MANAGERIAL BEHAVIOR, PRICING POLICIES, AND RESOURCE ALLOCATION WITHIN AMERICAN UNIVERSITIES AND AUXILIARY HEALTH CLINIC ENTERPRISES

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Chapter I

INTRODUCTION AND REVIEW OF THE LITERATURE

The purpose of this study is to apply the fundamental theorems of economics to the organization of American higher education institutions as well as to student health clinics within these institutions. Specifically, this study will attempt to: (1) analyze the effects of financing structure, competitive environment, and political organization on the constraints university administrators and managers face, (2) explain differences in resource allocation, pricing policies, and efficiency of state and private universities as a whole, and (3) explain differences in resource allocation, pricing policies, and efficiency of auxiliary student health clinic enterprises within state and private universities.

Institutions of higher education (colleges and universities) from now on referred to as "universities," not only produce a final output, "education," but also produce auxiliary or complementary outputs such as health care, food, housing, library, athletic, recreational, and administrative services. Of these auxiliary services, student health clinics or infirmaries were chosen for analysis because of the greater potential differences in resource allocation, pricing policies, and service offerings, and the relatively uni-

form demands for these services. To think of the organization of the student health clinic as a microcosm of the university would be misleading; however, predictions about student health clinic organization follow directly from the differences in the organization of the university. Naturally, these deductions about auxiliary enterprises are based on an understanding of the university as a whole, which is why analysis of universities will be undertaken at both the "micro" and "macro" level.

With positive transaction costs and given property right arrangements, financing structure and competitive environment imply differences in the constraints managers, patrons, faculty, and students face in their attempt to maximize utility. Identification of differences in these constraints allows prediction of differences in resource allocation (land, labor, capital, and manager emoluments), pricing and resource economizing policies, and efficiency within the university as well as within the student health clinic.

Models of managerial discretion and bureaucratic behavior have been applied to profit and non-profit firms; however, these models have not been tested within the context of non-profit institutions of higher education. Economic theory has been applied to institutions of education, but in no case has the analysis been supported by rigorous empirical tests.[1]

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[1] See, A. A. Alchian, "Private Property and the Relative Cost of Tenure," in P. Bradley (ed.), The Public Stake in Union Power (Charlottesville: University Press of Virginia, 1958), and "The Economic and Social Impact of Free Tuition," New Individualist Review, (Winter, 1968); J. M. Buchanan, "Student Revolts, Academic Liberalism, and Constitutional Attitudes," Social Research, 35 (Winter 1968); J. M. Buchanan and N. E. Devletoglou, Academia in Anarchy (New York: Basic Books, 1970); A. J. Culyer, "A Utility-Maximizing View of Universities," Scottish Journal, 1970, 349-68; M. Friedman, "The Role of Government in Education," in R. Solo (ed.), Economics and the Public Interest (New Brunswick, NJ, 1955), and "The Voucher Idea," New York Times Magazine, 23 September 1973; H. G. Manne, "The Political Economy of Modern Universities," in Education in a Free Society, ed. by A. H. Burleigh (Liberty Fund, Inc., 1973); Adam Smith, The Wealth of Nations (1776; reprinted New York: The Modern Library, 1937); and E. G. West, "Private versus Public Education: A Classical Economic Dispute," Journal of Political Economy (October 1964), 465-75, and Education and the State (Westminster: The Institute for Economic Affairs, 1970).

Furthermore, research in the area of student health care has been almost entirely neglected. The last study on student health care within American universities was done by Rodgers.[2] The only other study has been Mair's investigation of student health services in Great Britain and Northern Ireland.[3] Both of these studies are largely descriptive and offer no economic analysis of institutional differences and their effects on student health organization.

It is, of course, surprising that so little empirical work has been done in an area where academic economists have both a comparative advantage in research and a vested interest in improved university institutions. On the other hand, vested interest in the status quo may be even stronger. As Alchian has stated:

> If I thought this one exposition of economic analysis and one man's preferences really were capable of converting our system of education subsidies from zero tuition to a full tuition system . . . I might be less willing to expose it. . . .[4]

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[2] J. F. Rodgers, Student Health Services in Institutions of Higher Education (Washington: U.S. Department of the Interior, Bulletin No. 7, 1937.

[3] A. Mair, Student Health Services in Great Britain and Northern Ireland (Pergamon Press, 1974).

[4] Armen A. Alchian, "The Economic and Social Impact of Free Tuition," New Individualist Review, 5 (Winter 1968), p. 52.

However, if ideas had the long-term capital value that Keynes thought they did, then academic scribblers with an interest in more efficient university organization would rush to catalog the effects of institutional differences. This study represents a modest attempt to document the effects of these differences in the hope that "verified" theory does have a positive marginal product.

1.1 OUTLINE OF STUDY

The primary areas of research are (1) resource allocation, pricing policies, service quality, service mix, and output rates of student health care enterprises facing different institutional constraints, and (2) resource allocation and pricing policies within universities facing differences in financing methods , competitive environment, and political organization.

1.2 THE THEME OF THE STUDY

The major theme of this study is that managers, employees, patrons, and consumers, all having some control over the inputs and outputs of production, will behave in conformity with the first law of demand. For example, a manager's utility function includes a variety of arguments that can be expressed in short form as pecuniary and non-pecuni-

ary income. Managers will strive to maximize utility subject to a constraint that determines the rate at which pecuniary income can be exchanged for non-pecuniary income. That is, ceteris paribus, a manager will choose to consume more non-pecuniary goods the lower is the cost relative to pecuniary goods.

Most all institutions of higher education are non-profit in nature, yet the differences in the constraints university personnel face are significant.[5] Differences in constraints can be deduced from variations in:

1. the structure of university financing,
2. competitive position (demand elasticity), and
3. political organization (which is defined by property right arrangements, transaction costs, interest group preferences, and resource endowment).

First, with respect to the structure of financing and demand elasticity, universities will be classified as either "private" or "state."

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[5] Exceptions are the General Motors Institute, the Marjorie Webster Junior College, MacDonald's Hamburger College, and the National University in California. Furthermore, Fairleigh Dickinson University at Teaneck was a for-profit institution until the 1950s. Finally, although there are probably other examples, a number of Philippine universities are for-profit.

Private universities will be defined here as those that finance a relatively large proportion of total current expenditures through student tuition charges, say, over 70%. The higher the percentage of tuition financing, the more "private" is the university. Furthermore, it is assumed that private universities face a more elastic demand curve than state universities because of the greater number of close substitutes within a given tuition range and competition from lower tuition state universities.

State universities will be defined as those which finance a relatively small proportion of total current expenditures through student tuition charges, say, under 20%. State universities finance a relatively large percent of the budget through federal, state, and local government subsidies. It is expected that most state universities face relatively less elastic demand curves than private universities because of the relatively low tuition charges for in-state students and the tendency to price discriminate against out-of-state students.[6]

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[6] It should be pointed out that no attempt was made to measure demand elasticities for state and private universities. Furthermore, in one sense it is not clear whether private and state universities face the "same" demand curve with state universities locating in the less elastic portion of the demand curve or face different demand curves of different elasticities. Whatever is the case, the conclusions about the assumed differences in these elasticities would not be affected.

Second, with respect to political organization, differences in the costs facing alumni, student, patron, and taxpayer groups attempting to influence university decisions will have predictable effects on university organization. Significant differences in monitoring costs imply predictable variation in manager choices; patron and taxpayer groups may have less incentive to monitor the behavior of state university managers than do alumni and patrons monitoring the behavior of private university managers. Of course, in both state and private universities ownership rights are not exchangeable as they are for publicly held for-profit corporations, however, brand name capital depreciation will harm alumni and patrons of private and public universities more than those associated with state universities; i.e., the wealth reduction will be greater. Furthermore, because alumni groups from state universities tend to be larger, shirking from monitoring "responsibility" may be more widespread. Evidence of this can be found in the higher alumni contribution participation rates within private universities than within state universities.

Furthermore, different interest groups such as students, faculty, taxpayers, legislators, patrons, and alumni have conflicting preferences and face different costs of promoting those interests. For instance, in state universities,

the preferences of state legislators (or voters in the unlikely case they are well represented) will carry more weight than in private universities. As a result, preferences of students attending state universities may be less well represented.

Finally, an understanding of the property right structure within universities will add precision to the predictive models. The Coase theorem states that, with zero transaction costs and no income effects, property right or liability assignments will not affect the allocation of resources; however, this is only true if property rights are well defined. The distribution of property rights as well as the degree to which property rights are defined are important issues within the context of this study.

To conclude, within given property right arrangements, the structure of financing, demand elasticity, and political organization affect the constraints that university personnel face. Such differences between universities should explain much of the variation in resource allocation, pricing policies, and efficiency, both within universities and auxiliary health clinic enterprises.

1.3 VARIATIONS ON THE THEME

Property rights are an important feature of this investigation; however, certain aspects of the distribution and specification of property rights within the university must be clarified.

As will be seen, there are significant areas of undefined property rights within the university, a condition leading to predictable consequences. In other areas, however, property rights are clearly defined. For instance, if the output of the educational process is considered in terms of human capital improvement, then property rights to the enhanced values of human capital must be well defined to permit exchange between professor and student. Rights to human capital improvements are exchanged directly through faculty instruction, while recognition of the exchange is found in recommendations, grades, credit hours, and diplomas. Finally, there is a brand name capital value associated with the departments and universities through which students seek accreditation. Because property rights in education are well defined and exchangeable at relatively low cost, it would seem that, in this case, the markets for educational exchange would work efficiently and student demands would be more or less satisfied. That is, ceteris paribus, assuming homogeneous student preferences, differ-

ences in financing and political organization would not affect resource allocation, pricing policies, or university organization. Competition for students would drive university "profits" to zero and impose relative uniformity on the educational system. This implication, of course, is radically different from that outlined earlier, but it only follows if the educational industry is for-profit, competitive, and transaction costs are zero. The non-profit status of the university serves as insulation to student-consumer preferences, especially if a large proportion of the financing comes from outside sources. In this case, students will lose some degree of control over educational inputs, curriculum, and the composition of their enhanced human capital. Furthermore, if elements of "monopoly" exist in some universities, then students preferences may not be satisfied as fully as they would under competition.

It must also be noted that current students and alumni do have an interest in restricting entry to future students in order to raise their human capital asset value; however, this has little to do with the monopoly power that some universities may have with respect to students.

1.4 CODA

As has been stated, this study assumes that individual behavior conforms to the law of demand; while important determinants of relative costs are the financing structure, demand elasticity, and political organization that define these institutions. Furthermore, many of the groups within the educational system have different preferences, and one purpose of this study is to evaluate how, under different organizational constraints, the conflicting demands of these groups are satisfied.

It also should be noted that a number of possible models emphasizing different aspects of theory and involving different implications could be investigated; however, this study, anticipating gains from specialization, will concentrate on one fundamental model. All of the independent variables discussed earlier should contribute to the explanation of institutional differences between state and private universities; however, differences in financing structure will be used much more extensively to explain difference in resource allocation, pricing policies, and efficiency. Other factors, such as competitive environment and political organization, will be considered in the course of this investigation; but they will play minor roles compared to that of financing structure. Of course, other models specified

differently may be developed that better explain institutional differences; however, this is the method of scientific advancement.

A more fundamental goal of this research is to document the differences, in organization and outcomes, between private and state institutions of higher education. Although analysis of non-profit institutions such as universities may seem less tractable in terms of the public-private debate, differences in financing structure only should be enough to guarantee significant institutional variations. Finally, analysis of the consequences of these institutional differences will certainly allow more informed judgments about changes that would improve our present system of post-secondary education.

1.5 PREVIOUS RESEARCH

Much research has been done in the area of managerial discretion within public (non-profit and regulated) and private (for-profit) firms. Several authors have have provided the theoretical and some empirical background for the analysis of managerial behavior within public and private institutions. The general conclusion is that once the constraints that managers face have been identified, predictions about managerial choices, resource allocation, and pricing policies follow directly.[7]

Others have done research on bureaucratic organizations and manager behavior within bureaucracies. von Mises, Downs, Niskanen, and Tullock have all brought economic theo-

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[7] See, A. Alchian, "The Basis of Some Recent Advances in the Theory of Management of the Firm," Journal of Industrial Economics (November 1965), 30-41, and "Corporate Management and Property Rights," in H. Manne (ed.), Economic Policy and the Regulation of Corporate Securities (Washington, 1969); A. Alchian and R. A. Kessel, "Competition, Monopoly, and the Pursuit of Money," Aspects of Labor Economics (National Bureau of Economic Research, 1962); A. Alchian and H. Demsetz, "Economic Organization," American Economic Review (1972), 777-95; A. A. Berle and G. C. Means, The Modern Corporation and Private Property, (New York: Commerce Clearing House, Inc., 1932); D. G. Davies, "The Efficiency of Public versus Private Firms: The Case of Australia's Two Airlines," Journal of Law and Economics (April 1971), 149-65; M. Lindsay, "A Theory of Government Enterprise," (unpublished manuscript, 1974); and O. E. Williamson, The Economics of Discretionary Behavior: Managerial Objectives in a Theory of the Firm (Englewood Cliffs, NJ: Prentice Hall, 1964), "Managerial Discretion and Business Behavior," American Economic Review (December 1963), and Corporate Control and Business Behavior (Englewood Cliffs, NJ: Prentice Hall, 1970).

ry to bear on bureaucratic issues; however, these theories have not been applied to bureaucratic institutions within universities.[8]

Finally, the many advances in the theory of property rights describing the effect of property right specification on resource allocation and and resource dissipation must be noted. Alchian, Coase, Cheung, Demsetz, Furubotn and Pejovich, Pauly and Redisch, Umbeck, and many others have made important contributions.[9] Once the structure of rights and liabilities is understood, the evaluation of individual behavior under different sets of constraints can be applied to institutions of higher education.

