,731
Andrews	36,950	36,900	—	36,900	73,850
Aquinas	58,330	26,401	—	26,401	84,731
Calvin	116,594	109,440	—	109,440	226,034
Calvin Theo.	—	6,480	—	6,480	6,480
Cleary	—	—	—	—	—
Concordia	651	—	7,752	7,752	8,403
Cranbrook	—	—	—	—	—
Davenport	—	49,500	10,800	60,300	60,300
Delima	—	—	—	—	—
Detroit Bible	—	4,856	—	4,856	4,856
Detroit Col. of Bus.	210	—	—	—	210

Table 33 (cont'd)

<u>Institution</u>	<u>State Schlrshps</u>	<u>Federal</u>		<u>Total</u>	<u>All Programs</u>
		<u>NDSL</u>	<u>CWS</u>		
<u>Private Colleges (cont'd)</u>					
Detroit Col. of Law	---	---	---	---	---
Detroit Inst. of Tech.	190	---	---	---	190
Duns Scotus	---	---	---	---	---
General Motors Inst.	5,640	---	---	---	5,640
Grace Bible	---	---	---	---	---
Grand Rapids Baptist	296	---	---	---	296
Hillsdale	4,290	127,350	---	127,350	131,640
Hope	62,670	81,000	---	81,000	143,670
Jackson Bus.	---	---	---	---	---
Kalamazoo	72,428	62,235	13,230	75,465	147,893
Lawrence Inst. of Tech.	600	---	16,926	16,926	17,526
Madonna	4,278	---	12,537	12,537	16,815
Maryglade	---	---	---	---	---
Marygrove	57,678	---	27,466	27,466	85,144
Mercy	13,836	89,959	34,220	124,179	138,015
Merrill-Palmer	---	3,555	---	3,555	3,555
Michigan Christian	1,425	58,132	---	58,132	59,557
Michigan Col. of Osteo.	---	---	---	---	---
Midrasha	---	---	---	---	---
Muskegon Bus.	---	---	---	---	---
Nazareth	12,500	9,000	14,184	23,184	35,684
Northwood	800	---	---	---	800
Olivet	14,620	48,177	1,687	49,864	64,484
Owosso	308	15,435	9,180	24,615	24,923
Reformed Bible Inst.	---	---	---	---	---
Sacred Heart	1,440	---	---	---	1,440
St. John's	---	---	---	---	---
St. Mary's	---	---	---	---	---
Shaw Col. (Mich. Luth.)	---	---	---	---	---

Table 33 (cont'd)

<u>Institutions</u>	<u>State Schlrshps</u>	<u>NDSL</u>	<u>Federal CWS</u>	<u>Total</u>	<u>All Programs</u>
<u>Private Colleges (cont'd)</u>					
Siena Heights	6,440	—	—	—	6,440
Soc. of Arts & Crafts	—	—	—	—	—
Spring Arbor	12,314	87,197	—	87,197	99,511
Suomi	6,105	41,020	22,296	63,316	69,421
U. of Detroit	181,732	222,300	30,640	252,940	434,672
Walsh Inst.	—	—	—	—	—
Western Theo.	—	4,500	—	4,500	4,500
Total	797,311	1,116,737	220,564	1,337,301	2,134,612
Total Higher Education	2,002,419	5,904,091	1,823,365	7,727,456	9,729,875
Other	—	10,859	—	10,859	10,859
GRAND TOTAL	2,002,419	5,914,950	1,823,365	7,738,315	9,740,734

1/ State Tuition Grant program was not implemented until 1966-67.

2/ Federal Educational Opportunity Grant program was not implemented until 1966-67.

3/ Federal funds included in those granted to Michigan Technological University.

Sources: State program data are actual expenditures as recorded by Student Financial Assistance Services, Michigan Department of Education, Lansing, Michigan.

Federal program data are grants to institutions as recorded in Notification to Members of Congress; these will differ from actual expenditures when institutions did not spend the entire grant.

Table 34

State and Federal Financial Assistance for Students in Michigan Institutions of Higher Education by Program and Institution, 1966-67

Institution	Federal			
	Educ'l Oppor.	Nat'l Def.	College	Total
	Grants(EOG)	Stu. Loans (NDSL)	Work-Study (CWS)	
<u>Public Four-Year</u>				
Central Michigan	9,710	465,940	53,683	529,333
Eastern Michigan	153,420	578,400	629,213	1,361,033
Ferris State	94,580	256,284	54,855	405,719
Grand Valley	44,010	98,815	40,000	182,825
Lake Superior	1/	1/	1/	1/
Michigan State	376,750	1,300,000	295,234	1,971,984
Michigan Tech.	48,060	180,028	25,317	253,405
Northern Michigan	70,300	303,768	146,153	520,221
Oakland Univ.	---	416,250	78,507	494,757
Saginaw Valley	---	15,156	20,808	35,964
Univ. of Michigan	194,200	1,494,000	35,522	1,723,722
Wayne State	742,954	752,400	556,398	2,051,752
Western Michigan	159,180	751,500	244,273	1,154,953
Total	1,893,164	6,612,541	2,179,963	10,685,668
<u>Public Two-Year</u>				
Alpena	13,980	17,183	47,090	78,253
Bay de Noc	---	---	57,540	57,540
Delta	---	19,260	---	19,260
Genesee(Flint C.C.)	26,410	21,600	102,052	150,062
Gogebic	7,570	---	22,680	30,250
Grand Rapids Jr.	21,840	31,950	72,700	126,490
Henry Ford	4,080	18,720	30,915	53,715
Highland Park	---	---	63,270	63,270
Jackson	5,830	---	14,688	20,518
Kellogg	1,900	2,668	10,530	15,098
Lake Michigan	3,110	1,783	38,398	43,291
Lansing	32,040	21,455	41,192	94,687
Macomb	---	---	21,820	21,820
Monroe	20,390	18,000	---	38,390
Montcalm	---	---	---	---
Muskegon	---	---	47,250	47,250
North Central	---	6,597	---	6,597
Northwestern Mich.	10,200	16,470	12,040	38,710
Oakland C.C.	---	21,542	68,040	89,582
St. Clair	---	---	38,925	38,925
Schoolcraft	9,320	---	8,830	18,150
Southwestern Mich.	---	---	15,396	15,396
Washtenaw	---	---	56,418	56,418
Total	156,670	197,228	769,774	1,123,672

Table 34 (cont'd)

Institution	Federal			Total
	EOG	NDSL	CWS	
<u>Private Colleges</u>				
Adrian	<u>2/</u>	42,390	33,750	76,140
Albion	88,540	128,250	17,775	154,565
Alma	35,760	88,740	17,435	141,935
Andrews	34,660	58,500	64,883	158,043
Aquinas	23,600	30,240	—	53,840
Calvin	16,310	123,750	13,500	153,560
Calvin Theo.	—	9,405	—	9,405
Cleary	—	—	—	—
Concordia	—	—	40,185	40,185
Cranbrook	—	—	—	—
Davenport	16,430	63,900	22,050	102,380
DeLima	—	—	—	—
Detroit Bible	—	7,110	—	7,110
Detroit Col. of Bus.	—	—	—	—
Detroit Col. of Law	—	—	—	—
Detroit Inst. of Tech.	—	—	—	—
Duns Scotus	—	—	—	—
General Motors Inst.	—	—	—	—
Grace Bible	—	—	—	—
Grand Rapids Baptist	—	—	—	—
Hillsdale	—	104,400	—	104,400
Hope	42,000	94,500	27,360	163,860
Jackson Bus.	—	—	—	—
Kalamazoo	37,870	63,720	35,100	136,690
Lawrence Inst. of Tech.	4,660	16,200	8,408	29,268
Madonna	9,900	18,158	10,802	38,860
Maryglade	—	—	—	—
Marygrove	24,280	72,450	40,500	137,230
Mercy	—	109,604	60,932	170,536
Merrill-Palmer	—	3,521	—	3,521
Michigan Christian	—	52,117	—	52,117
Michigan Col. of Osteo.	—	—	—	—
Midrasha	—	—	—	—
Muskegon Bus.	—	—	—	—
Nazareth	15,670	13,500	18,000	47,170
Northwood	—	—	—	—
Olivet	19,340	49,950	13,905	83,195
Owosso	9,900	11,250	10,970	32,120
Reformed Bible Inst.	—	—	—	—
Sacred Heart	—	—	—	—
St. John's	—	—	—	—
St. Mary's	—	—	—	—
Shaw (Mich. Luth.)	—	—	19,500	19,500
Siena Heights	—	—	3,600	3,600
Soc. of Arts & Crafts	—	—	—	—
Spring Arbor	—	113,922	—	113,922
Suomi	13,980	41,400	36,135	91,515