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[8] L. von Mises, Bureaucracy (New Haven, CT: Yale University Press, 1944); A. Downs, Inside Bureaucracy (Boston: Little, Brown & Co., 1967); W. A. Niskanen, Bureaucracy and Representative Government (Chicago: Aldine Atherton, 1971); and G. Tullock, The Politics of Bureaucracy (Washington: Public Affairs Press, 1965).

[9] A. Alchian, Some Economics of Property (The Rand Corporation, 26 May 1961), and "Some Recent Advances in the Theory of Management of the Firm"; R. H. Coase, "The Problem of Social Cost," Journal of Law and Economics (October 1960), 1-44; S. N. S. Cheung, "The Structure of a Contract and the Theory of a Non-exclusive Resource," Journal of Law and Economics (April 1970), 49-70; H. Demsetz, "some Aspects of Property Rights," Journal of Law and Ecoonmics (October 1966), 61-70, and "Toward a Theory of Property Rights," American Economic Review (May 1967); E. G. Furubotn and S. Pejovich, "Property Rights and Economic Theory: A Survey of Recent Literature," Journal of Economic Literature (December 1972); M. Pauly and M. Redisch, "The Not-for-Profit Hospital as a Physician's Cooperative," American Economic Review (March 1972), 87-99; and J. Umbeck,

1.6 REVIEW OF THE EDUCATION LITERATURE

Ever since Adam Smith published The Wealth of Nations in 1776, economists have been interested in education and have even had some success in effecting changes in educational institutions. James Mill, Jeremy Bentham, J. R. McCulloch, T. R. Malthus, J. S. Mill, Nassau Senior, R. Lowe, and others were active in the education debate; however, it was not until the last 25 years that serious application of economic theory to educational institutions was developed.[10]

In Adam Smith's discussion of "the expense of the institutions for the education of youth," his central focus was the effect of financing method on the quality of education. Smith believed that the usual method of financing universities from outside revenues caused a number of undesirable outcomes. He suggested instead that

> (t)he institutions for the education of the youth may . . . furnish a revenue sufficient for defraying their own expense . . . (and) (e)verywhere the reward of the master does not arise altogether from this natural revenue, it is still not necessary that it should be derived from the general revenue of the society. . . .[11]

"A Theory of Contract Choice and the California Gold Rush," Journal of Law and Economics (October 1977), 421-37.

[10] For more on this debate, see E. G. West, "Private versus Public Education: A Classical Economic Dispute," Journal of Political Economy, October 1964, pp. 465-75; and Education and the State (London: The Institute of Economic Affairs, 1970).

As an introduction, Smith asks the following questions:

> Have these public endowments contributed in general to promote the end of their institution? Have they contributed to encourage the diligence, and to improve the abilities of the teachers? Have they directed the course of education towards objects more useful, both to the individual, and to the public, than those to which it would have naturally gone of its own accord?[12]

And confidently proposes that, "(i)t should not seem very difficult to give at least a probable answer to each of those questions."[13]

The principle used to analyze the effects of financing structure on educational institutions was nothing more than the law of demand. As Smith states:

> In every profession, the exertion of the greater part of those who exercise it, is always in proportion to the necessity they are under of making that exertion.[14]

And concludes that,

> The endowments of schools and colleges have necessarily diminished more or less the necessity of application in the teachers.[15]

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[11] Adam Smith, The Wealth of Nations (1776; reprinted New York: The Modern Library, 1937), p. 716.

[12] Ibid.

[13] Ibid.

[14] Ibid., p. 717.

[15] Ibid.

Smith furthermore concludes that outside financing encourages schools to use more discipline to "force all of (the) pupils to the most regular attendance upon (these) sham lectures(s),[16] that "the best endowed universities have been the slowest in adopting . . . improvements,"[17] and "(w)ere there no public institutions of education . . . no science would be taught for which there was no demand."[18] And, finally, that "(t)hose parts of education, . . . for the teaching of which there are no public institutions, are generally the best taught."[19] Smith makes these claims and gives examples to support each; however, the dangers of casual empiricism lead us to demand more rigorous tests of these propositions.

Armen A. Alchian: Alchian has written two papers on education: "Private Property and the Relative Cost of Tenure" and "The Economic and Social Impact of Free Tuition." In "Private Property and the Relative Cost of Tenure," Alchian discusses the "special employment relations in the professors' market" and attempts to explain why tenure contracts

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[16] Ibid., p. 720.

[17] Ibid., p. 727.

[18] Ibid., p. 733.

[19] Ibid., p. 721.

exist in colleges and universities and not elsewhere. Alchian concludes that the major reason for the use of tenure contracts is not, as is usually argued, because university professors need job security to pursue truth and teaching excellence, but instead arises "from the special ownership arrangements and financial structure of our colleges.[20]

Briefly, the argument goes as follows. Because colleges and universities are non-profit instituions, managers find it less costly to satisfy their own preferences in hiring and firing employees. Because the rights to profits are attenuated, the manager does not bear the full costs of these decisions. Therefore, the costs to the manager of entering into tenure contracts is less than in for-profit firms. Fear of employer "arbitrariness" in hiring and firing provides incentives for employees to demand protection from this "capricious behavior." Thus, as Alchian states,

> (B)ecause the demand for (tenure) is larger, and because the gains to the employer from opposing it get smaller, the probability of tenure is increased in non-profit institutions.[21]

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[20] Armen A. Alchian, "Private Property and the Relative Cost of Tenure," in The Public Stake in Union Power, ed. by P. Bradley (Charlottesville: The University Press of Virginia, 1958), pp. 350-71.

[21] Ibid., pp. 359-60.

Furthermore, in the case of universities with relatively large endowments and/or significant state financing,

> (I)t will be even more in the administrator's interest to devote some more of the income of the institution to sources of satisfaction that do not bring in pecuniary income.[22]

Besides being able to "purchase" non-pencuniary goods and services at lower cost, the costs of granting tenure will be even less and the demand for it even more for non-profit institutions that have the luxury of outside financing through endowment income and tax financed subsidies.

A number of tests of theory are suggested. First, the frequency of tenure contracts will be higher in non-profit school than in for-profit schools. This proposition is clearly supported by the evidence; for-profit schools such as Berlitz, Evelyn Wood and others do not have tenure contract arrangements with faculty.

Secondly, state financed and heavily endowed universities should have a higher incidence of tenure than private universities which are financed mainly through student tuition. Unfortunately, no empirical test of this proposition is offered, so caution about this conclusion must be exercised.

In "The Economic and Social Impact of Free Tuition," Alchian discusses the effects of financing structure on university organization, i.e., the effect of the subsidization

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22 Ibid., p. 363.

of universities (zero tuition) versus the subsidization of individuals (full tuition with financial grants to students).

Alchian notes, as did Adam Smith, that changes in the system of financing would dramatically change university policies and organization. If universities changed from zero or low tuition to full tuition financing, the increased competition for students would make teaching ability relatively more important than publishing performance. Students would have more control over teaching methods and curriculum; university managers would become more responsive to the demands of the marketplace than to their own interests. As Alchian states,

> The lower the ratio of tuition payments, the greater the power of the faculty over students because the students are less able to exert significant effects on the financing of schools or deparments as a reward for "good" performance--as they can with restaurants.[23]

Because of the gains low tuition offers to university administrators and faculty members, the greater is the incentive to finance universities through outside sources. Furthermore, university administrators have learned to utilize political connections in lobbying for financing from the state. In these cases, university decisions will be more influenced

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[23] Alchian, "Economic and Social Impact of Free Tuition," p. 50.

by state legislatures than by students consuming the services. Furthermore, because legislators' power is enhanced by direct state financing of universities, their incentive to adopt this form of financing may be just as strong as university administrators.

If legislators value more concrete evidence of spending on education, then it is more likely that relatively more emphasis will be placed on physical plant, recreational facilities, campus space, and faculty publishing record than on superior teaching and the efficient combination of inputs to the education process.[24]

To conclude, the important empirical implications proposed by Alchian are the following: (1) student preferences will be less well satisfied in state and heavily endowed universities than in universities where tuition payments represent a significant percentage of total revenues, i.e., there will be lower capital/student ratios, higher teacher/student ratios, less emphasis on publishing and more emphasis on teaching, and more limited auxiliary enterprises in private universities; (2) the quality of education per dollar spent will be higher in private universities than in state universities; (3) state universities will have a high-

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[24] Opportunities for kickbacks from building contractors may also be greater in state universities and would tend to encourage building contracts rather than teacher contracts.

er incidence of tenure than private universities; and, (4) private universities will exhibit greater variety in organization and educational philosophies than will state and public institutions.[25]

James M. Buchanan and Nicos E. Devletoglou: In Academia in Anarchy, Buchanan and Devletoglou analyze the unique industry of university education where, "students are consumers that do not buy, faculties are producers that do not sell, and taxpayers are owners that do not control."[26]

Taking these characteristics of university organization one at a time, the authors point out that the consequence of consumers not paying the full cost of their education is either congestion or rationing. Furthermore,

> There is no implication, however, that the quality of the service maintained will reflect the preferences of students. Since they do not have to pay full value for services, what legitimate claims can students possibly have on the determination of university quality?[27]

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[25] Even with zero transaction costs, this implication would not violate the Coase theorem as long as tastes for education were not homogeneous.

[26] J. M. Buchanan and N. E. Devletoglou, Academic in Anarchy (New York: Basic Books, Inc., 1970).

[27] Ibid., p. 20.

Finally, the current financing method insulates universities from the discipline of competition.

> The allocation of university resources tends to become less efficient <as a result of zero or low cost tuition>. . . . Under any scheme where students, themselves, are financed, rather than the universities, the producers of education would find it necessary to compete for students in order to obtain their resources.[28]

Again, competition would "force" producers to respond more to student tastes and preferences. Unfortunately, as will be seen, refutable implications about university efficiency are more difficult to find; however, evidence is certainly available.

In the case of "producers who do not sell," implications about faculty and administrator behavior are easily derived. With attenuated property rights to university profits, faculty and administration will attempt to discriminate against or exclude students who make the job of managing and teaching less rewarding.[29]

As has been argued, the greater the attenuation of property rights to profits, the lower the cost of ignoring consumer demands. One manifestation involves the responsiveness of the curriculum to changes in student preferences. Because faculty members have a significant degree of control

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[28] Ibid., p. 30.

[29] Ibid., pp. 41-43.

over the courses offered, the university curriculum would be expected to remain relatively constant over time and not respond to shifts in demand. It is costly to faculty to offer new subject matter; however, these costs are lower to faculty in private institutions. Therefore, private universities will yield to consumer changes in tastes by changing the curriculum more frequently than state universities.[30] As Buchanan and Devletoglou state,

> Faculty control is, . . . mitigated to the extent that competition enters at any level. It is at once evident that any lessening of a monopoly position reduces the discretionary range open to decision makers.[31]

Finally, additional support for the above implictions can be derived from the fact that taxpayers are owners who do not control. Buchanan and Devletoglou point out that most modern universities, especially state universities, are "common property" which no one really owns. Ownership is more divorced from control than in any private for-profit firm, largely because there is no capital market in university shares that would foster efficient diversity of ownership, low-cost input combinations, and management responsiveness to consumer demands. The extent of inefficiency will depend, in part , upon the degree to which ownership is

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30 Ibid., p. 47.

31 Ibid., p. 56-7.

divorced from control; however, as will be seen in a later discussion, this proposition must be qualified.

The authors also attempt to explain why the taxpayer would willingly finance universities through taxes. Naturally, there is recognition that compulsory payments protect society from free riders unwilling to subsidize an industry characterized by external benefits. However, it is not clear that the "right" people are receiving the subsidies or whether the external benefits are as great as believed.

The attempt to solve this problem of "market failure," however, creates another; overinvestment is a possible consequence because of bureaucratic capture of legislators controlling government spending. This, of course, leads to the discussion of government failure. The free-rider problem in reverse explains why it is irrational for individuals to attempt to reduce excess government expenditures; the expected return on the investment in changing policy is significantly lower than the costs involved.[32] Furthermore, charity certainly plays a significant role because people believe that the goals of education are valuable. However, as Gordon Tullock has argued, charitable institutions are often less efficient than for-profit institutions because the monitoring of manager behavior is much less important

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[32] Ibid., p. 68.

than the act of giving itself.[33]

In their discussion of the differences between state and privately endowed universities, Buchanan and Devletoglou argue that,

> The particular vulnerability of the endowments of private universities must be mentioned. . . . These endowments represent wealth that is available for tapping. And, in many cases it may prove much easier to tap the existing endowment wealth of private universities than it is to tap the potential wealth of public universities represented in the tax base of the community.[34]

Thus, well endowed private universities may tend to yield faster to minority student demands than state universities, much as they did in the late 1960s and early 1970s. Furthermore, private universities with little or no endowment probably would not yield as quickly to unreasonable minority student demands as well-endowed private universities because those administrators and students would have a greater interest in maintaining quality academic standards. Weak, casual evidence suggests that the lowest level of student disruptions during the 1960s was found in less well-endowed private and state universities rather than in well-endowed private universities.