Table 34 (cont'd)

<u>Institution</u>	<u>Federal</u>			<u>Total</u>
	<u>EOG</u>	<u>NDSL</u>	<u>CWS</u>	
<u>Private Colleges (cont'd)</u>				
U. of Detroit	94,910	305,910	56,225	457,045
Walsh	—	—	—	—
Western Theo.	—	4,500	—	4,500
Total	407,810	1,627,387	551,015	2,586,212
Total Higher Educ.	2,457,644	8,437,156	3,500,752	14,395,552
Other	—	9,693	44,113	53,806
GRAND TOTAL	2,457,644	8,446,849	3,544,865	14,449,358

Table 34 (cont'd)

<u>Institution</u>	<u>Scholarships (Schol)</u>	<u>State</u>		<u>All Programs</u>
		<u>Tuition Grants(TG)</u>	<u>Total</u>	
<u>Public Four-Year</u>				
Central Michigan	180,396	I	180,396	709,729
Eastern Michigan	81,733	N	81,733	1,442,766
Ferris State	33,908	E	33,908	439,627
Grand Valley	32,553	L	32,553	215,378
Lake Superior	16,351	I	16,351	16,351 ^{1/}
Michigan State	667,235	G	667,235	2,639,219
Michigan Tech.	82,621	I	82,621	336,026
Northern Michigan	63,103	B	63,103	583,324
Oakland Univ.	83,062	L	83,062	577,819
Saginaw Valley	3,765	E	3,765	39,729
Univ. of Michigan	463,235		463,235	2,186,957
Wayne State	129,474		129,474	2,181,226
Western Michigan	139,844		139,844	1,294,797
Total	1,977,280		1,977,280	12,662,948
<u>Public Two-Year</u>				
Alpena	3,125	I	3,125	81,378
Bay de Noc	3,890	N	3,890	61,430
Delta	9,265	E	9,265	28,525
Genessee (Flint C.C.)	6,142	L	6,142	156,204
Gogebic	4,055	I	4,055	34,305
Grand Rapids Jr.	21,952	I G	21,952	148,442
Henry Ford	5,755	N I	5,755	59,470
Highland Park	1,632	E B	1,632	64,902
Jackson	6,801	L L	6,801	27,319
Kellogg	7,813	I E	7,813	22,911
Lake Michigan	7,398	I G	7,398	50,689
Lansing	3,524	N I	3,524	28,221
Macomb	3,460	E B	3,460	25,280
Monroe	495	L L	495	38,885
Montcalm	—	I E	—	—
Muskegon	15,670	I G	15,670	62,920
North Central	7,876	N I	7,876	14,473
Northwestern Mich.	15,458	E B	15,458	54,168
Oakland C.C.	362	L L	362	89,944
St. Clair	9,525	I E	9,525	48,450
Schoolcraft	1,974	G	1,974	20,124
Southwestern Mich.	480	I	480	15,876
Washtenaw	200	B	200	56,618
Total	136,922	L E	136,922	1,260,594

Table 34 (cont'd)

<u>Institution</u>	<u>State</u>		<u>Total</u>	<u>All Programs</u>
	<u>Schol</u>	<u>TG</u>		
<u>Private Colleges</u>				
Adrian	41,825	23,992	65,817	141,957
Albion	101,490	32,770	134,260	288,825
Alma	69,077	31,100	100,177	242,112
Andrews	57,239	28,700	85,939	243,982
Aquinas	100,335	49,000	149,335	203,175
Calvin	204,084	90,040	294,124	447,684
Calvin Theo.	—	—	—	9,405
Cleary	535	1,902	2,437	2,437
Concordia	3,090	—	3,090	43,275
Cranbrook	—	—	—	—
Davenport	7,536	65,092	72,628	175,008
DeLima	940	5,060	6,000	6,000
Detroit Bible	570	—	570	7,680
Detroit Col. of Bus.	1,329	—	1,329	1,329
Detroit Col. of Law	—	—	—	—
Detroit Inst. of Tech.	2,114	8,182	10,296	10,296
Duns Scotus	—	—	—	—
General Motors Inst.	5,320	32,047	37,367	37,367
Grace Bible	384	—	384	384
Grand Rapids Baptist	18,232	8,975	27,207	27,207
Hillsdale	4,293	4,700	8,993	113,393
Hope	98,839	28,945	127,784	291,644
Jackson Bus.	—	—	—	—
Kalamazoo	102,094	27,110	129,204	265,894
Lawrence Inst. of Tech.	8,430	65,186	73,616	102,884
Madonna	11,170	19,630	30,800	69,660
Maryglade	—	—	—	—
Marygrove	96,378	24,227	120,605	257,835
Mercy	41,515	37,678	79,193	249,729
Merrill-Palmer	—	—	—	3,521
Michigan Christian	8,747	10,535	19,282	71,399
Mich. Col. of Osteo.	—	—	—	—
Midrasha	—	—	—	—
Muskegon	3,268	—	3,268	3,268
Nazareth	24,510	11,085	35,595	82,765
Northwood	2,377	39,174	41,551	41,551
Olivet	28,745	18,175	46,920	130,115
Owosso	3,051	9,350	12,401	44,521
Reformed Bible Inst.	—	—	—	—
Sacred Heart	12,030	—	12,030	12,030
St. John's	—	—	—	—
St. Mary's	—	—	—	—
Shaw (Mich. Luth.)	—	10,022	10,022	29,522
Siena Heights	11,670	17,223	28,893	32,493
Soc. of Arts & Crafts	—	6,410	6,410	6,410
Spring Arbor	33,902	28,307	62,209	176,131
Suomi	6,330	24,600	30,930	122,445

Table 34 (cont'd)

<u>Institution</u>	<u>State</u>		<u>Total</u>	<u>All Programs</u>
	<u>Schol</u>	<u>TG</u>		
<u>Private Colleges (cont'd)</u>				
U. of Detroit	263,336	79,530	342,866	799,911
Walsh	545	5,030	5,575	5,575
Western Theo.	—	—	—	4,500
Total	1,375,330	843,777	2,219,107	4,805,319
Total Higher Educ.	3,489,532	843,777	4,333,309	18,728,861
Other	261	1,250	1,511	55,317
GRAND TOTAL	3,489,793	845,027	4,334,820	18,784,178

1/ Federal funds included in those granted to Michigan Technological University.

2/ Adjusted from \$26,410 because these funds not expended.

Sources: State program data are actual expenditures as recorded by Student Financial Assistance Services, Michigan Department of Education, Lansing, Michigan.

Federal program data are grants to institutions as recorded in Notifications to Members of Congress; these will differ from actual expenditures when institutions do not spend the entire grant.

Table 35

State and Federal Financial Assistance for Students in Michigan Institutions of Higher Education by Program and Institution, 1967-68

Institution	Federal			
	Educ'l Oppor.	Nat'l Def.	College	Total
	Grants(EOG)	Stu. Loans (NDSL)	Work-Study (CWS)	
<u>Public Four-Year</u>				
Central Michigan	90,000	496,189	72,490	658,679
Eastern Michigan	176,850	622,903	1,527,322	2,327,075
Ferris State	176,600	215,826	51,333	443,759
Grand Valley	128,800	110,277	44,500	283,577
Lake Superior	10,900	11,343	16,950	39,193
Michigan State	1,082,000	1,925,458	620,231	3,627,689
Michigan Tech.	120,700	175,851	73,057	369,608
Northern Michigan	129,650	305,623	95,709	530,982
Oakland Univ.	8,250	291,247	100,280	399,777
Saginaw Valley	14,500	6,173	27,863	48,536
Univ. of Michigan	505,750	1,480,852	37,867	2,024,469
Wayne State	631,900	882,210	354,677	1,868,787
Western Michigan	398,650	569,827	188,737	1,157,214
Total	3,474,550	7,093,779	3,211,016	13,779,345
<u>Public Two-Year</u>				
Alpena	18,750	13,785	54,173	86,708
Bay de Noc	—	—	58,581	58,581
Delta	24,000	33,871	29,009	86,880
Genessee (Flint C.C.)	48,300	21,157	100,218	169,675
Glen Oaks	15,000	16,542	48,825	80,367
Gogebic	3,000	—	12,093	15,093
Grand Rapids Jr.	60,700	29,888	64,005	154,593
Henry Ford	16,600	11,343	38,850	66,793
Highland Park	—	—	57,979	57,979
Jackson	12,850	—	12,795	25,645
Kellogg	12,300	10,843	15,283	38,426
Lake Michigan	19,800	9,689	49,093	78,582
Lansing	23,200	18,117	22,057	63,374
Macomb	10,000	7,877	24,882	42,759
Monroe	18,700	15,754	22,695	57,149
Montcalm	—	2,363	4,200	6,563
Muskegon	19,200	—	48,742	67,942
North Central	—	4,412	4,500	8,912
Northwestern Mich.	28,200	19,141	17,829	65,170
Oakland C.C.	15,000	—	54,600	69,600
St. Clair	—	1,575	34,305	35,880
Schoolcraft	8,000	—	34,980	42,980
Southwestern Mich.	—	—	15,568	15,568
Washtenaw	—	—	64,100	64,100
Total	353,600	216,357	889,362	1,459,319

Table 35 (cont'd)

Institution	Federal			Total
	EOG	NDSL	CWS	
<u>Private Colleges</u>				
Adrian	—	32,019	12,596	44,615
Albion	20,350	152,882	32,860	206,092
Alma	76,450	83,259	24,104	183,813
Andrews	90,050	46,080	58,200	194,330
Aquinas	80,600	29,538	27,000	137,138
Calvin	92,800	141,784	75,000	309,584
Calvin Theo.	—	9,543	—	9,543
Cleary	—	—	—	—
Concordia	—	—	11,000	11,000
Cranbrook	—	—	—	—
Davenport	53,300	51,594	25,380	130,274
DeLima	—	—	—	—
Detroit Bible	—	11,500	—	11,500
Detroit Col. of Bus.	—	—	—	—
Detroit Col. of Law	—	—	—	—
Detroit Inst. of Tech.	—	24,445	—	24,445
Duns Scotus	—	—	—	—
General Motors Inst.	—	—	—	—
Grace Bible	—	—	—	—
Grand Rapids Baptist	16,800	—	—	16,800
Hillsdale	—	112,245	—	112,245
Hope	79,900	102,084	29,100	211,084
Jackson Bus.	—	—	—	—
Kalamazoo	49,750	61,085	23,479	134,314
Lawrence Inst. of Tech.	6,600	15,527	8,042	30,169
Madonna	15,500	14,763	65,218	95,481
Maryglade	—	—	—	—
Marygrove	45,200	50,412	31,350	126,962
Mercy	38,500	93,514	55,697	187,711
Merrill-Palmer	1,800	4,427	—	6,227
Michigan Christian	4,650	51,390	—	56,040
Mich. Col. of Osteo.	—	—	—	—
Midrasha	—	—	—	—
Muskegon Bus.	—	—	—	—
Nazareth	28,150	11,500	21,000	60,650
Northwood	—	—	—	—
Olivet	64,000	56,083	23,105	143,188
Owosso	24,450	12,840	8,131	45,421
Reformed Bible Inst.	—	—	—	—
Sacred Heart	—	—	32,217	32,217
St. John's	—	—	—	—
St. Mary's	—	—	—	—
Shaw (Mich. Luth.)	—	—	18,511	18,511
Siena Heights	—	—	—	—
Soc. of Arts & Crafts	—	—	—	—
Spring Arbor	—	89,796	—	89,796
Suomi	29,000	43,323	35,471	107,794

Table 35 (cont'd)

<u>Institution</u>	<u>Federal</u>			<u>Total</u>
	<u>EOG</u>	<u>NDSL</u>	<u>CWS</u>	
<u>Private Colleges</u> (cont'd)				
U. of Detroit	151,600	326,921	55,273	533,794
Walsh	—	—	—	—
Western Theo.	—	3,938	—	3,938
Total	969,450	1,632,492	672,734	3,274,676
Total Higher Educ.	4,797,600	8,942,628	4,773,112	18,513,340
Other	52,000	92,688	143,464	288,152
GRAND TOTAL	4,849,600	9,035,316	4,916,576	18,801,492

Table 35 (cont'd)

<u>Institution</u>	<u>Scholarships (Schol)</u>	<u>State</u>		<u>All Programs</u>
		<u>Tuition Grants(TG)</u>	<u>Total</u>	
<u>Public Four-Year</u>				
Central Michigan	307,874		307,874	966,553
Eastern Michigan	150,506	I	150,506	2,477,581
Ferris State	54,512	N	54,512	498,271
Grand Valley	59,778	E	59,778	343,355
Lake Superior	23,220	L	23,220	62,413
Michigan State	1,243,571	I	1,243,571	4,871,260
Michigan Tech.	164,541	G	164,541	534,149
Northern Michigan	106,992	I	106,992	637,974
Oakland Univ.	130,126	B	130,126	529,903
Saginaw Valley	6,670	L	6,670	55,206
Univ. of Michigan	697,225	E	697,225	2,721,694
Wayne State	255,506		255,506	2,124,293
Western Michigan	256,187		256,187	1,413,401
Total	3,456,708		3,456,708	17,236,053
<u>Public Two-Year</u>				
Alpena	7,478	I	7,478	94,186
Bay de Noc	6,233	N	6,233	64,814
Delta	15,378	E	15,378	102,258
Genessee (Flint C.C.)	14,573	L	14,573	184,248
Glen Oaks	1,636	I	1,636	82,003
Gogebic	11,217	I G	11,217	26,310
Grand Rapids Jr.	46,488	N I	46,488	201,081
Henry Ford	7,507	E B	7,507	74,300
Highland Park	2,726	L L	2,726	60,705
Jackson	12,969	I E	12,969	38,614
Kellogg	18,075	I G	18,075	56,501
Lake Michigan	9,618	N I	9,618	88,200
Lansing	11,422	E B	11,422	74,796
Macomb	7,699	L L	7,699	50,450
Monroe	2,970	I E	2,970	60,119
Montcalm	285	I G	285	6,848
Muskegon	27,620	N I	27,620	95,562
North Central	10,020	E B	10,020	18,932
Northwestern Mich.	25,225	L L	25,225	90,395
Oakland C.C.	2,957	I E	2,957	72,557
St. Clair	11,915	G	11,915	47,795
Schoolcraft	4,226	I	4,226	47,206
Southwestern Mich.	3,719	B	3,719	19,287
Washtenaw	500	L	500	64,600
Total	262,456	E	262,456	1,721,775

Table 35 (cont'd)

<u>Institution</u>	<u>State</u>		<u>Total</u>	<u>All Programs</u>
	<u>Schol</u>	<u>TG</u>		
<u>Private Colleges</u>				
Adrian	54,704	62,483	117,187	161,802
Albion	133,480	90,700	224,180	430,272
Alma	95,098	93,493	188,591	372,404
Andrews	67,951	72,616	140,567	334,897
Aquinas	127,778	138,296	266,074	403,212
Calvin	293,823	294,452	588,275	897,859
Calvin Theo.	—	—	—	9,543
Cleary	1,038	17,554	18,592	18,592
Concordia	8,634	—	8,634	19,634
Cranbrook	—	—	—	—
Davenport	13,822	113,982	127,804	258,078
DeLima	190	10,390	10,580	10,580
Detroit Bible	468	—	468	11,968
Detroit Col. of Bus.	800	—	800	800
Detroit Col. of Law	600	—	600	600
Detroit Inst. of Tech.	3,078	22,688	25,766	50,211
Duns Scotus	—	—	—	—
General Motors Inst.	5,515	56,537	62,052	62,052
Grace Bible	—	—	—	—
Grand Rapids Baptist	14,788	12,071	26,859	43,659
Hillsdale	7,520	11,925	19,445	131,690
Hope	115,475	95,492	210,967	422,051
Jackson Bus.	—	—	—	—
Kalamazoo	131,004	65,876	196,880	331,194
Lawrence Inst. of Tech.	14,163	168,896	183,059	213,228
Madonna	11,965	19,640	31,605	127,086
Maryglade	—	500	500	500
Marygrove	104,593	59,364	163,957	290,919
Mercy	57,747	99,039	156,786	344,497
Merrill-Palmer	180	200	380	6,607
Michigan Christian	10,500	30,094	40,594	96,634
Mich. Col. of Osteo.	—	—	—	—
Midrasha	—	—	—	—
Muskegon Bus.	5,348	—	5,348	5,348
Nazareth	30,150	35,660	65,810	126,460
Northwood	2,088	66,356	68,444	68,444
Olivet	37,875	17,805	55,680	198,868
Owosso	5,829	18,221	24,050	69,471
Reformed Bible Inst.	—	—	—	—
Sacred Heart	20,860	—	20,860	53,077
St. John's	—	—	—	—
St. Mary's	195	—	195	195
Shaw	—	25,369	25,369	43,880
Siena Heights	12,970	38,325	51,295	51,295
Soc. of Arts & Crafts	1,600	13,025	14,625	14,625
Spring Arbor	35,633	65,580	101,213	191,009
Suomi	5,825	45,734	51,559	159,353