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[33] Gordon Tullock, Private Wants, Public Means (New York: Basic Books, 1970), Ch. 14, and "The Charity of the Uncharitable," Western Economic Journal (December 1971), 379-92.

[34] Buchanan and Devletoglou, Academia in Anarchy, pp. 79-80.

Finally, in discussing the peculiar ownership characteristics of universities, the authors state that

> (W)e may question whether or not the rights of ownership are vested with any person or group. . . . The person who holds title to a piece of land is entitled to use the land for some purposes but not necessarily for all purposes. . . . The modern university is much more complex . . . (i)f one looks at the university in terms of ownership, it immediately seems a very complex and interlinked chain of rights, duties, and obligations claimed and exercised by several well-defined groups in a peculiar sort of hierarchy.[35]

The second half of this book, the application of the theory to an explanation of student disruption is not particularly germane to this study and will not be reviewed.

A rough outline of the empirical implications that follow from the Buchanan and Devletoglou analysis follows: (1) There will be weaker attempts to minimize the cost of output in state universities relative to private universities; (2) service quality and output mix will satisfy student preferences less in state universities than in private universities; (3) well-endowed private (and in some cases state) universities will discriminate more against students scoring poorly on SAT exams and/or having low grade point averages; (4) state and well-endowed private universities will not respond as quickly to changes in students tastes in curriculum; and (5) private universities will offer greater diver-

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35 Ibid., pp. 81-82.

sity in course offerings yet will be less tolerant of minority and radical student groups attempting to infuence university policies.

A. J. Culyer: In "A Utility Maximizing View of Universities,"[36] Culyer uses a simple utility maximization model to derive implications about university organization. That many of the implications are also derived by Smith, Alchian, and Buchanan and Devletoglou provides evidence of the consistency of economic theory.

Culyer assumes that university administrators, faculty, and students are utility maximizers, and points out that the non-profit nature of universities implies that managers will attempt to increase their consumption of on-the-job sources of utility relative to take-home income. As Culyer states,

> Previous analysts have pointed out that utility maximizing managers who are not compelled by their market environment to make high profits have the costs to them of acquiring on-the-job sources of utility reduced, and hence they are predicted to increase consumption of such components. . . . Pretty secretaries tend to be substituted for efficient ones, solid mahogany desks for veneered, and . . . inefficient white employees substituted for efficient black ones. In universities, similar behavior is predicted: the office furnishings of administrators will tend on average to be luxurious compared with those of academics, labour intensive teaching techniques are retained though

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[36] A. J. Culyer, "A Utility Maximizing View of Universities," Scottish Journal of Political Economy, 17 (November 1970), 349-368.

> in many cases productivity could be increased with more capital intensive methods, especially in lecturing.[37]

Culyer continues by derving implications from the conflict between administrators, faculty, and students. With respect to administrators and faculty, Culyer believes that management rights give them "wide discretion in the use of their authority."[38] Furthermore, Culyer argues (as did Alchian) that the "(s)ecurity of tenure, . . . is precisely the sort of institution which would be predicted to develop . . . as a defense against the additional possible threat of political interference."[39] In addition, as Culyer argues,

> This theory would predict that in countries where there are both state-owned and privately operated colleges tenure would be relatively more frequent in the former than the latter.[40]

Culyer attempts to identify the arguments in the utility functions of the faculty and adminstrators so that predictions about resource allocation within departments and the university can be made. Without such identification, the testable propostions would remain empty. Culyer argues that,

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[37] Ibid., p. 353.

[38] Ibid., p. 354.

[39] Ibid.

[40] Ibid.

> (c)eteris paribus, teachers would probably prefer a more comprehensive library stock, greater number of competent professional colleagues, research assistants, etc., while administrators might prefer more personal telephones, carpets, social junketing, and other entities that increase their on-the-job utility.[41]

Culyer continues and discusses the consequence of conflict between faculty and administrators, and students by noting that students have limited rights which instead are held by administrators and faculty; that is,

> (n)o student has the right to a university place, neither can he purchase that right. British universities are, in effect, organized in a state controlled cartel and there are very substantial barriers to entry in the cartel.[42]

Because of this particular distribution of rights, as Buchanan and Devletoglou pointed out, faculty and administrators will establish quality standards for students that will satisfy their preferences, i.e., intelligent and congenial students that reduce teaching and policing efforts.

Finally, a number of implications follow from the analysis of conflicts between administrators and students. Here Culyer is interested in the rules and regulations imposed on students "which could not survive in a situation where exchange was possible."[43] Examples of such restrictions are:

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[41] Ibid., p. 355.

[42] Ibid.

[43] Ibid., p. 357.

requirements that students behave according to certain moral codes and live in campus dormitories for the first two years, restrictions on the use of automobiles to all but commuting students, denial or attenuation of visitation rights between sexes, physical education and other curriculum requirements, dress codes, and parking restrictions. In contrast, Culyer observes that colleges and universities which face greater competition from other institutions and are more dependent on student fees for financing will not impose such restrictions on student behavior.[44]

An additional implication derived by Culyer, a major thesis of Buchanan and Devletoglou in Academia in Anarchy, is that,

> (t)he absence of well organized markets in which the rights to education and its ancillary services can be exchanged leads . . . to major inefficiencies. (Although) student protest must clearly be regarded as an extremely costly method of exchanging rights . . . . (I)t is a substitute for exchange in the market place.[45]

Culyer furthermore applies the concept of monopoly extension and tie-in sales to certain behavioral restrictions and charges on auxiliary university services and argues that,

> All British universities operate a tie-in system of more or less sophistication. (A) convenient and important example of this sort of tie-in is

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[44] Ibid., pp. 357-58. Note also that some of these restrictions may be tie-in devices to raise total revenue.

[45] Ibid., pp. 358-62.

> the sale of the university's own residential accommodation(s). . . .[46]

It must be noted, however, that these alleged cases of monopoly extension through tie-in sales may simply be evidence of price discrimination; for example, not requiring elastic demanders, such as part-time or extension students to live in university residence halls.

Milton Friedman: In "The Role of Government in Education" and "The Voucher Idea,"[47] Friedman provides a prescriptive analysis of state secondary and university education systems. The thesis of both articles is that state school systems are supplying inferior products because they are insulated from the discipline of competition. Friedman discusses two justifications for government financing of education:

1. neighborhood effects, and
2. paternalistic concern for "irresponsible" parents and children.[48]

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[46] Ibid., p. 359.

[47] Milton Friedman, Capitalism and Freedom (Chicago: University of Chicago Press, 1962), pp. 85-107; and "The Voucher Idea," New York Times Magazine, 23 September 1973.

[48] James Buchanan, however, has argued persuasively that the equity criterion of equal opportunity may be the strongest justification for state financing, through not production, of education.

But he notes that,

> (t)he actual administration of educational institutions by the government, the "nationalization," as it were, of the bulk of the "education industry" is much more difficult to justify on these, or, any other grounds.[49]

If this is the case, and there is evidence suggesting it is, then competition could be increased dramatically and the education system "denationalized" through a simple voucher system. The essence of a voucher system is that educational taxes will remain the same; however, the income would be transferred not to monopoly public school system administrators or school boards, but to the parents, in the form of vouchers that could be used in any accredited vocational or educational institution. If vouchers were introduced, "public" schools would be forced to compete for students, just as all entering educational firms would, by offering quality, low cost education. The consequences of such a change are obvious: greater diversity in educational institutions, greater responsiveness to consumer preferences, increased technical innovation, higher teaching quality, and lower unit costs.

Friedman, in these articles, spends the rest of his time on the political and legal advantages and difficulties of the voucher program. These arguments, important as they

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[49] Capitalism and Freedom, p. 89.

are, do not have significant bearing on the goals of this study and will not be reviewed here. Friedman's analysis, however, is consistent with the thesis that public or state schools will be organized less efficiently than private schools; identifiable differences between state and private schools are predicted to exist. Being more interested in describing an alternative to the present monopoly public school system, Friedman does not derive the theoretical implications of institutional differences.

Henry G. Manne: In "The Political Economy of Modern Universities,"[50] Manne builds on the work of Alchian, Buchanan, Devletoglou, and Culyer but proposes a slightly different approach to the problem of university organization. The previous writers focused on the effects of less-than-full-cost tuition, while Manne's theme is that the "non-profit organization of universities is probably the principal determinant of less-than-full-cost tuition."[51] Furthermore, Manne argues that this "broader approach will explain a wider range of issues and behavior patterns that can be related exclusively to the less-than-full-cost tui-

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[50] Henry G. Manne, "The Political Economy of Modern Universities," The Economics of Legal Relationships: Readings in the Theory of Property Rights, (St. Paul, MN: West Publishing Co., 1975), pp. 614-30.

[51] Ibid., p. 614.

tion circumstance."[52] Unfortunately, Manne states that

> (n)o effort will be made to examine in detail the full behavioral implications of state-owned and state-operated universities, though the development of state universities, . . . played an important role in establishing some aspects of the modern private university.[53]

Manne begins his analysis with an historical overview of the origins of the modern university. He first identifies two traditions in nineteenth century American education: (1) religious education designed to inculcate religious values and train students for the ministry; and (2) elitist, liberal education viewed as a luxury good and intended to train, or at least amuse, wealthy upper-class members. The political economy of these schools, says Manne, was quite similar; they were both upper-class institutions and were controlled by those who provided the financing. Furthermore, it also appeared that universities were more interested in maintaining social values than in educating. As Manne proposes,

> Brilliance and scholarship were not the virtues most highly regarded for either students or teachers. Loyalty to the cultural or religious ideals of the institution must have been far more important than grades, publications, or inventions.[54]

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[52] Ibid.

[53] Ibid.

[54] Ibid., p. 617.

The religious nature of most universities during the nineteenth century had much to do with the secular universities' choice of non-profit status. Competition with religious universities that, for first amendment reasons, were regularly exempted from local taxation, encouraged non-denominational universities to seek this implicit state subsidy as non-profit institutions.

Manne goes on to offer an explanation of the less-than-full-cost tuition characteristic of universities during this time period. He argues that,

> Clearly, if universities were to function efficiently as the means by which donors "produced" attitudes for a certain set of students, it was necessary to avoid a competitive market situation. This could only be guaranteed if the education was offered at a "bargain" price; that is, below full cost. If schools began to cover all costs by tuition, students or their parents would have been converted into "consumers" and would have exercised normal market controls over competing sellers. Only by maintaining the form of a non-profit institution subsidizing, . . . the students who could take advantage of the program could the donors continue to control the substance of what was taught, who taught it, and to whom it was taught.[55]

Manne notes that, in time, the demand for vocational training in medicine, dentistry, law, accounting, engineering, and other areas of study increased to the point where a number of proprietary schools entered the market. At one point, Manne argues, these proprietary vocational schools

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[55] Ibid., p. 618.

may have predominated; however, government "standards" used to protect existing schools from this competition were imposed causing the proprietary schools to leave the industry.

Manne proposes, however, that the major change for the American system of higher education came with the dramatic expansion of state universities after the Morrill Acts of 1862 and 1890.[56] State universities thus became a significant competitive threat to private universities and have been increasing their market share ever since. It is, of course, ironic that the expansion of the state university system involves an increase in the net transfer of wealth from lower and middle income groups to upper income groups, those most likely to be willing to forego current income for a college education. Although the extent of wealth transfer from the poor to the educated is probably less today than it was 50 or 100 years ago, there is evidence that this transfer is significant even today.

Manne also discusses a number of important changes that have occurred only recently. First, more progressive personal income tax rates have lowered the costs of charity meaning a relative increase in university support through gifts of money and facilities. This, however, does not mean that control by outside donors has increased. On the con-

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[56] Ibid., p. 619.

trary, Manne argues that despite the increased private support of universities, influence with respect to university policy has decreased.[57] Furthermore, "(f)oundations have avoided giving any positive direction to universities . . . (and) have certainly done almost nothing to counteract economic and political biases of most of them."[58] Second, government sponsored research and government contributions have increased dramatically. Again, this would tend to weaken the influence of individual donors who may attempt to affect university policy through contributions. Furthermore, as faculties are given alternative means of support for research through government grants, it would become more difficult for trustees and donors to influence administra-

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57 Galbraith offers a dissenting view by asserting that, "(C)ontrol (of educational institution budgets) has been undergoing steady erosion. Funds are accepted from the federal government and, in lesser measure, from industrial firms, for research, for teaching and for scholarships. . . . The funds reflect the areas of industrial need. In effect, it means that the industrial system, acting on its own behalf or through the agency of the Federal government, has bypassed the university administration to adapt education to its requirements. The nineteenth century entrepreneur who, from his position on the university board, intervened to suppress heresy and insist on proper respect for Christian principles and acquisitive (sic) capitalism, exercised only the most trivial influence as compared with the power thus deployed. It is a measure of its subtlety, and that of the standard college president, that the latter, declaiming on his commitment to academic freedom, is often unaware of how much of it he has himself surrendered." (The New Industrial State, (Houghton-Mifflin, 1967).