Table 35 (cont'd)

<u>Institutions</u>	<u>State</u>			<u>All</u>
	<u>Schol</u>	<u>TG</u>	<u>Total</u>	<u>Programs</u>
<u>Private Colleges (cont'd)</u>				
U. of Detroit	364,092	306,787	670,879	1,204,673
Walsh	—	9,000	9,000	9,000
Western Theo.	—	—	—	3,938
Total	1,797,379	2,178,150	3,975,529	7,250,205
Total Higher Educ.	5,516,543	2,178,150	7,694,693	26,208,033
Other	795	1,075	1,870	290,022
GRAND TOTAL	5,517,338	2,179,225	7,696,563	26,498,055

Sources: State program data are actual expenditures as recorded by Student Financial Assistance Services, Michigan Department of Education, Lansing, Michigan.

Federal program data are grants to institutions as recorded in Notifications to Members of Congress; these will differ from actual expenditures when institutions do not spend the entire grant.

Table 36

State and Federal Financial Assistance for Students in Michigan Institutions of Higher Education by Program and Institution, 1968-69

Institution	Federal			
	Educ'l Oppor.	Nat'l Def.	College	Total
	Grants(EOG)	Stu. Loans (NDSL)	Work-Study (CWS)	
<u>Public Four-Year</u>				
Central Michigan	140,960	442,826	124,434	708,220
Eastern Michigan	164,330	649,036	839,203	1,652,569
Ferris State	130,766 ^{1/}	229,072	88,505	448,343
Grand Valley	158,670	132,584	47,300	338,554
Lake Superior	35,300	24,990	120,765	181,055
Michigan State	1,145,930	1,696,828	696,228	3,538,986
Michigan Tech.	98,740	109,274	39,500	247,514
Northern Michigan	159,550	300,431	170,100	630,081
Oakland Univ.	49,100	234,625	143,921	427,646
Saginaw Valley	21,710	11,176	29,600	62,486
Univ. of Michigan	570,260	1,542,571	165,768	2,278,599
Wayne State,	642,300	798,281	437,200	1,877,781
Western Michigan	481,300	616,335	372,107	1,469,742
Total	3,798,916	6,788,029	3,274,631	13,861,576
<u>Public Two-Year</u>				
Alpena	21,070	13,397	101,133	135,600
Bay de Noc	8,460	—	53,346	61,806
Delta	49,860	31,584	52,120	133,564
Genessee (Flint C.C.)	33,630	19,282	113,449	166,361
Glen Oaks	29,370	24,295	60,780	114,445
Gogebic	12,010	—	23,890	35,900
Grand Rapids Jr.	88,390	26,378	75,392	190,160
Henry Ford	9,130	13,189	42,254	64,573
Highland Park	—	—	66,600	66,600
Jackson	16,270	7,886	23,115	47,271
Kalamazoo Valley	2,070	6,942	37,009	46,021
Kellogg	17,630	10,624	23,334	51,588
Kirtland	—	—	49,608	49,608
Lake Michigan	47,150	28,877	59,575	135,602
Lansing	19,550	22,907	29,520	71,977
Macomb	17,160	7,566	39,700	64,426
Mid Michigan	—	—	4,502	4,502
Monroe	20,770	19,436	46,952	87,158
Montcalm	—	2,082	12,155	14,237
Muskegon	4,110	—	61,872	65,982
North Central	—	3,818	5,000	8,818
Northwestern Mich.	33,240	14,230	19,800	67,270
Oakland C.C.	50,820	41,649	30,000	122,469
St. Clair	—	2,777	61,920	64,697
Schoolcraft	13,200	—	78,939	92,139

Table 36 (cont'd)

Institution	Federal			Total
	EOG	NDSL	CWS	
<u>Public Two-Year (cont'd)</u>				
Southwestern Mich.	—	—	29,851	29,851
Washtenaw	82,930	69,417	63,760	216,107
West Shore	—	—	3,648	3,648
Total	576,820	366,336	1,269,224	2,212,380
<u>Private Colleges</u>				
Adrian	23,220	39,185	21,322	83,727
Albion	34,260	102,933	56,940	194,133
Alma	76,800	65,350	32,000	174,050
Andrews	78,970	58,448	13,506	150,924
Aquinas	99,520	30,851	26,950	157,321
Calvin	146,650	142,302	110,682	399,634
Calvin Theo.	—	9,107	—	9,107
Cleary	—	—	—	—
Concordia	—	3,611	7,935	11,546
Cranbrook	—	—	—	—
Davenport	51,970	40,400	28,750	121,120
DeLima	4,150	6,942	4,200	15,292
Detroit Bible	—	10,586	—	10,586
Detroit Col. of Bus.	—	—	—	—
Detroit Col. of Law	—	—	—	—
Detroit Inst. of Tech.	33,840	22,213	13,501	69,554
Duns Scotus	3,730	—	7,030	10,760
General Motors Inst.	—	—	—	—
Grace Bible	—	—	—	—
Grand Rapids Baptist	16,190	—	—	16,190
Hillsdale	20,730	79,134	21,630	121,494
Hope	114,980	98,917	37,851	251,748
Jackson Bus.	—	—	8,591	8,591
Kalamazoo	64,390	58,031	63,650	186,071
Lawrence Inst. of Tech.	18,770	17,179	11,904	47,853
Madonna	23,000	19,662	75,549	118,211
Maryglade	—	—	—	—
Marygrove	52,560	40,261	26,400	119,221
Mercy	56,230	112,974	83,620	252,824
Merrill-Palmer	2,500	5,866	—	8,366
Michigan Christian	15,090	44,495	10,260	69,845
Mich. Col. of Osteo.	—	—	—	—
Midrasha	—	—	—	—
Muskegon Bus.	—	—	8,393	8,393
Nazareth	28,450	7,983	21,400	57,833
Northwood	11,200	6,942	16,735	34,877
Olivet	54,430	55,880	24,000	134,310
Owosso	36,590	10,943	13,910	61,443
Reformed Bible Inst.	—	—	—	—
Sacred Heart	—	—	44,248	44,248

Table 36 (cont'd)

<u>Institution</u>	<u>Federal</u>			
	<u>EOG</u>	<u>NDSL</u>	<u>CWS</u>	<u>Total</u>
<u>Private Colleges (cont'd)</u>				
St. John's	—	—	—	—
St. Mary's	—	—	—	—
Shaw (Mich. Luth.)	3,480	—	22,949	26,429
Siena Heights	—	—	—	—
Soc. of Arts & Crafts	—	—	—	—
Spring Arbor	13,680	83,993	—	97,673
Suomi	24,510	31,931	40,803	97,244
U. of Detroit	232,240	374,152	95,209	701,601
Walsh	—	8,678	—	8,678
Western Theo.	—	3,332	—	3,332
Total	1,342,130	1,592,181	949,918	3,884,229
Total Higher Educ.	5,717,866	8,746,546	5,493,773	19,958,185
Other	65,300	90,132	125,446	280,878
GRAND TOTAL	5,783,166	8,836,678	5,619,219	20,239,063

Table 36 (cont'd)