58 Manne, "Political Economy of Modern Universities," p.

tion and faculty behavior.[59]

Manne also focuses on the behavior of four important groups within universities: trustees, administration, faculty, and students.

In Manne's view, trustees appear to be the weakest of all these groups. Although there are exceptions, trustee control of the views taught and the standards for student selection has been yielded to the faculty. Manne's claim that trustees have an "almost total lack of real interest in exercising any authority,"[60] is possibly exaggerated; however, some evidence of trustee impotence is found in the willingness of some universities to allow student representatives to sit on the board of trustees.

The administration or president, according to Manne, has more control over university affairs than do trustees because much of trustee control has been lost to the faculty. To satisfy better faculty preferences, university presidents and deans are required to have fund raising rather than man-

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620. It should be noted that this conclusion may not be as true today. An article in the 16 July 1978 New York Times Business and Finance section discusses William Simon's success in getting some foundations to be more selective in their support of universities to avoid financing "left-wing intellectuals and institutions which espouse the exact opposite of what (business) believes in."

59 Ibid., pp. 620-21.

60 Ibid., p. 621.

aging abilities; and, as government, foundation, and private donations become more important sources of financing, faculty members will seek administrators with political, foundation, and industry connections. Manne comments on the power that remains with the administration by saying that,

> University presidents today have almost no authorized discretionary power over academic matters like faculty selection and course content. They can, however, still wield some influence by tactical use of their power over budget matters. A strong president, with trustee support, can use the budget as a lever to gain some academic policy ends. . . . A skilled president can still make matters uncomfortable for professors who are personally obnoxious to him, but even that power must be used sparingly. . . .[61]

Furthermore, Manne asserts that if the faculty finds itself in conflict with administration policies, they need only wait for the opportunity to choose a president whose views are more coincident with their own.

Again, qualification of the above statements should be made. First, faculty may find themselves waiting years for the opportunity to choose a new president and, in many cases, faculty have little or no control over the choice of president. Second, the issue of "control" is sometimes difficult to analyze. There are many cases where "superior" but controversial professors are not granted tenure or given terminal contracts over faculty protests. Or there are cas-

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[61] Ibid., p. 624.

es where the president of the institution hires a faculty member over the heads of the disapproving faculty. That is, faculty may be given the "choice" or "control" as long as their decisions conform to the interests of the administration. Yet, even in these cases, the president or administration is not really controlling the outcome either; the spectrum of student, trustee, faculty, donor, and institutional interests all carry some force in the decision process.

Finally, it is difficult to imagine that either faculty, administration, or trustees have a significant degree of control over policy within a price-taking university. Most of the empirical implications are derived in Manne's discussion of the faculty; however, again there are no significant differences between Manne's analysis and that which has been outlined earlier. Manne, in fact, notes that so much has been done by Alchian, Buchanan, and Rogge that little can be added.

Manne argues that faculties have gained power within universities because, receiving the greatest benefits from control, they have worked hardest to achieve control and found it relatively easy to move into the power vacuum created by the trustees.[62] As faculties gained more control,

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[62] Ibid., p. 626.

the university organization was changed to suit their interests better. As has been pointed out, faculties prefer to teach good students because they are "easier" to teach, research grants are more available to universities with "good reputations," and faculty brand-name capital value also increases with the reputation of the institution. Therefore, as faculty increased its influence within the university, one would expect to find relatively more emphasis on academic qualifications than before. Casual evidence suggests that, at least in Ivy League universities, the entrance requirements are much stricter today than in the 1930s and 1940s. However, it is not at all clear whether this is a result of increased faculty control or the simple result of successful product differentiation and monopolization by these universities. Ceteris paribus, increased government grants and other outside financing would, however, make this form of discrimination against "inferior" students a less costly policy for faculties to pursue.

Manne also discussed the ability of faculties to earn non-pecuniary income through lighter teaching loads, arguing that teaching load would be inversely related to faculty control. Futhermore, Manne argues, the curriculum will reflect faculty preferences more than student demands, graduate programs will be preferred to undergraduate programs,

and faculty will not be required to spend much time counselling students outside of the classroom.

As has been discussed by Alchian and Buchanan, Manne points out that faculty making decisions about hiring do not face ordinary market constraints and will search for colleagues that will "fit in" with the rest of the department; that is, views of faculties in these departments will tend to be relatively homogeneous. Again, it is expected that the more private the university, the relatively less homogeneous the views within departments. Furthermore, state universities will emphasize publication record relative to teaching ability.

Wasting little effort on the analysis of students, Manne maintains that the conflict of interest between students and teachers is almost always resolved in the favor of teachers. This, of course, should come as no surprise because,

> (t)here is really no way that students can make their demands felt in this non-profit environment. Those who make decisions in universities cannot profit personally by operating the university in the ecuational interest of the students.[63]

Once again, students demands or preferences will be better satisfied the greater tuition payments are as a percent of total revenues.

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[63] Ibid., pp. 629-30.

E. G. West: Probably more has been written by E. G. West on the economics of education than by any other contemporary economist. He has written two books: Education and the State and Education and the Industrial Revolution, edited a book, Nonpublic School Aid, and authored "Private versus Public Education: A Classical Economic Dispute," as well as numerous other articles, most of which are contained in that volume.[64] For the purpose of this study, only the former volume need be reviewed.

In Education and the State, West begins much the same way Smith did by asking such fundamental questions as:

> Why should the state educate? Do we believe that others cannot be trusted? What is the real basis of the common assumption that if the state withdrew from education and reduced taxes accordingly, most children would be worse off? . . . Does the average parent . . . approve of the present system only because he thinks that other (richer) people are paying for most of the child's education? Or does each parent (believe) that most other parents would be negligent if the state did not continue to do their educational spending for them? . . . How do we explain the increasing momentum of state spending on education in the latter half of the 20th century . . . ? Have important new arguments for state intervention appeared . . . (o)r has state education become a "necessary" institution simply because it is one of those institutions to which we have become accustomed?[65]

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64 Education and the State (London: The Institute of Economic Affairs, 1970); Education and the Industrial Revolution (London: B. T. Batsford Ltd., 1975); Nonpublic School Aid (Lexington: Lexington Books, D. C. Heath and Company, 1976); and "Private versus Public Education: A Classical Economic Dispute," Journal of Political Economy, 72 (October 1964), 465-75.

West continues by pointing out that state involvement in education may be a good example of society's self-deception about existing institutions because of an inadequate application of logic and evidence supposed to support these institutions.[66] Furthermore, West argues that with such institutions, once established,

> there follows the danger that the original political exertion will adopt a momentum of its own and grow beyond all proportion. For instance the employees and administrators of the new institution may become a vested interest of significant political influence. Furthermore, the institution may condition successive generations into accepting it simply by habitual dependence on it.[67]

West also argues that the case for state education, or state financing of education, is best made in the context of two principles: (1) a paternalistic interest in the welfare of children, and (2) the neighborhood effects or positive externalities argument. West then spends a good deal of time analyzing the above two justifications for state control of or intervention in the education industry.

With respect to the state's interest in protecting children, West asks whether the state or the parent is better equipped to protect the child's interest in education, and he concludes that parents, the better equipped of the two,

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[65] Education and the State, pp. 1-2.

[66] Ibid., p. 2.

[67] Ibid.

should not have "absolute" control over their children; however, the state should only interfere in those cases where children are being "abused" by the parents' irresponsibility. Of course, the issue of what constitutes abuse is a difficult one and West does not attempt an answer. West continues by asking which children need protection and concludes that greater emphasis on education and less emphasis on schooling would go far in protecting children from the abuses of the present educational system. That is, much of the present abuse stems from the inability of the current, state-controlled, education system to recognize the significant diversity of interests and preferences among students; instead of spending 12 years teaching students to read Shakespeare and multiply with logarithms, time could be spend teaching marketable skills to the students who most need the increases in productivity. Furthermore, having state institutions provide schooling is very different from making education, in either marketable skills or academic achievement, compulsory and simply enforcing this through mandatory achievement or certification examinations.[68]

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[68] Ibid., p. 12. In Mill's Essay on Liberty (London, 1859, ed. Fontana, 1962), the same argument is made. Mill argues that, "Once in every year the examination should be renewed, . . . (so as to make) a certain minimum of general knowledge virtually compulsory. Beyond that minimum there should be voluntary examinations on all subjects, at which all who come up with a certain standard of proficiency might claim a certificate."

Of course, J. S. Mill believed that, in the case of education, the principles of laissez faire broke down because he felt that children and young adults were not competent enough to choose among competing educational institutions; however, most economists would argue that competition among institutions would guarantee higher quality, lower cost education (even to those few "incompetent" consumers) than the education provided by monopoly state paternalism.[69]

West then considers the neighborhood effect argument for state intervention in education by proposing two broad cases: (1) social benefits of education derived from reduced crime, increased "social cohesion," and a better functioning democracy, and (2) social benefits in the form of increased human capital investment, greater worker productivity, and increased real output."[70] West maintains that, important as these arguments are, they have been oversold, and he spends the next four chapters documenting this belief.

In the remaining chapters, West discusses the classical economist's positions on the role of the state in education and provides an historical overview of the rise and fall of private education. West concludes his work by analyzing current trends in education and proposing reforms. Finally,

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[69] Ibid., pp. 8-14.

[70] Ibid., pp. 31-32.

West issues a warning by stating that,

> All . . . theoretical work should be continually tested for concealed value-judgments and for relevance to the facts; if economists themselves do not bother to do this, then one danger is that by "fond repetition" the hypotheses themselves will eventually masquerade as evidence. Another danger is that theorems will be used to rationalize existing policy at one moment only to be dropped when it is inconvenient.[71]

This concludes the review of the literature. Unfortunately, not all economists who have written on education can be reviewed here (see Pauly, 1967; Rogge and Goodrich, 1964; Southwick, 1967, 1969; and others); however, a representative sample of the research relevant to this study has been covered.[72] Again, it is instructive that of all the above approaches to education, no significant differences in implications exist and only small differences in emphasis and theoretical framework. Finally, although the previous researchers applied economic theory to the broad characteristics of universities, very little evidence was presented to support these arguments. One purpose of this study is to

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[71] Ibid., p. 232.

[72] M. Pauly, "Mixed Public and Private Financing of Education: Efficiency and Feasibility," American Economic Review (No. 1, 1967); B. Rogge and R. Goodrich, "Education in a Free Society," in A. H. Burleigh, ed., Education in a Free Socity (Indianapolis, IN: Liberty Fund, Inc., 1973). L. Southwick, "Cost Trends in Land Grant Colleges and Universities," Applied Economics (No. 1, 1969), and "The University as a Firm," Carnegie Review (No. 13, 1967).

test some of these broad propositions at the university level as well as to apply and test these theorems with respect to auxiliary student health clinic enterprises.

Chapter II

A THEORY OF MANAGERIAL BEHAVIOR

In this chapter, a theory of managerial behavior within non-profit institutions of higher education will be developed. A generalization of the following approach is that the relative cost of goods in the manager's utility function will predictably affect consumption rates of these goods. There exists a number of models of managerial discretion and bureaucratic behavior; however, all have been applied to issues of managerial behavior differences between for-profit and non-profit institutions. This investigation proposes to analyze the differences in the constraints managers face within state and private universities, and provide theoretical justification for the propositions to be tested in Chapter III.

2.1 METHODOLOGY

The methodology employed in this study is positive[73] and individualistic.[74] A requirement of positive economics is

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[73] See Milton Friedman, "The Methodology of Positive Economics," in Essays in Positive Economics (Chicago: University of Chicago Press, 1935), pp. 3-34.

[74] See, James M. Buchanan and Gordon Tullock, The Calculus of Consent (Ann Arbor: University of Michigan Press, 1962), pp. 3-4.

that theoretical hypotheses be conceptually refutable; i.e., it is known beforehand what observation(s) would count against the hypothesis.[75] Unless one can specify what observerations would count against the hypothesis, the theoretical propostions would be empty; dogma and wishful thinking would become perfect substitutes for observed reality and verified theory. Furthermore, careful construction of theory should allow the predicted relationship between variables to show through clearly. Support for these relationships can be found only through various statistical tests. Positive economics, or any other science for that matter, also requires that propositions of causation--e.g., if A then B--be distinguished carefully from normative propositions. Positive economic theory cannot tell one what should be done but only what consequences are likely to follow from different relative costs or institutional arrangements.

The axiom of "methodological individualism" simply requires that analysis begin with the individual. Generalizations about the effects of variable changes on "group" behavior are deduced from the prediction of changes in individual behavior under the same circumstances. A "group" or "society" behaves only as the sum of the autonomous,

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75 See, Wittgenstein, L. Tractatus Logico-Philosophicus (1921; London: Routledge & Kegan Paul, 1961). Also, see A. J. Ayer, Language, Truth and Logic (1946; New York: Dover Publications, 1952).

self-interested individuals within that group. Outcomes are the sum of individual responses to changes in the constraints each individual faces.

Finally, it must be noted that facts or observations cannot be interpreted without theory. The possibility of post hoc, ergo propter hoc, and non causa pro causa errors demands that theory exist to impose an order of causation upon events. Scientists can never "understand" the effect of independent variable changes on dependent variables without theory; theories best able to explain and predict outcomes become the looking glasses through which we view the world.

2.2 UTILITY VERSUS WEALTH MAXIMIZATION

Active debate in economics concerns the issue of whether to assume individual wealth maximization, individual utility maximization, or some other maximand. The assumption of wealth maximization is more convenient if one wants to simplify the process of deriving empirically refutable propositions, since wealth is an easily observed variable. The assumption of utility maximization, however, is more "powerful" in its ability to "explain" events; yet, the utility maximization assumption almost becomes tautological, and therefore meaningless, unless the individual's choice set is properly constrained. If restrictions are placed on

the choice set, then refutable propositions about consumption rates of particular goods, given a change in relative prices, become more meaningful. Naturally, the greater the restrictions placed on the choice set, the "stronger" the utility maximization hypothesis can be made. However, in the case of non-profit institutions, the identification of wealth or profit changes is more difficult than the identification of changes in the input mix resulting from changes in the constraints facing individual choosers.

Because of this difficulty with the wealth maximization hypothesis, this study will rely on the simple utility maximization hypothesis. It should be pointed out, however, that much of the analysis of government, non-profit, and even for-profit institutions has utilized very different assumptions about individual motivations. Newhouse has proposed an individual maximand of service quality in his model of a non-profit hospital.[76] Baumol and others have proposed, with little empirical support, that managers of for-profit institutions maximize either sales or staff.[77] Niskanen argues, with more cogency, that bureaucrats within non-profit

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[76] J. P. Newhouse, "Toward a Theory of Nonprofit Institutions: An Economic Model of a Hospital," American Economic Review (March 1970).

[77] W. G. Baumol, Business Behavior, Value, and Growth (New York: The Macmillan Co., 1950).

institutions may attempt to maximize staff.[78] In another variation, Maslow has proposed a hierarchy of "needs" approach to individual motivation.[79] The above approaches are unsatisfactory, however, because the expected behavior is assumed and not derived from the more fundamental postulates of economic theory. Of course, the same reductio ad adsurdum objections to assumed postulates of economics could also be made; however, the relative strength of empirical support for the postulates of economic theory should vitiate this argument.

2.3 PROPERTY RIGHTS AND MANAGERIAL BEHAVIOR

Most discussions of managerial behavior relate the effects of property right differences on managerial incentives to manage efficiently inputs to the production process. If a manager does not have full rights to the value of his marginal product or residual, then the manager will find it less costly to follow other ends that increase his own utility at the expense of a lowered capitalized value of the productive resources. Attenuated property rights to this income means that the manager or owner does not bear the

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[78] W. A. Niskanen, Jr., Bureaucracy and Representative Government (Chicago: Aldine & Stherton, 1971).

[79] A. Maslow, Toward a Psychology of Being (D. Van Nostrand Co., 1968).

full cost of his decisions; this is a change at the margin and will predictably affect behavior. Furthermore, the more property rights to residuals are attenuated, the greater the temptation for managers to follow strategies designed to increase personal utility at the expense of residual payments.

The welfare loss, from the perspective of the traders, results from the unexploited wealth that would have been created had the potential exchanges been made. Gains from exchange exist conceptually, in that the manager would be willing to forego some non-pecuniary income in exchange for pecuniary income from consumers; however, the rate of exchange between pecuniary and non-pecuniary income is certainly changed, as pecuniary income becomes relatively more costly to consume than non-pecuniary income. Legal or institutional "restrictions" have prevented exchanges that would have produced a more efficient allocation of resources. Under an attenuated set of property rights, potential gains from exchange are left unrealized and resources are wasted. Under a "well-defined" set of property rights, all potential gains from exchange would be exploited and resource allocation efficient.

2.4 CONTRACTING COSTS, MARKETS, AND EXCHANGE

The problem of social welfare losses can be considered to be a consequence of, among other things, "restrictions" on exchange, be the restrictions mercantilistic, technological, legal, or institutional.

Of course, in one sense, there is no such thing as welfare loss or inefficiency because all individuals are maximizers: the world is as it is because it is too costly to change it. However, knowledge about the consequences of institutional differences does have value since a major role of economic theory is to improve our understanding of the architectural or design flaws within our social institutions. Therefore, the analysis of differences in contracting or exchange costs resulting from different institutional arrangements and restrictions should be useful in the discussion of managerial behavior, pricing policies, and resource allocation.

The extent of exchange depends, among other things, on the relative costs of contracting. Contracting costs, in turn, are affected by the specificaiton of property rights, political orgnization, market size, information costs, and collusion costs. The ability of consumers (students and parents) to monitor administrator behavior and enforce the production of preferred outputs will be affected by the ef-

ficiency of these markets as well as the cost of contracting in these markets. If student tuition financed most of the university operating expenses, then more of the conflicting demands between students and faculty will be contracted away; student preferences will be better satisfied than if tuition financed a relatively small proportion of operating expenses. If, on the other hand, taxes financed a large proportion of university operations, then the political market between state legislators and university officials would be better developed and more likely to result in exchanges that ignored the preferences of students and parents. Transaction costs in this political market would be relatively lower for legislators and university officials, meaning that their preferences would tend to be better satisfied under these conditions. The increased external costs borne by students are, in this case, more difficult to contract away because of the increased relative costs of making these exchanges. Because the costs to legislators, administrators, and faculty of ignoring student preferences are lower, they will tend to reduce the value of output through appropriation of larger shares of non-pecuniary amenities.

The political and economic relationships between students, faculty, administrators, taxpayers, and legislators

will affect the markets and contractual arrangements made between these groups. Those groups trading in markets with lower transaction costs will be better able to satisfy their own preferences than those groups forced to exchange in less developed markets with higher transaction costs. The method of financing university operations, whether through taxes, alumni and foundation support, or student tuition, will have significant effects on the contracting and exchange costs each group faces.

The effects of financing structure on managerial discretion, resource allocation, and efficiency can be deduced from the above analysis; however, more support for using financing structure as an explanatory variable will be offered in a later section.

2.5 MONOPOLY AND MANAGERIAL DISCRETION

The literature relating managerial discretion to monopolistic and publicly owned firms is extensive. Adam Smith observed that the grants of perpetual monopoly

> (M)erely . . . enable the company to support the negligence, profusion, and malservation of their own servants, whose disorderly conduct seldom allows the company to exceed the ordinary rate of profit in trades which are altogether free.[80]

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[80] Adam Smith, The Wealth of Nations (New York: Modern Library, 1937), p. 712.

J. R. Hicks has argued that the "quiet life" rather than monetary gain was "the best of all monopoly profits."[81] With respect to publicly held firms, J. M. Keynes has maintained that when stockholders are "almost entirely dissociated from management, . . . the direct personal interest of the latter in making a profit becomes quite secondary".[82] This point is also made by Berle and Means when they ask if,

> (W)e have any justification for assuming that those in control of a modern corporation will also choose to operate it in the interest of the stockholders? The answer to this question will depend on the degree to which the self-interest of those in control may run parallel to the interests of ownership and, insofar as they differ, on the checks on the use of power which may be established by political, economic or social conditions.[83]

In the case of publicly owned corporations, however, Alchian warns against the conclusion that managers will always be able to "take advantage" of the dispersion of ownership. Numerous economists have argued that the greater the number of stockholders and the more dispersed the holdings, the more difficult it is for owners to "police" the actions of managers. But, as Alchian maintains,

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[81] J. R. Hicks, "Annual Survey of Economic Theory: The Theory of Monopoly," Econometrica (January 1935), p. 8.

[82] J. M. Keynes, Essays in Persuasion (London: Macmillan Co., Ltd., 1931), p. 316.

[83] A. A. Berle and G. C. Means, The Modern Corporation and Private Property (New York: Commerce Clearing House, Inc., 1932), p. 121.

> (S)ome features of group ownership cut against this argument. A greater number of owners implies a greater variety of owners, some with more knowledge of the particular business. We cannot assume legitimately that when there is one stockholder, he is the person most able to detect deviant behavior. Specialization of knowledge is not to be ignored; the corporate form enables a greater utilization of specialization of expert business knowledge. Despite the difficulty in reconciling several points of view, the variety of talents and the special knowledge may more than compensate.[84]

Alchian continues by observing that these "cartel" arrangements within management are generally unstable. For,

> (I)f a management group is exploiting stockholders by operating an enterprise in a diversionary manner, opportunities will arise within the group for some to gain personally by eliminating that "inefficient" behavior. Management cannot adequately by analyzed if it is regarded as a single person; there is competition within management; managers can move to new jobs; and they compete for jobs by superior performance on present jobs.[85]

Furthermore, if the separation of ownership and control did pose the above problems, one would expect the tenure of these managers to be greater, returns to stockholders lower, and salaries of managers higher than in privately owned firms. However, the myth of the indolent manager in either publicly held or monopolistic firms, although widely be-

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[84] A. A. Alchian, "Corporate Management and Property Rights," in Economic Policy and the Regulation of Corporate Securities, ed. by H. Manne (Washington: 1969); reprinted in The Economics of Legal Relationships, ed. by H. Manne (West Publishing, 1975), p. 501.

[85] Ibid., p. 502.

lieved, has not yet been empirically supported.[86] The discipline of competition does constrain manager behavior, while the profit maximization rule is enforced through the penalities of losses and potential extinction.

Even in the case of the monopolistic firm, it is not at all clear that managers will attempt to substitute more non-pecuniary on-the-job perquisites for pecuniary income than in competitive firms. First, if the monoply is unregulated and makes a greater than market rate of return, the manager's indifference curve must be non-homothetic for the budget constraint shift to result in a change in the proportion of non-pecuniary income consumed. Of course, with non-homothetic indifference curves, the percentage change in consumption of non-pecuniary versus pecuniary income is not unambiguous. Naturally, the slope of the transformation curve depends on the progressivity of the income tax. If taxed at a flat proportional rate, the slope of the transformation curve will not change with income fluctuations; however, as has been pointed out, this does not mean that the Engel curves will be straight lines from the origin. Therefore, given the possibly higher income generated as a result of monopoly power, there is no presumption that managers in these monopolistic firms will consume relatively

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86 Idem.

more non-pecuniary income than managers in competitive firms earning normal profits.

Therefore, under the restrictive assumptions of homothetic indifference curves, the grant of monopoly or any environmental change increasing the income of the firm is neither necessary nor sufficient for managers to substitute non-pecuniary for pecuniary income. However, a sufficient condition would be anything that changed the slope of the budget constraint facing the manager of either the competitive or monopolistic firm holding net income constant.[87]

But more important for the institutions being discussed in this study is the case of regulated or non-profit monopolies. In this case, an increase in monopoly power or reduction in the elasticity of the demand curve faced by the institution may, ceteris paribus, make non-pecuniary amenities relatively less costly for managers to consume.

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[87] With homothetic indifference curves, it is impossible for the initial consumption proportions to persist after a change in the slope of the transformation curve. With non-homothetic indifference curves, however, it is possible for a change in the slope, in connection with a shift in the constraint, to result in the same consumption proportions as before the change in the slope. It is even possible for this effect to work in the "wrong" direction; that is, where the income effect (the shifting out of the constraint) more than offsets the substitution effect. Since income effects are expected to be relatively small, this possibility should not cause much difficulty.

If the demand curve faced by state universities is significantly less elastic than that faced by private universities, then the reduced consumer "control" will mean that the relative costs of managerial consumption of non-pecuniary amenities will be lower for managers within state universities. Because universities are non-profit institutions, managers cannot simply increase their take-home pecuniary income; they will be constrained to accept higher proportional levels of non-pecuniary on-the-job amenities.

As has been noted, however, there has been no attempt to measure the demand elasticities for state and private universities, so a rigorous test of this propostion cannot be made. Therefore, it must be recognized that this competitive environment effect possibly works in the same direction as the financial structure effect and may, ultimately, provide a better explanation for institutional differences.

2.6 COMPETITIVE ENVIRONMENT

It has been established that any monopoly power exercised by non-profit institutions may well have a predictable effect on resource allocation within "single" objective institutions. Yet, competitive environment will have, in another sense, significant effects on resource allocation within multi-product university institutions. For instance, if the

surrounding community provided low cost and efficient health care, the university managers would not have as much incentive to provide the same level of health care services to students. It is not, of course, the purpose of this study to evaluate the effects of competitive environment on resource allocation within universities; however, this illustrates the importance of choosing a sample of universities that face similar environmental conditions.

2.7 THE CONCEPTUAL MODEL APPLIED TO THE UNIVERSITY

This investigation proposes to analyze the effects of financing differences on resource allocation within state and private universities. The predicted consequence of these differences between state and private universities is illustrated in Figure 1. To simplify the analysis, homothetic and strictly convex indifference curves are assumed.