Institution	Scholarships (Schol)	State		All Programs
		Tuition Grants(TG)	Total	
<u>Public Four-Year</u>				
Central Michigan	374,061	I	374,061	1,082,281
Eastern Michigan	172,147	N	172,147	1,824,716
Ferris State	52,677	E	52,677	501,020
Grand Valley	60,702	L	60,702	399,256
Lake Superior	24,145	I	24,145	205,200
Michigan State	1,489,049	G	1,489,049	5,028,035
Michigan Tech.	196,957	I	196,957	444,471
Northern Michigan	123,974	B	123,974	754,055
Oakland Univ.	173,812	L	173,812	601,458
Saginaw Valley	6,769	E	6,769	69,255
Univ. of Michigan	910,893		910,893	3,189,492
Wayne State	290,916		290,916	2,168,697
Western Michigan	286,913		286,913	1,756,655
Total	4,163,015		4,163,015	18,024,591
<u>Public Two-Year</u>				
Alpena	7,184	I	7,184	142,784
Bay de Noc	3,330	N	3,330	65,136
Delta	15,780	E	15,780	149,344
Genessee (Flint C.C.)	9,101	L	9,101	175,462
Glen Oaks	2,765	I	2,765	117,210
Gogebic	9,960	I G	9,960	45,860
Grand Rapids Jr.	30,059	N I	30,059	220,219
Henry Ford	8,620	E B	8,620	73,193
Highland Park	1,248	L L	1,248	67,848
Jackson	13,341	I E	13,341	60,612
Kalamazoo Valley	600	I G	600	46,621
Kellogg	9,725	N I	9,725	61,313
Kirtland	570	E B	570	50,178
Lake Michigan	3,860	L L	3,860	139,462
Lansing	7,733	I E	7,733	79,710
Macomb	8,537	I G	8,537	72,963
Mid Michigan	710	N I	710	5,212
Monroe	3,520	E B	3,520	90,678
Montcalm	1,203	L L	1,203	15,440
Muskegon	19,707	I E	19,707	85,689
North Central	9,067	G	9,067	17,885
Northwestern Mich.	17,712	I	17,712	84,982
Oakland C.C.	2,060	B	2,060	124,529
St. Clair	7,070	L	7,070	71,767
Schoolcraft	5,344	E	5,344	97,483
Southwestern Mich.	2,412		2,412	32,263
Washtenaw	665		665	216,772
West Shore	—		—	3,648
Total	201,883		201,883	2,414,263

Table 36 (cont'd)

<u>Institution</u>	<u>State</u>			<u>All Programs</u>
	<u>(Schol</u>	<u>TG</u>	<u>Total</u>	
<u>Private Colleges</u>				
Adrian	51,310	78,887	130,197	213,924
Albion	169,785	107,335	277,120	471,253
Alma	122,847	142,057	264,904	438,954
Andrews	64,710	110,105	174,815	325,739
Aquinas	143,095	172,653	315,748	473,069
Calvin	275,009	465,159	740,168	1,139,802
Calvin Theo.	—	—	—	9,107
Cleary	1,972	15,648	17,620	17,620
Concordia	6,984	684	7,668	19,214
Cranbrook	—	350	350	350
Davenport	10,482	119,604	130,086	251,206
DeLima	650	7,425	8,075	23,367
Detroit Bible	1,014	—	1,014	11,600
Detroit Col. of Bus.	1,769	36,744	38,513	38,513
Detroit Col. of Law	—	—	—	—
Detroit Inst. of Tech.	1,405	71,927	73,332	142,886
Duns Scotus	—	—	—	10,760
General Motors Inst.	4,147	59,750	63,897	63,897
Grace Bible	260	—	260	260
Grand Rapids Baptist	16,380	24,225	40,605	56,795
Hillsdale	5,404	20,475	25,879	147,373
Hope	140,552	151,802	292,354	544,102
Jackson Bus.	—	—	—	8,591
Kalamazoo	127,155	82,766	209,921	395,992
Lawrence Inst. of Tech.	16,183	234,124	250,307	298,160
Madonna	9,100	57,875	66,975	185,186
Maryglade	—	—	—	—
Marygrove	73,060	100,539	173,599	292,820
Mercy	50,809	115,261	166,070	418,894
Merrill-Palmer	—	125	125	8,491
Michigan Christian	4,110	24,484	28,594	98,439
Mich. Col. of Osteo.	—	—	—	—
Midrasha	—	—	—	—
Muskegon Bus.	4,571	—	4,571	12,964
Nazareth	23,513	57,145	80,658	138,491
Northwood	1,612	77,333	78,945	113,822
Olivet	44,680	99,300	143,980	278,290
Owosso	3,690	17,604	21,294	82,737
Reformed Bible Inst.	—	—	—	—
Sacred Heart	8,865	—	8,865	53,113
St. John's	—	—	—	—
St. Mary's	305	—	305	305
Shaw (Mich. Luth.)	—	55,805	55,805	82,234
Siena Heights	7,435	48,505	55,940	55,940
Soc. of Arts & Crafts	1,313	18,099	19,412	19,412
Spring Arbor	34,166	96,611	130,777	228,450
Suomi	4,700	56,698	61,398	158,642

Table 36 (cont'd)

<u>Institution</u>	<u>State</u>			<u>All</u>
	<u>Schol</u>	<u>TG</u>	<u>Total</u>	<u>Programs</u>
<u>Private Colleges</u> (cont'd)				
U. of Detroit	415,460	578,181	993,641	1,695,242
Walsh	—	19,042	19,042	27,720
Western Theo.	—	—	—	3,332
Total	1,848,502	3,324,327	5,172,829	9,057,058
Total Higher Educ.	6,213,400	3,324,327	9,537,727	29,495,912
Other	140	2,175	2,315	283,193
GRAND TOTAL	6,213,540	3,326,502	9,540,042	29,779,105

1/ Adjusted from \$210,020 because not all of this was spent.

Sources: State program data are actual expenditures as recorded by Student Financial Assistance Services, Michigan Department of Education, Lansing, Michigan.

Federal program data are grants to institutions as recorded in Notifications to Members of Congress; these will differ from actual expenditures when institutions do not spend the entire grant.

Table 37

State and Federal Financial Assistance for Students in Michigan Institutions of Higher Education by Program and Institution, 1969-70

<u>Institution</u>	<u>Federal</u>			
	<u>Educ'l Oppor.</u>	<u>Nat'l Def.</u>	<u>College</u>	<u>Total</u>
	<u>Grants(EOG)</u>	<u>Stu. Loans</u> <u>(NDSL)</u>	<u>Work-Study</u> <u>(CWS)</u>	
<u>Public Four-Year</u>				
Central Michigan	205,035	461,821	155,022	821,878
Eastern Michigan	182,557	611,481	570,119	1,364,157
Ferris State	84,933	212,642	54,724	352,299
Grand Valley	156,088	163,628	82,981	402,697
Lake Superior	39,748	40,210	113,899	193,857
Michigan State	1,057,933	1,656,281	1,184,811	3,899,025
Michigan Tech.	96,101	47,321	84,541	227,963
Northern Michigan	157,117	209,978	180,903	547,998
Oakland Univ.	53,848	318,307	197,952	570,107
Saginaw Valley	31,423	18,455	27,551	77,429
Univ. of Michigan	469,096	1,463,483	307,549	2,240,128
Wayne State	552,245	790,185	434,650	1,777,080
Western Michigan	454,003	489,445	223,403	1,166,851
Total	3,540,127	6,483,237	3,618,105	13,641,469
<u>Public Two-Year</u>				
Alpena	15,857	17,753	91,215	124,825
Bay de Noc	17,192	—	65,480	82,672
Delta	60,427	37,955	54,819	153,201
Genessee (Flint C.C.)	35,186	15,798	111,769	162,753
Glen Oaks	25,766	23,225	44,684	93,675
Gogebic	28,559	—	25,543	54,102
Grand Rapids Jr.	66,473	30,224	93,437	190,134
Henry Ford	8,567	17,339	46,326	72,232
Highland Park	109,820	127,259	80,146	317,225
Jackson	25,713	11,148	22,816	59,677
Kalamazoo Valley	20,213	8,908	48,127	77,248
Kellogg	23,424	14,219	35,826	73,469
Kirtland	—	—	27,533	27,533
Lake Michigan	51,893	26,343	99,937	178,173
Lansing	19,500	20,680	34,894	75,074
Macomb	34,845	30,256	40,576	105,677
Mid Michigan	2,745	6,363	4,711	13,819
Monroe	14,335	19,089	45,807	79,231
Montcalm	2,745	2,020	19,177	23,942
Muskegon	19,663	16,035	55,336	91,034
North Central	5,820	5,653	8,883	20,356
Northwestern Mich.	25,737	16,461	14,773	56,971
Oakland C.C.	89,540	72,538	56,546	218,624
St. Clair	3,569	2,927	69,437	75,933
Schoolcraft	18,238	—	72,123	90,361