As can be seen, the manager within the private university, facing constraint AB, will choose OX pecuniary income and XY non-pecuniary amenities at the point where the constraint is tangent to indifference curve I_1.

On the other hand, the manager within the state university faces constraint CD. Constrained utility maximization dictates that he choose OZ pecuniary income and WZ non-pecuniary amenities because that is the point where the const-

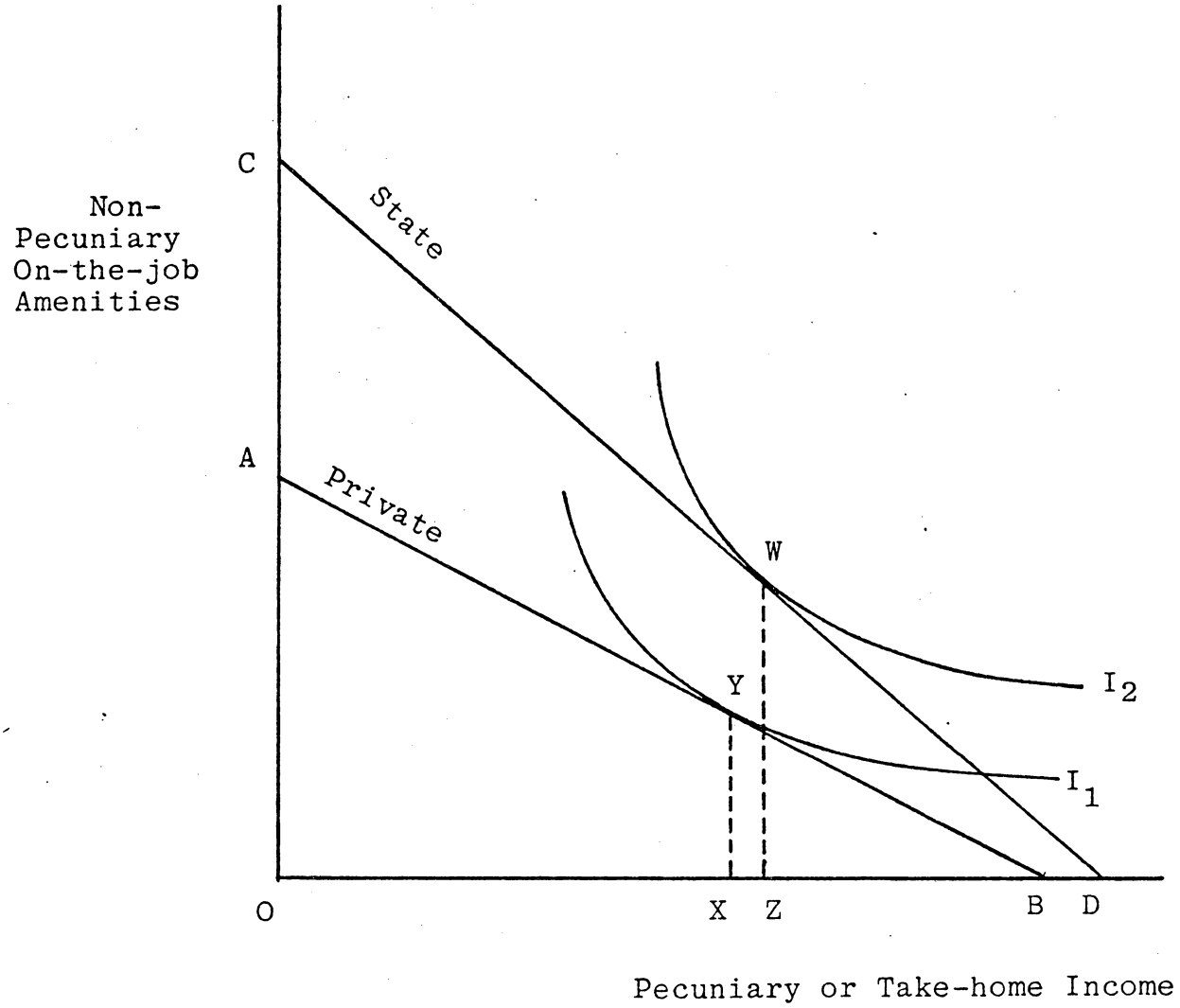

Figure 1: Indifference Curve Analysis: Non-pecuniary Amenities versus Pecuniary Income

raint is tangent with indifference curve I_2. That is, the manager's utility is maximized when that combination of pecuniary income and non-pecuniary amenities is chosen.[88]

Of course, depending on the expansion path of the indifference curves (a function of competitive environment, exchange restrictions, and other variables), the pecuniary income earned by managers within state universities may be equal to or even less than the pecuniary income earned by managers within private universities. Although no comparisons were made, it appears reasonable to assume that the mean salaries earned at state universities are slightly higher than the salaries earned at private universities and Figure 1 reflects this assumption.

Still, the important issue is the predicted difference in the slopes of the constraints faced by managers within state and private universities. If the slopes of these constraints are equal, then propositions about proportional differences in spending on "non-educational" items will not follow; even if total per-student spending of state univer-

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88 Total revenue of state universities will tend to be greater than for private universities because state universities have been "more effective" in solving the positive externality problem by taxing "beneficiaries" and subsidizing producers. Of course, a common example of government failure is the welfare loss resulting from the overproduction (over-subsidization) of good producing positive externalities. Another issue not discussed here is the relative benefits of government production of the good opposed to subsidization of private production.

sities is greater than that of private universities.[89] The following discussion provides more detailed analysis concerning these predicted differences.

Property rights to residuals are attenuated in all institutions of higher education studied becuase of their non-profit legal status; however, the relative costs to managers of choosing non-pecuniary amenities are not the same. Because private universities rely more on student tuition payments for revenues, managers bear higher relative costs of losing students to competing universities. As a consequence, managers within private universities will tend to spend relatively less of the institution's scarce resources on non-pecuniary managerial amenities and relatively more resources on educational goods that better satisfy the interests of student and parent consumers, i.e., have higher marginal products from the consumer's point of view.

Naturally, in some cases it is difficult to distinguish between expenditures that provide non-pecuniary amenities to managers and faculty and those that better satisfy the interests of students. Most expenditures involve benefits for both groups; however, it is clear that certain expenditures

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89 This is not exactly true because, depending on the constraint definition and the expansion path of the indifference curves (assuming non-homothetic indifference curves), higher incomes may be consistent with higher relative consumption of non-pecuniary amenities.

yield greater marginal utility to managers than marginal product to students. Furthermore, rather than try to make these distinctions, tests will be run on a variety of expenditure items that would appear to provide greater benefits to managers than to students.

On the other hand, because managers within state universities face lower relative costs of losing students to competing universities, it follows that the relative costs of choosing non-pecuniary amenities is also lower. In a sense, managers do not care whether students apply to the state university or not because of the large state subsidies that provide most of the operating revenues.[90] Of course, to maintain political support, managers want students to be attracted to their university, which is one reason why lower than market tuition rates are charged; to attract students to a "lower quality" product, a lower price must be set.

The slope of the constraint faced by managers within private and state universities depends, in large part, on the financing structure. The slope of the constraint (Figure 1) facing managers within private universities is less than the slope of the state university constraint because the relative costs of consuming non-pecuniary amenities to managers

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90 Naturally, in state universities there is a relationship between the number of students and the legislated budget; however, this relationship is a good deal looser than for private universities.

within state universities is less than for managers within private universities. The lower relative costs to managers within state universities implies that relatively more of these non-pecuniary amenities will be purchased.

2.8 PRICING POLICIES WITHIN THE UNIVERSITY

Implications about pricing policies also follow from the analysis of property right differences that can be extended to the pricing strategies of universities.

Peltzman has investigated the effects of ownership rights on the pricing policies of public and private utilities in the United States.[91] Peltzman examined the different incentives that managers in private and public firms have in choosing particular pricing policies and argues that managers of public firms, because they possess no rights to residuals, would be willing to exchange enterprise profits for political support from the taxpayer-consumer and job security. The manager purchases this political support by lowering prices on output to particular constituent groups. A test of this implication would be that prices of electricity to particular groups serviced by public enterprises would be significantly lower than those prices charged by private en-

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91 S. Peltzman, "Pricing in Public and Private Enterprises: Electric Utilities in the United States, Journal of Law and Economics, April 1971.

terprises.

Peltzman bases this conclusion on the fundamental difference in property rights to residuals in public and private firms and the different abilities of taxpayers and consumers of public firms and stockholders in private firms to change the bundle of assets in their portfolios.[92] In private firms, individual owners can exchange shares, i.e., ownership, for the relatively low cost of a stock broker's commission. On the other hand, the cost of "exchanging" shares from one public enterprise to another varies from the cost of moving to a different community to the cost of moving to another country; a cost that depends on the market size of the public enterprise. Because, in most cases, the opportunity costs of changing governments is significantly higher than the cost of exchanging shares in private firms, governments will behave more as monopolists than private firms. The non-profit status of governments contributes to the expectation that government managers will consume relatively more non-pecuniary amenities and will produce a lower valued output for consumer-constituents. As Peltzman argues:

> There is no organized capital market for shares in government firms, so that reshuffling of ownership requires change in residence, legislated change in the tax structure, etc. Indeed, if these

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[92] This discussion by Peltzman is based on an article by A. Alchian, "Some Economics of Property Rights," Il Politico, (no. 4, 1965), 816-29.

> transaction costs for reshuffling of ownership are not substantially higher for government than for private firms, there is no good reason to suppose that government firms would behave differently than private firms.[93]

Of course, the above conclusion is not exactly true because there are other significant differences between public and private enterprises. The private firm's goal of profit maximization is agreed to and easily identified, while public firm goals are varied, difficult to identify or measure, sometimes mutually exclusive, and often used to further the manager's utility goals rather than the mandated goals of the legislature. Furthermore, governments are "controlled" by majorities and selected vested interest groups, and officials are often tempted to maintain the allegience of these voting coalitions by supplying goods and services that satisfy the preferences of these coalitions at the expense of other weaker coalitions. Still, government manager control over resources is greatly weakened by lower cost resident mobility. Finally, citizen control over government manager's behavior is less because information costs about government performance is higher than in private firms; the absence of daily capitalized value quotations, as with private firms, is one reason for these higher information costs.

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[93] Peltzman, "Pricing in Public and Private Enterprises," p. 111.

The non-separability of the bundle of public goods offered by the government, together with the majority choice decision rule, will insure that government-produced services will not precisely mirror the outcomes that would follow from private production of separable outputs.[94] Because the cost of exchanging shares in government firms is significantly higher than the costs of changing ownership in private firms, even if it is no more costly to monitor government enterprise performance and as difficult for managers to take advantage of the non-separability of produced goods, it is clear that government managers will be better able to trade "owner's" wealth for manager's utility than managers of private firms.[95]

Peltzman goes on to state that,

> (T)he willingness of the government enterprise management to trade profits for political support will lead managers to use the pricing system as a mechanism for redistributing the wealth within the political constituency. That is, government firm managers will use prices to confer benefits on voters in return for effective political support for the enterprise and its management.[96]

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[94] Of course, with legitimate public goods that are technically non-separable, there exist clear advantages to government production. In many cases, however, the publicness of the good and the difficulty or privatization may be exaggerated. Note, also, that dividers (government officials) of non-homogeneous goods always have an advantage over the choosers (citizens).

[95] Peltzman, "Pricing in Public and Private Enterprises," p. 112.

Peltzman points out that the government is somewhat constrained in providing benefits through direct money payments or through manipulation of the tax structure; however, he overlooks the possibility of providing benefits through patronage employment or selected services to political supporters. Peltzman furthermore argues that it is not group size but the intensity of group political interest that is important in terms of political interest. Therefore, in many cases, capturing a small but dedicated group of political workers through patronage jobs may well be worth the investment. Of course, the extent to which each strategy to purchase political support is used will depend upon the relative costs of each. Naturally, the identification of these relative costs is necessary to strengthen the refutability of these propositions.

Peltzman offers a number of other implications, some of which have already been discussed. Briefly, Peltzman proposes the following: (1) government firm price changes will be more highly correlated with other government firms than comparable private firm price changes, (2) government firm prices will not reflect the costs of serving different consumer groups as much as will private firm prices, (3) government firms will have less product variety than private

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96 Ibid., p. 112.

firms, (4) government firms facing demand curves of approximately the same elasticity will not utilize price discrimination, multi-part pricing, fee plus marginal cost pricing, or tie-in pricing strategies as extensively as private firms, and (5) the output of government firms, per unit input, will be significantly less than the output, per unit input, of private firms.

In this study, a similar approach to managers' choice of pricing policies will be taken. It has been argued that managers in private and state universities face different constraints and thus will have different incentives in the pricing of university services. For instance, the tuition of state universities would tend to be lower than the tuition in public and private universities. Furthermore, the different constraints faced by auxiliary enterprise managers within state and private universities will affect the pricing of services provided to students. Instead of looking for political support from student-consumers, however, the manager of the auxiliary university service may choose to price output at less than marginal cost to generate political support from university administrators for an expansion of services. This is, of course, much the way government managers behave in Niskanen's bureaucratic models.[97] Whatev-

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[97] William A. Niskanen, Jr., Bureaucracy and Representative Government (Chicago: Aldine-Atherton, 1971).

er is the case, the costs to private and state administrators of this below-marginal-cost pricing tactic are different and should allow testable implications about pricing policies to be derived. It is proposed here that managers of state universities have less incentive to conserve resources through prices that approximate the marginal cost of services so that state universities would be expected to price the same auxiliary services lower than private universities.

2.9 RESOURCE DISSIPATION AND PRICING: A DIGRESSION

The following discussion proposes to clarify the relationship between resource dissipation, pricing policies, and manager incentives to price output at less than marginal cost. First, as illustrated in Figure 2, suppose the manager priced output at marginal cost OW. In this case, an equilibrium would exist at output OA; no resources would be wasted, and the manager would be maximizing profits or minimizing losses. If, on the other hand, the manager chose to price output at OV, less than marginal cost, two outcomes are possible. First, the manager obtains subsidy VWYZ to cover marginal costs and produce equilibrium output OB; in the absence of externalities that would justify the subsidy, the welfare loss of such a policy would be equal to area

XYZ. Second, if the manager chooses to produce output OA but maintains the price at OV, then the enterprise would only require subsidy VWXQ to cover marginal costs. This would seem to imply no inefficiency because the subsidy would only be a transfer payment; however, because at price OV there exists excess demand, consumers will waste or dissipate resources competing for fixed output OA. Of course, it cannot be said, a priori, which arrangement would involve the greatest welfare loss; however, resources would be dissipated in either case.[98] Naturally, managers will have the incentive to capture as much as possible, say, subsidy XYZ, while producing only OA output. This may occur in cases where the output is not well defined, say in the case of government regulation of an industry; but the important issue is which of the alternative strategies will the manager choose. If the manager chooses to produce at OA and somehow ration the output, he may forego a subsidy amounting to area QXYZ, but may be able to capture side payments from consumers competing for the output. Otherwise, if the manager is able to obtain a subsidy covering the costs of output OB, then he would forego consumer side payments because, at price OV, the market would clear at that output rate. Of

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[98] See, Gordon Tullock, "The Welfare Costs of Tariffs, Monopolies, and Theft," Western Economic Journal 5 (June 1967), 224-32.

course, the relative costs to the manager of making such exchanges with consumers compared to the costs of lobbying for additional subsidies will affect the outcome.

Although this discussion has omitted a number of institutional arguments, two points can be made with respect to services provided within the institution: (1) if the manager is interested in reducing resource dissipation, then the output must be priced more closely to the marginal costs of production, and (2) the relative costs of resource dissipation to managers within state universities is less than these costs to managers within private universities. A consequence is that private universities will rely more on pricing mechanisms to reduce the costs of resource dissipation than will state universities.

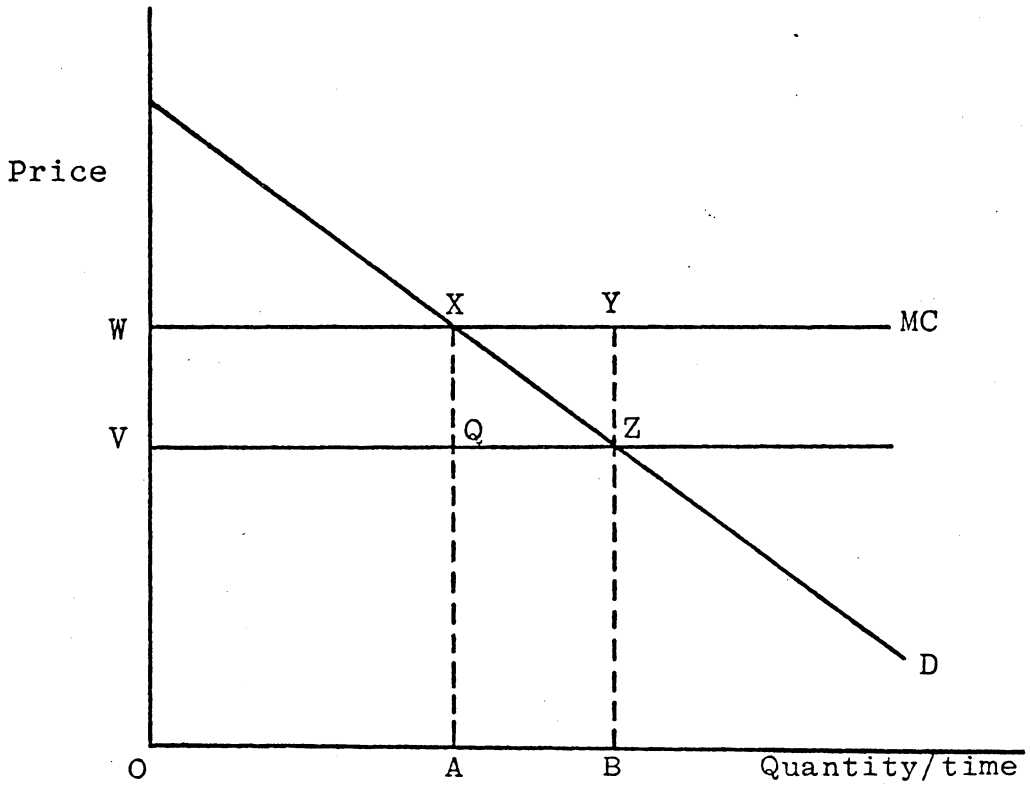

Figure 2: Below Marginal Cost Pricing and Resource Dissipation

2.10 MODELS OF THE UNIVERSITY

The following section is intended to focus on the two models of the university, private and state, in relation to managerial discretion, resource allocation, and pricing policies within the university and auxiliary enterprises. As has been argued, the classification of these two types of universities depends in part upon (1) financing structure, and (2) competitive environment. If total student tuition income is denoted by T, and total revenue denoted by TR, then:

1. private universities can be defined as having relatively high T/TR ratios (greater than 70%) and facing relatively elastic demand curves, and
2. state universities can be defined as having relatively low T/TR ratios (less than 20%) and facing, in a number of cases, less elastic demand curves.

In the next section, the characteristics of private and state universities will be discussed in more detail.

2.11 THE PRIVATE UNIVERSITY

In private universities, assumed to be financed mainly through student fees and tuition, the mix between endowment income, private and foundaion grants, and state transfer payments will not be considered important. In the extreme,

university financing of current capital projects would require borrowing in the capital market and financing the debt through tuition paid by future students. In this case, tuition payments would approximate the student's share of the interest payment to the human and physical capital made available for the student's current consumption. The student in the private university pays mainly for current services in the form of teaching, classrooms, living quarters, auxiliary services, and academic environment. Students, of course, would be willing to pay a premium for the captured capitalized value of the university brand-name, so, in the case of a price-searching university, not all tuition payments would be for current educational services.

2.12 THE STRUCTURE OF FINANCE, MANAGERIAL BEHAVIOR, AND RESOURCE ALLOCATION IN THE PRIVATE UNIVERSITY

It has been argued that the private university will tend to spend less per student on "non-educational" auxiliary goods and services; however, this may only be a consequence of the higher revenues of state universities. Although this will be investigated, the important implication of this study is that relatively more of the resources of private universities will be devoted to educational services as compared to state universities.

Furthermore, within the student health clinic, in particular, private universities are not just expected to spend less per student on doctors, nurses, physical plant, medical equipment, and other health care services than state universities; but they are expected to spend relatively less of these scarce resources on student health care than will state universities.

Two reasons why private universities will "better" satisfy consumer preferences per dollar spent are: (1) consumers of private universities bear most of the education costs and will have a greater incentive to search for preferred educational bundles, i.e., will be more elastic demanders; and (2) managers and administrators in private universities rely more upon student tuition for salaries and operating expenses and more directly bear the costs or benefits of a change in consumer patronage. Administrators must provide the demanded supply and quality of health care services, among other things, or students and parents on the margin will patronize other universities. Of course, it may seem unlikely that consumers would patronize competing universities merely because the health care clinic is an inefficient size; however, one would be forgetting the constraints that administrators and managers face. If an administrator decides to spend $10,000 on health care, the cost must be considered in

terms of the additional students that would have been attracted to the university had the $10,000 been spent on something else that marginal consumers would have valued more. Preferences of consumers receive much greater weight in private universities simply because the costs to administrators of ignoring these preferences are greater. Furthermore, managers within the student health clinics, recognizing the constraints faced by their superiors, would soon find themselves out of a job if they did not follow the same resource economizing strategies. Finally, administrators would tend to enforce this by offering student health clinics, and other auxiliary enterprises, relatively smaller budgets than their state university counterparts.

2.13 PRICING POLICIES IN PRIVATE UNIVERSITIES

In the simple case of two outputs, education and health care, the demand curve for university services would reflect the value the consumer placed on the joint product of health care and education services. If a consumer valued a given quantity of health care at, say, $30 per year, then the consumer would be willing to pay, at most, $30 per year in addition to tuition for the right to use the university health care services.

Given that the university has decided to supply health care, however, the important question becomes that of how the university should price these scarce health care services. That is, would it be more profitable for the university to provide "free," zero-price health care, charge a flat fee to cover all services, charge different fees for different services, charge a fee that covers the marginal cost of the service, or use some other methods, such as supply constraints or queueing, to allocate scarce health care resources.

At first glance, it may seem irrelevant whether the university provided zero-price health care and charged $30 in increased tuition or charged the $30 separately as fees for health care services. This would only be true, however, if the demand for university health care was perfectly inelastic. The elasticity principle of public finance warns that it is "impossible" to give away goods efficiently when the elasticity of demand is greater than zero over the relevant range.[99]

If the university decided to give medical services away at zero marginal cost, the increase in the quantity demanded would cause a number of consequences. First, the excess de-

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99 James M. Buchanan, The Inconsistences of the National Health Service. Reprinted as an Occasional Paper by the Institute of Economic Affairs, Ltd. (Leavesden: Rowan Press Ltd., 1965).

mand for health care services would mean queues, allocation on a first-come first-served basis, and increased discrimination according to personal characteristics. Second, pressure would be brought upon university administrators to expand the "overutilized" health care services. Indeed, zero cost pricing is one strategy managers of health services, or any other auxiliary service, can use to "stimulate" demand as a means of lobbying for increased university support. Whether administrators reduce spending elsewhere to expand the health clinic, or left conditions as they were, students on the margin would choose different universities, ceteris paribus, because of higher than necessary health care costs or resource misallocation within the university. Because resources are used inefficiently when supplied at zero cost, students will have to bear the costs of this inefficiency. Furthermore, private universities will be more constrained than state universities to adopt mechanisms that will reduce the resource dissipation.

It should be noted, however, that any sale of goods or services at less than the marginal costs of production will necessarily involve a wealth transfer, meaning that certain students would be made better off despite the total reduction in the quality of the service. Students placing a lower value on time will tend to benefit from less than marginal cost pricing policies.

Even if private universities do not charge a fee for health care services, resource dissipation and misallocation can still be reduced by supplying reduced levels of health care service, as with a doctor who only dispenses aspirin, inducing students to go outside the university for health care services. In this case, the university would merely charge a lower tuition to compensate students for the "absence" of on-campus health services. This is, of course, another solution that saves students money and resources by minimizing waste. Furthermore, there are certainly increased transaction costs in requiring students to pay a separate fee for medical services, so universities may find it better to use the latter method of service reduction to solve this particular problem.

To summarize, it is expected that attempts to reduce inefficiency and resource misallocation through marginal cost pricing and supply restriction on the use of health clinic services will be more widespread in private universities because the costs of misallocating resources are greater to administrators in private universities than to administrators in state universities.

2.14 THE STATE UNIVERSITY

The state university is assumed to receive the major portion of revenues through state transfers; endowment income, alumni gifts, private and foundation grants will represent a relatively small proportion of total revenues; student tuition will constitute no more than 20% of total yearly revenues. In general, only in-state students will have the right to attend the state university at the "low" tuition; out-of-state students will pay a higher tuition than in-state students. Furthermore, the out-of-state tuition for state universities will be, in most cases, higher than the in-state student tuition of other state universities.

2.15 THE STRUCTURE OF FINANCE, MANAGERIAL BEHAVIOR, AND RESOURCE ALLOCATION IN THE STATE UNIVERSITY

The state university will tend to spend more per student on auxiliary enterprises and non-educational services. Again, the more important implication is that state universities will spend relatively more per student on these non-educational auxiliary enterprises and relatively less on educational services than will private universities. Within student health clinics, in particular, state universities will be expected to spend absolutely and relatively more per student on doctors, nurses, physical plant, medical equipment, office space, manager emoluments, and other services related to the provision of health care.

State universities will satisfy the demands of consumers and taxpayers less well per dollar spent than private universities for the following reasons: (1) consumers pay a relatively small proportion of the university's total cost and have less incentive to search for a preferred bundle of services; also of importance is the lower in-state tuition costs that makes other state and private universities less competitive; and (2) administrators bear significantly lower costs, than those in private universities, if a student decides to patronize a competing university. Because administrators rely mostly upon state subsidies, it will be much less costly to ignore student and taxpayer preferences.