Table 37 (cont'd)

Institution	Federal			Total
	EOG	NDSL	CWS	
<u>Public Two-Year (cont'd)</u>				
Southwestern Mich.	5,234	—	26,792	32,026
Washtenaw	81,031	63,630	74,297	218,958
Wayne Co. Comm. Col.	—	—	—	—
West Shore	—	—	6,842	6,842
Total	812,092	585,823	1,377,852	2,775,767
<u>Private Colleges</u>				
Adrian	37,520	35,967	17,408	90,895
Albion	54,076	130,899	39,106	224,081
Alma	80,028	65,539	42,410	187,977
Andrews	63,723	46,768	8,682	119,173
Aquinas	104,398	30,440	37,683	172,521
Calvin	158,710	139,031	91,304	389,045
Calvin Theo.	—	9,544	—	9,544
Cleary	—	—	—	—
Concordia	—	3,137	8,320	11,457
Cranbrook	—	—	—	—
Davenport	28,615	29,461	22,882	80,958
DeLima	6,492	7,010	1,748	15,250
Detroit Bible	—	9,646	—	9,646
Detroit Col. of Bus.	—	—	—	—
Detroit Col. of Law	—	—	—	—
Detroit Inst. of Tech.	41,099	17,816	18,618	77,533
Duns Scotus	2,196	—	4,989	7,185
General Motors Inst.	—	—	—	—
Grace Bible	—	—	—	—
Grand Rapids Baptist	17,820	—	—	17,820
Hillsdale	41,298	70,788	32,958	145,044
Hope	155,297	109,761	31,281	296,339
Jackson Bus.	—	—	5,612	5,612
Kalamazoo	60,224	70,941	65,544	196,709
Lawrence Inst. of Tech.	14,229	15,271	11,236	40,736
Madonna	15,041	23,067	69,331	107,439
Maryglade	—	—	—	—
Marygrove	99,621	86,409	34,082	220,112
Mercy	47,971	90,230	51,228	189,429
Merrill-Palmer	2,474	2,055	—	4,529
Michigan Christian	16,436	35,249	14,494	66,179
Mich. Col. of Osteo.	—	—	—	—
Midrasha	—	—	—	—
Muskegon	—	—	5,769	5,769
Nazareth	26,442	6,999	21,014	54,455
Northwood	21,533	—	22,384	43,917
Olivet	81,103	54,149	23,258	158,510
Owosso	16,483	10,845	13,367	40,695
Reformed Bible.Inst.	—	—	—	—

Table 37 (cont'd)

<u>Institution</u>	<u>Federal</u>			
	<u>EOG</u>	<u>NDSL</u>	<u>CWS</u>	<u>Total</u>
<u>Private Colleges (cont'd)</u>				
Sacred Heart	—	—	35,409	35,409
St. John's	—	—	—	—
St. Mary's	—	—	—	—
Shaw (Mich. Luth.)	45,906	—	36,546	82,452
Siena Heights	—	—	—	—
Soc. of Arts & Crafts	—	—	—	—
Spring Arbor	58,251	74,765	—	133,016
Suomi	28,346	39,769	51,813	119,928
U. of Detroit	243,806	373,506	94,463	711,775
Walsh	—	—	—	—
Western Theo.	—	—	—	—
Total	1,569,138	1,589,062	912,939	4,071,139
Total Higher Educ.	5,921,357	8,658,122	5,908,896	20,488,375
Other	58,621	103,003	150,722	312,346
GRAND TOTAL	5,979,978	8,761,125	6,059,618	20,800,721

Table 37 (cont'd)

Institution	State			All Programs
	Scholarships (Schol)	Tuition Grants(TG)	Total	
<u>Public Four-Year</u>				
Central Michigan	384,751	I	384,751	1,206,629
Eastern Michigan	162,890	N	162,890	1,527,047
Ferris State	51,626	E	51,626	403,925
Grand Valley	86,212	L	86,212	488,909
Lake Superior	26,876	I	26,876	220,733
Michigan State	1,911,117	G	1,911,117	5,810,142
Michigan Tech.	213,171	I	213,171	441,134
Northern Michigan	126,699	B	126,699	674,697
Oakland Univ.	233,786	L	233,786	803,893
Saginaw Valley	14,273	E	14,273	91,702
Univ. of Michigan	1,203,898		1,203,898	3,444,026
Wayne State	268,656		268,656	2,045,736
Western Michigan	357,383		357,383	1,524,234
Total	5,041,338		5,041,338	18,682,807
<u>Public Two-Year</u>				
Alpena	8,877	I	8,877	133,702
Bay de Noc	3,915	N	3,915	86,587
Delta	15,325	E	15,325	168,526
Genessee (Flint C.C.)	7,106	L	7,106	169,859
Glen Oaks	1,099	I	1,099	94,774
Gogebic	8,861	I G	8,861	62,963
Grand Rapids Jr.	28,193	N I	28,193	218,327
Henry Ford	8,297	E B	8,297	80,529
Highland Park	—	L L	—	317,225
Jackson	9,145	I E	9,145	68,822
Kalamazoo Valley	1,280	I G	1,280	78,528
Kellogg	8,314	N I	8,314	81,783
Kirtland	935	E B	935	28,468
Lake Michigan	2,375	L L	2,375	180,548
Lansing	7,484	I E	7,484	82,558
Macomb	5,298	I G	5,298	110,975
Mid Michigan	990	N I	990	14,809
Monroe	2,980	E B	2,980	82,211
Montcalm	2,159	L L	2,159	26,101
Muskegon	22,825	I E	22,825	113,859
North Central	7,267	I G	7,267	27,623
Northwestern Mich.	19,846	N I	19,846	76,817
Oakland C.C.	5,108	E B	5,108	223,732
St. Clair	9,283	L L	9,283	85,216
Schoolcraft	4,000	I E	4,000	94,361
Southwestern Mich.	1,822	G	1,822	33,848
Washtenaw	680	I	680	219,638
Wayne Co. Comm. Col.	—	B	—	—
West Shore	320	L	320	7,162
		E		

Table 37 (cont'd)

<u>Institution</u>	<u>State</u>		<u>All Programs</u>
	<u>Schol</u>	<u>TG</u>	
<u>Public Two-Year (cont'd)</u>			
<u>Total</u>	193,784		2,969,551
<u>Private Colleges</u>			
Adrian	51,753	129,327	271,975
Albion	178,475	194,891	597,447
Alma	140,347	251,380	579,704
Andrews	59,727	168,269	347,169
Aquinas	126,975	247,484	546,980
Calvin	348,722	644,882	1,382,649
Clavin Theo.	—	—	9,544
Cleary	1,028	8,697	9,725
Concordia	7,745	5,253	24,455
Cranbrook	—	—	—
Davenport	5,508	148,540	235,006
DeLima	400	—	15,650
Detroit Bible	2,642	—	12,288
Detroit Col. of Bus.	2,390	84,451	86,841
Detroit Col. of Law	—	—	—
Detroit Inst. of Tech.	2,350	106,380	186,263
Duns Scotus	—	—	7,185
General Motors Inst.	3,525	9,730	13,255
Grace Bible	1,268	—	1,268
Grand Rapids Baptist	25,821	50,197	93,838
Hillsdale	9,794	37,929	192,767
Hope	155,660	242,844	694,843
Jackson Bus.	—	—	5,612
Kalamazoo	163,182	89,491	449,382
Lawrence Inst. of Tech.	16,198	247,644	304,578
Madonna	7,758	69,436	184,633
Maryglade	—	—	—
Marygrove	64,460	150,704	435,276
Mercy	63,305	178,691	431,425
Merrill-Palmer	804	280	5,613
Michigan Christian	2,770	31,866	100,815
Mich. Col. of Osteo.	—	—	—
Midrasha	—	—	—
Muskegon Bus.	3,378	30,758	39,905
Nazareth	24,503	79,899	158,857
Northwood	800	84,186	128,903
Olivet	46,910	173,635	379,055
Owosso	4,378	13,595	58,668
Reformed Bible Inst.	—	—	—
Sacred Heart	11,700	—	47,109
St. John's	—	—	—
St. Mary's	150	—	150
Shaw (Mich. Luth.)	—	73,702	156,154
Siena Heights	9,575	53,310	62,885

Table 37 (cont'd)

<u>Institution</u>	<u>Schol</u>	<u>State</u> <u>TG</u>	<u>Total</u>	<u>All</u> <u>Programs</u>
<u>Private Colleges (cont'd)</u>				
Soc. of Arts & Crafts	800	25,994	26,794	26,794
Spring Arbor	44,320	151,168	195,488	328,504
Suomi	1,600	85,840	87,440	207,368
U. of Detroit	398,874	1,004,462	1,403,336	2,115,111
Walsh	340	11,735	12,075	12,075
Western Theo.	—	—	—	—
Total	1,989,935	4,886,650	6,876,585	10,947,724
Total Higher Educ.	7,225,057	4,886,650	12,111,707	32,600,082
Other	400	—	400	312,746
GRAND TOTAL	7,225,457	4,886,650	12,112,107	32,912,828

Sources: State program data are actual expenditures as recorded by Student Financial Assistance Services, Michigan Department of Education, Lansing, Michigan.

Federal program data are grants to institutions as recorded in Notifications to Members of Congress; these will differ from actual expenditures when institutions do not spend the entire grant.

Table 38

State and Federal Financial Assistance for Students in Michigan Institutions of Higher Education by Program and Institution, 1970-71

<u>Institution</u>	<u>Federal</u>			<u>Total</u>
	<u>Educ'l Oppor.</u> <u>Grants(EOG)</u>	<u>Nat'l Def.</u> <u>Stu. Loans</u> <u>(NDSL)</u>	<u>College</u> <u>Work-Study</u> <u>(CWS)</u>	
<u>Public Four-Year</u>				
Central Michigan	257,900	674,842	200,000	1,132,742
Eastern Michigan	242,200	698,950	600,000	1,541,150
Ferris State	164,800	223,634	88,500	476,934
Grand Valley	194,100	200,512	100,000	494,612
Lake Superior	53,100	72,965	235,359	361,424
Michigan State	1,028,200	2,082,445	1,122,500	4,233,145
Michigan Tech.	93,000	38,389	80,000	211,389
Northern Michigan	158,600	310,358	179,000	647,958
Oakland Univ.	101,100	332,077	200,000	633,177
Saginaw Valley	42,000	22,060	28,000	92,060
Univ. of Michigan	397,100	1,698,099	350,000	2,445,199
Wayne State	614,400	1,126,033	500,000	2,240,433
Western Michigan	466,900	719,509	329,066	1,515,475
Total	3,813,400	8,199,873	4,012,425	16,025,698
<u>Public Two-Year</u>				
Alpena	21,600	26,533	117,382	165,515
Bay de Noc	18,400	—	61,905	80,305
Delta	72,000	44,560	70,000	186,560
Genessee (Flint C.C.)	37,100	23,880	100,000	160,980
Glen Oaks	27,600	28,807	45,600	102,007
Gogebic	41,600	—	30,000	71,600
Grand Rapids Jr.	81,900	35,251	110,000	227,151
Henry Ford	6,500	21,984	60,000	88,484
Highland Park	147,200	83,389	100,000	330,589
Jackson	29,700	19,331	29,011	78,042
Kalamazoo Valley	16,100	14,949	30,000	61,049
Kellogg	26,800	18,573	30,000	75,373
Kirtland	4,200	—	26,000	30,200
Lake Michigan	40,400	25,775	80,300	146,475
Lansing	23,000	29,944	44,280	97,224
Macomb	58,300	42,074	40,000	140,374
Mid Michigan	8,200	15,162	16,800	40,162
Monroe	13,400	13,275	30,475	57,150
Montcalm	3,100	2,927	26,000	32,027
Muskegon	23,300	16,678	55,300	95,278
North Central	8,700	8,183	11,199	28,082
Northwestern Mich.	27,200	12,281	17,900	57,381
Oakland C.C.	115,300	90,591	90,000	295,891
St. Clair	6,800	6,444	83,000	96,244
Schoolcraft	21,200	12,508	72,000	105,708

Table 38 (cont'd)

Institution	Federal			
	EOG	NDSL	CWS	Total
<u>Public Two-Year (cont'd)</u>				
Southwestern Mich.	14,200	—	26,516	40,716
Washtenaw	83,500	49,654	100,000	233,154
Wayne Co. Comm. Col.	—	75,808	120,000	195,808
West Shore	14,600	—	20,000	34,600
Total	991,900	718,561	1,643,668	3,354,129
<u>Private Colleges</u>				
Adrian	47,800	39,193	8,556	95,549
Albion	53,300	133,953	44,000	231,253
Alma	105,800	75,429	62,000	243,229
Andrews	60,800	48,517	4,903	114,220
Aquinas	103,200	58,751	45,000	206,951
Calvin	127,000	161,623	123,000	411,623
Calvin Theo.	—	14,024	—	14,024
Cleary	—	—	—	—
Concordia	—	3,419	9,869	13,288
Cranbrook	—	—	—	—
Davenport	104,000	43,211	45,000	192,211
DeLima	—	—	—	—
Detroit Bible	—	9,324	—	9,324
Detroit Col. of Bus.	20,500	17,057	16,000	53,557
Detroit Col. of Law	—	—	—	—
Detroit Inst. of Tech.	58,100	22,742	18,000	98,842
Duns Scotus	3,500	—	2,000	5,500
General Motors Inst.	—	—	—	—
Grace Bible	—	—	—	—
Grand Rapids Baptist	14,700	22,742	10,000	47,442
Hillsdale	38,200	80,073	15,706	133,979
Hope	143,600	128,869	29,700	302,169
Jackson Bus.	—	— ^{1/}	10,000	10,000
Kalamazoo	84,800	72,018	78,425	235,243
Lawrence Inst. of Tech.	23,700	22,424	10,784	56,908
Madonna	14,500	21,946	77,396	113,842
Maryglade	—	—	—	—
Marygrove	88,600	75,675	45,000	209,275
Mercy	68,100	102,192	53,062	223,354
Merrill-Palmer	700	611	—	1,311
Michigan Christian	14,400	49,465	6,056	69,921
Mich. Col. of Osteo.	—	18,952	25,620	44,572
Midrasha	—	—	—	—
Muskegon Bus.	—	13,266	12,000	25,266
Nazareth	29,100	8,187	24,000	61,287
Northwood	28,000	—	36,500	64,500
Olivet	86,800	65,043	30,220	182,063
Owosso	23,300	6,595	17,155	47,050
Reformed Bible.Inst.	—	—	—	—

Table 38 (cont'd)

<u>Institution</u>	<u>Federal</u>			
	<u>EOG</u>	<u>NDSL</u>	<u>CWS</u>	<u>Total</u>
<u>Private Colleges (cont'd)</u>				
Sacred Heart	—	—	45,000	45,000
St. John's	—	—	—	—
St. Mary's	—	—	—	—
Shaw (Mich. Luth.)	27,400	18,952	36,546	82,898
Siena Heights	—	—	—	—
Soc. of Arts & Crafts	—	—	—	—
Spring Arbor	77,600	73,534	—	151,134
Suomi	37,200	48,896	103,668	189,764
U. of Detroit	332,200	416,944	118,297	867,441
Walsh	—	18,952	—	18,952
Western Theo.	—	6,018	—	6,018
Total	1,816,900	1,898,597	1,163,463	4,878,960
Total Higher Educ.	6,622,200	10,817,031	6,819,556	24,258,787
Other	38,800	75,212	79,616	193,628
GRAND TOTAL	6,661,000	10,892,243	6,899,172	24,452,415

Table 38 (cont'd)

<u>Institution</u>	<u>State</u>			<u>All Programs</u>
	<u>Scholarships (Schol)</u>	<u>Tuition Grants(TG)</u>	<u>Total</u>	
<u>Public Four-Year</u>				
Central Michigan	340,619	I	340,619	1,473,361
Eastern Michigan	138,373	N	138,373	1,679,523
Ferris State	49,024	E	49,024	525,958
Grand Valley	111,111	L	111,111	605,723
Lake Superior	34,894	I	34,894	396,318
Michigan State	1,692,204	G	1,692,204	5,925,349
Michigan Tech.	235,230	I	235,230	446,619
Northern Michigan	149,578	B	149,578	797,536
Oakland Univ.	232,571	L	232,571	865,748
Saginaw Valley	27,476	E	27,476	119,536
Univ. of Michigan	1,218,920		1,218,920	3,664,119
Wayne State	327,209		327,209	2,567,642
Western Michigan	362,232		362,232	1,877,707
Total	4,919,441		4,919,441	20,945,139
<u>Public Two-Year</u>				
Alpena	8,430	I	8,430	173,945
Bay de Noc	8,050	N	8,050	88,355
Delta	18,380	E	18,380	204,940
Genessee (Flint C.C.)	10,996	L	10,996	171,976
Glen Oaks	4,490	I	4,490	106,497
Gogebic	15,492	I G	15,492	87,092
Grand Rapids Jr.	41,302	N I	41,302	268,453
Henry Ford	11,040	E B	11,040	99,524
Highland Park	1,320	L L	1,320	331,909
Jackson	19,057	I E	19,057	997,099
Kalamazoo Valley	3,390	I G	3,390	64,439
Kellogg	14,363	N I	14,363	89,736
Kirtland	572	E B	572	30,772
Lake Michigan	4,405	L L	4,405	150,880
Lansing	13,606	I E	13,606	110,830
Macomb	12,107	I G	12,107	152,481
Mid Michigan	1,388	N I	1,388	41,550
Monroe	6,605	E B	6,605	63,755
Montcalm	4,493	L L	4,493	36,520
Muskegon	27,202	I E	27,202	122,480
North Central	10,023	I G	10,023	38,105
Northwestern Mich.	22,829	N I	22,829	80,210
Oakland C.C.	9,301	E B	9,301	305,192
St. Clair	9,719	L L	9,719	105,963
Schoolcraft	6,585	I E	6,585	112,293
Southwestern Mich.	1,550	G	1,550	42,266
Washtenaw	1,420	I	1,420	234,574
Wayne Co. Comm. Col.	930	B	930	196,738
West Shore	3,470	L	3,470	38,070

Table 38 (cont'd)

<u>Institution</u>	<u>Schol</u>	<u>State</u> <u>TG</u>	<u>Total</u>	<u>All</u> <u>Programs</u>
<u>Public Two-Year (cont'd)</u>				
Total	292,515		292,515	3,646,644
<u>Private Colleges</u>				
Adrian	63,993	132,805	196,798	292,347
Albion	159,520	139,820	299,340	530,593
Alma	161,696	182,925	344,621	587,850
Andrews	54,816	161,390	216,206	330,426
Aquinas	125,535	224,050	349,585	556,536
Calvin	346,153	525,036	871,189	1,282,812
Calvin Theo.	—	—	—	14,024
Cleary	947	12,645	13,592	13,592
Concordia	9,630	8,152	17,782	31,070
Cranbrook	—	4,000	4,000	4,000
Davenport	9,616	173,847	183,463	375,674
DeLima	—	—	—	—
Detroit Bible	2,320	—	2,320	11,644
Detroit Col. of Bus.	3,298	121,033	124,331	177,888
Detroit Col. of Law	—	6,750	6,750	6,750
Detroit Inst. of Tech.	2,400	94,394	96,794	195,636
Duns Scotus	970	—	970	6,470
General Motors Inst.	9,155	8,610	17,765	17,765
Grace Bible	504	—	504	504
Grand Rapids Baptist	38,405	61,843	100,248	147,690
Hillsdale	14,262	36,485	50,747	184,726
Hope	166,738	194,692	361,430	663,599
Jackson Bus.	—	—	—	10,000
Kalamazoo	156,454	60,365	216,819	452,062
Lawrence Inst. of Tech.	31,118	216,174	247,292	304,200
Madonna	10,530	53,500	64,030	177,872
Maryglade	—	—	—	—
Marygrove	55,520	179,272	234,792	444,067
Mercy	74,815	244,252	319,067	542,421
Merrill-Palmer	—	—	—	1,311
Michigan Christian	3,859	36,209	40,068	109,989
Mich. Col. of Osteo.	—	—	—	44,572
Midrasha	—	—	—	—
Muskegon Bus.	2,161	64,162	66,323	91,589
Nazareth	26,505	85,288	111,793	173,080
Northwood	1,366	77,459	78,825	143,325
Olivet	54,602	187,616	242,218	424,281
Owosso	2,280	29,438	31,718	78,768
Reformed Bible Inst.	140	—	140	140
Sacred Heart	6,085	—	6,085	51,085
St. John's	—	—	—	—
St. Mary's	—	—	—	—
Shaw (Mich. Luth.)	—	71,098	71,098	153,996
Siena Heights	10,750	59,013	69,763	69,763

Table 38 (cont'd)

Institution	State		Total	All
	Schol	TG		Programs
<u>Private Colleges (cont'd)</u>				
Soc. of Arts & Crafts	2,383	28,513	30,896	30,896
Spring Arbor	45,929	192,312	238,241	389,375
Suomi	6,000	84,053	90,053	279,817
U. of Detroit	393,030	1,191,284	1,584,314	2,451,755
Walsh	—	5,721	5,721	24,673
Western Theo.	—	—	—	6,018
Total	2,053,485	4,954,206	7,007,691	11,886,651
Total Higher Educ.	7,265,441	4,954,206	12,219,647	36,478,434
Other	—	—	—	193,628
GRAND TOTAL	7,265,441	4,954,206	12,219,647	36,672,062

1/ Adjusted from \$9,097 because these funds not expended.

Sources: State program data are preliminary figures of actual expenditures as recorded by Student Financial Assistance Services, Michigan Department of Education, Lansing, Michigan.

Federal program data are grants to institutions as recorded in Notifications to Members of Congress; these will differ from actual expenditures when institutions do not spend the entire grant.

Appendix E

A Procedure For Estimating The Foregone Earnings Of Students

The average gross weekly earnings in current dollars in private nonagricultural industries were \$114.61 in 1969 and \$119.46 in 1970 (Council of Economic Advisors, 1972 Annual Report transmitted with the Economic Report of the President, U.S. Government Printing Office, Washington, D.C., 1972, Table B-32, p. 232). Let the average, \$117.04, represent weekly earnings foregone by full-time enrolled students who would have worked if not in college in the 1969-70 academic year.

Since "full-time" in this usage implies being in school approximately three-fourths of the year, the earnings foregone in the academic year would be $39 \times \$117.04 = \4564.56 for those who would have worked.

Not all young people, of course, do work. The labor force participation rates for civilian, noninstitutionalized 18-24 year olds not enrolled in school in 1969-70 were 93 and 64 percent for males and females, respectively (U.S. Department of Labor, Handbook of Labor Statistics 1971, Bureau of Labor Statistics Bulletin 1705, U.S. Government Printing Office, Washington, D.C., 1971, Table 11, p. 45). The student population in Michigan was approximately 60 and 64 percent male at the undergraduate and graduate levels, respectively. Combining the above information on the sexes, we obtain the following labor force participation rates for undergraduates and graduates:

$$\text{Undergraduates } (.60 \times 93) + (.40 \times 64) = 81.4\%$$

$$\text{Graduates } (.64 \times 93) + (.36 \times 64) = 82.6\%$$

Using the above labor force participation rates to deflate the earnings figure for an employed young person, the foregone earnings

become:

Undergraduates $.814 \times \$4565 = \3716

Graduates $.826 \times \$4565 = \3771

The calculation for graduate students assumes that their added earnings potential is balanced by their additional income as teachers and researchers; the assumption is admittedly crude, but it does have some basis in fact (see Theodore W. Schultz, Investment in Human Capital, N.Y.: The Free Press, 1971, pp. 115-119). Since the two figures differ by only a small amount, it is reasonable to use just one estimate, say \$3740.

In order to project foregone earnings, it is necessary to assume a rate of growth to apply to \$3740. During the 1961-69 period average gross weekly earnings in constant dollars in private nonagricultural industries grew at an annual rate of 1.56 percent and from 1961 to 1971 the average rate was 1.24 percent (Council of Economic Advisors, op. cit.). Using a rate of 1.3 percent which is roughly comparable to the income assumptions in the enrollment projections yields the following estimates of foregone earnings in 1969-70 dollars in the four academic years appearing in the analysis:

1969-70: \$3740

1975-76: \$4041

1972-73: \$3888

1980-81: \$4311.

Converting these to 1972-73 dollars gives

1969-70: \$4180

1975-76: \$4520

1972-73: \$4340

1980-81: \$4820.

Finally, these estimates must be used in conjunction with full-time-equivalent enrollment figures rather than headcount enrollments, for all of the above calculations assume that the student is a full-

time student.

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