Managers in this environment will face significantly lower costs of "discretionary" behavior. Managers lobbying for utility increasing health care inputs, such as long distance telephone rights, larger offices, larger staff, thicker rugs, etc., will have greater success in state universities than in private universities. Furthermore, university administrators will find it less costly to grant health clinic managers these larger budgets.

2.16 PRICING POLICIES IN STATE UNIVERSITIES

As has been argued, an effective method for managers to lobby for higher budgets from the university is to create an excess demand for the product by pricing it well below marginal cost. Because constraints on administrators in state universities are such that it is less costly for them to follow policies resulting in increased inefficiency and misallocation of resources, it is expected that either significantly lower marginal fees will be charged for services or there will be less attempt to control student consumption rates through supply restrictions. Student health clinics, though larger on a per-capita basis, may be more overcrowded and overutilized in state than in private universities.

2.17 SUMMARY OF EMPIRICAL IMPLICATIONS

The six major implications to be tested in the following section are:

1. Non-educational auxiliary per-student expenditures will be greater in state universities than in private universities.
2. State universities will spend relatively more of their scarce resources on non-educational auxiliary goods and services and relatively less on educational services than will private universities.

3. Private universities will make more extensive use of prices to allocate and reduce the dissipation of scarce resources than will state universities. Private universities will tend to price auxiliary services closer to marginal cost than will state universities.
4. Student health clinics within state universities will spend more per student on health clinic goods and services than will student health clinics within private universities.
5. A larger percent of total university revenues will be devoted to student health clinic goods and services in state universities than in private universities.
6. Student health clinics within private universities will make more extensive use of prices to allocate and reduce the dissipation of scarce resources than student health clinics within state universities.

Chapter III

EMPIRICAL TESTS OF THEORY

This investigation proposes to analyze two aspects of state and private universities: (1) resource allocation and pricing policies within the university as a whole, and (2) resource allocation and pricing policies within student health clinics. The former issue will be analyzed first.

3.1 DATA SOURCES

Because this investigation involves both a "micro" and "macro" view of the university, a number of information sources were utilized. First, with respect to the overall view of university resource allocation and pricing policies, two general sources were used: (1) Higher Education Finance, 1976, originally collected by the National Center for Educational Statistics and made available by the Inter-University Consortium for Political and Social Research, ICPSR (7649) (see Appendix A), and (2) source books such as the Comparative Guide to American Colleges by Cass and Birnbaum, for background information on specific universities. The 1976 Higher Education Finance tapes include 155 variables for 1812 four-year colleges and universities within the United States. Information used by this study includes:

(1) university revenues by 19 sources, (2) expenditures by 18 categories, (3) book and replacement values of physical plant assets, and (4) total enrollments. Furthermore, this Higher Education Finance data were used to classify universities as either private or state institutions.

Second, with respect to the student health clinic, data were collected in three ways: (1) requests for information through questionnaires (see Appendix B), (2) follow-up telephone calls to managers of the student health clinics, and (3) personal visits to a chosen sample of health clinics for collection of more detailed information about health clinic facilities and environment.

The health clinic questionnaire was used to collect detailed information, such as: (1) number of doctors, nurses, laboratory technicians, file clerks, secretaries, and volunteer workers, (2) total staff wages, (3) total health clinic budget, (4) number of beds, (5) square footage of health clinic, (6) types of services offered, (7) number of students treated, (8) proximity of "competing" hospitals and health clinics, (9) operating hours, and (10) pricing policies.

Because cross-sectional regression and t-test analysis are used to provide empirical support for theory, the following must be assumed: (1) the distribution of preferences

and abilities for administration and university managers, in each of the sample categories, is roughly equal, (2) the universities in each category, face similar environmental conditions (other than demand elasticities), and (3) the distribution of preferences for students, parents, taxpayers, legislators, etc., in each category is approximately the same.

Table 1 lists the relevant revenue and expenditure variables for the analysis of the university as a whole. For definitions of these variables, see Appendix A.

TABLE 1

1976 Higher Education Finance Statistics

Part A: Line	Current Funds Revenues	Part B: Line	Current Funds Expenditures
1	Tuition and fees	1	Instruction
2	Federal government appropriations	2	Research
3	State government appropriations	3	Public service
4	Local government appropriations	4	Academic support
5	Unrestricted federal grants & contracts	5	Libraries
6	Restricted federal grants & contracts	6	Student services
7	Unrestricted state grants & contracts	7	Institutional support
8	Restricted state grants & contracts	8	Operation & Maintenance of plant
9	Unrestricted local grants & contracts	9	Unrestricted scholarships & fellowships
10	Restricted local grants & contracts	10	Restricted scholarships & fellowships
11	Unrestricted private gifts, grants, contracts	11	Educational & general mandatory transfers
12	Restricted private gifts, grants, contracts	12	Total educational & gen'l mandatory transfers
13	Unrestricted endowment income	13	Mandatory transfers to auxiliary enterprises
14	Restricted endowment income	14	Auxiliary enterprises
15	Sales & services of educational actvs.	15	Mandatory transfers to hospitals
16	Sales & services of auxiliary enterprises	16	Hospitals
17	Sales & services of hospitals	17	Mandatory transfers to independent operations
18	Other sources	18	Independent operations
19	Independent operations		
20	Total Current Funds Revenues	19	Total current funds expenditures and mandatory transfers

Table 1, continued

Part C: Physical Plant Assets for Fiscal Year Ending 1976

Current	Book Value (beginning of year)	Book Value (end of year)	Replacement Value
1 Land	C1	C2	
2 Buildings	C3	C4	C5
3 Equipment	C6	C7	

3.2 RESOURCE ALLOCATION WITHIN THE UNIVERSITY: PER STUDENT SPENDING IN VARIOUS CATEGORIES

It has been argued that auxiliary enterprise spending and non-educational spending per student will be greater in state than in private universities. This proposition can be tested by running simple regressions with annual auxiliary spending per student as the dependent variable and annual tuition revenues as a percent of total annual university revenues as the independent variable. Student tuition and fee revenues as a percent of total revenues is as good a proxy for the "privateness" or "publicness" of the university as any. After all, the responsiveness of university managers to consumer-student demands is predicted to be a function of the percent of total revenues being directly paid to the university in the form of tuition.

A linear relationship such as the following is assumed:

$$S_i/\text{Enroll} = \alpha + \beta T + \varepsilon, \qquad (1)$$

where S_i denotes university spending in category i, Enroll denotes student population, T denotes tuition revenues as a percent of total revenue (from Table 1, defined as A1/A20), and ε denotes the stochastic error term.

Because it is sometimes difficult to separate educational spending from non-educational or discretionary spending, a number of tests will be performed on dependent variables

that at least appear to have non-educational or discretionary elements.

Dependent variables that are here assumed to be non-educational or discretionary, meaning higher consumption rates of non-pecuniary amenities for managers, are the following: (1) B14, auxiliary enterprise spending, (2) B2, research spending, (3) B4, academic support spending, (4) B7, institutional support spending, (5) B8, operation and plant maintenance spending, (6) C5, replacement value of buildings, and (7) the sum of these preceding categories, except for the replacement value of buildings, which will be called "discretionary" spending. Naturally, a number of items, such as research grants and contracts, are not strictly discretionary; however, research can be considered as a non-pecuniary amenity.

Finally, the dependent variable that should adequately measure educational spending is (8) B1, instruction spending.

Of course, at this stage, it is expected that per student spending on these items will be negatively related to the "privateness" (the ratio of tuition revenue to total revenue) of the university. Therefore, in the case of auxiliary enterprise spending:

$$B14/Enroll = f(A1/A20);\ f' < 0. \qquad (2)$$

Table 2 provides the estimated regression equations for the above variables; t values are in parentheses.

As can be seen from Table 2, the slope is negative in every case, as expected, and significant at better than the .001 level.

To provide a better picture of the scatter of points, Figures 3 through 10 represent the plotted relationship between tuition as a percent of total revenue and the various dependent variables. First and third degree polynomial curves have been fitted to the first two cases; first degree polynomials have been fitted to the data in the remaining cases. Furthermore, many of the observations are missing from these plots because zero valued and outlier observations were not plotted.

TABLE 2

Regression Results for Per-Student Spending versus Tuition as a Percent of Total Revenue

---

1. Auxiliary Enterprise Spending per Student:

$$B14/Enroll = 0.9758 - 0.6462T \quad (26.62)^{**}$$

$R^2 = 0.0145$
Cases = 1812

2. Research Spending per Student:

$$B2/Enroll = 1.2602 - 2.2941T \quad (31.87)^{**}$$

$R^2 = 0.0173$
Cases = 1812

3. Academic Support Spending per Student:

$$B4/Enroll = 0.6088 - 0.6941T \quad (123.80)^{**}$$

$R^2 = 0.0640$
Cases = 1812

4. Institutional Support Spending per Student:

$$B7/Enroll = 1.2123 - 1.2219T \quad (78.35)^{**}$$

$R^2 = 0.0415$
Cases = 1812

5. Operation and Plant Maintenance Spending per Student:

$$B8/Enroll = 0.8771 - 0.9695T \quad (67.60)^{**}$$

$R^2 = 0.0360$
Cases = 1812

6. Replacement Value of Buildings per Student:

$$C5/Enroll = 30.799 - 33.6748T \quad (94.15)^{**}$$

$R^2 = 0.0494$
Cases = 1812

7. Discretionary per Student = (B14 + B2 + B4 + B7 + B8)/Enroll

$$Disc/Enroll = 5.0344 - 5.9260T \quad (60.25)^{**}$$

$R^2 = 0.0322$
Cases = 1812

Table 2, continued

8. Instruction Spending per Student:

$$Bl/Enroll = 2.9121 - 3.1994T \quad (103.20)^{**}$$

$R^2 = 0.0539$
Cases = 1812

**Significant at the .001 level.

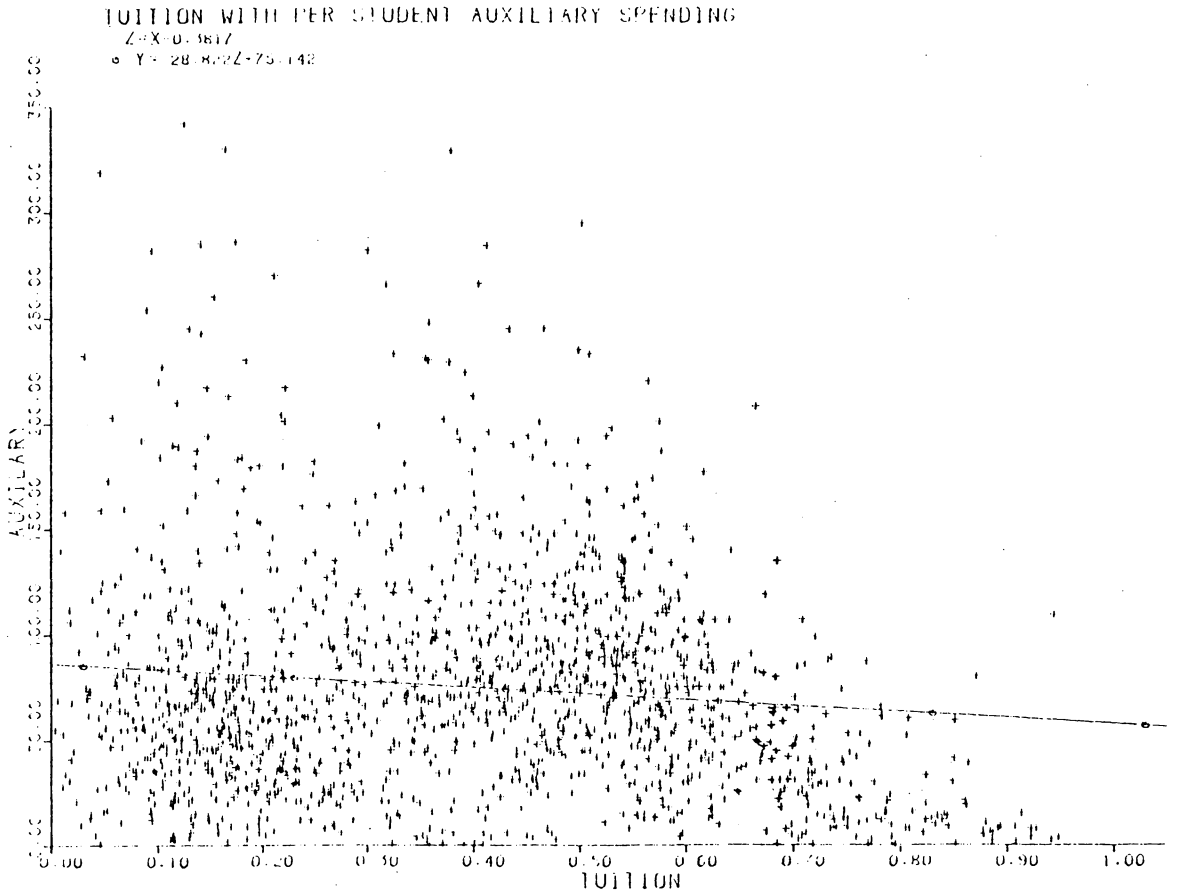

Figure 3: Per-Student Auxiliary Enterprise Spending vs. Tuition as a Percent of Total Revenue

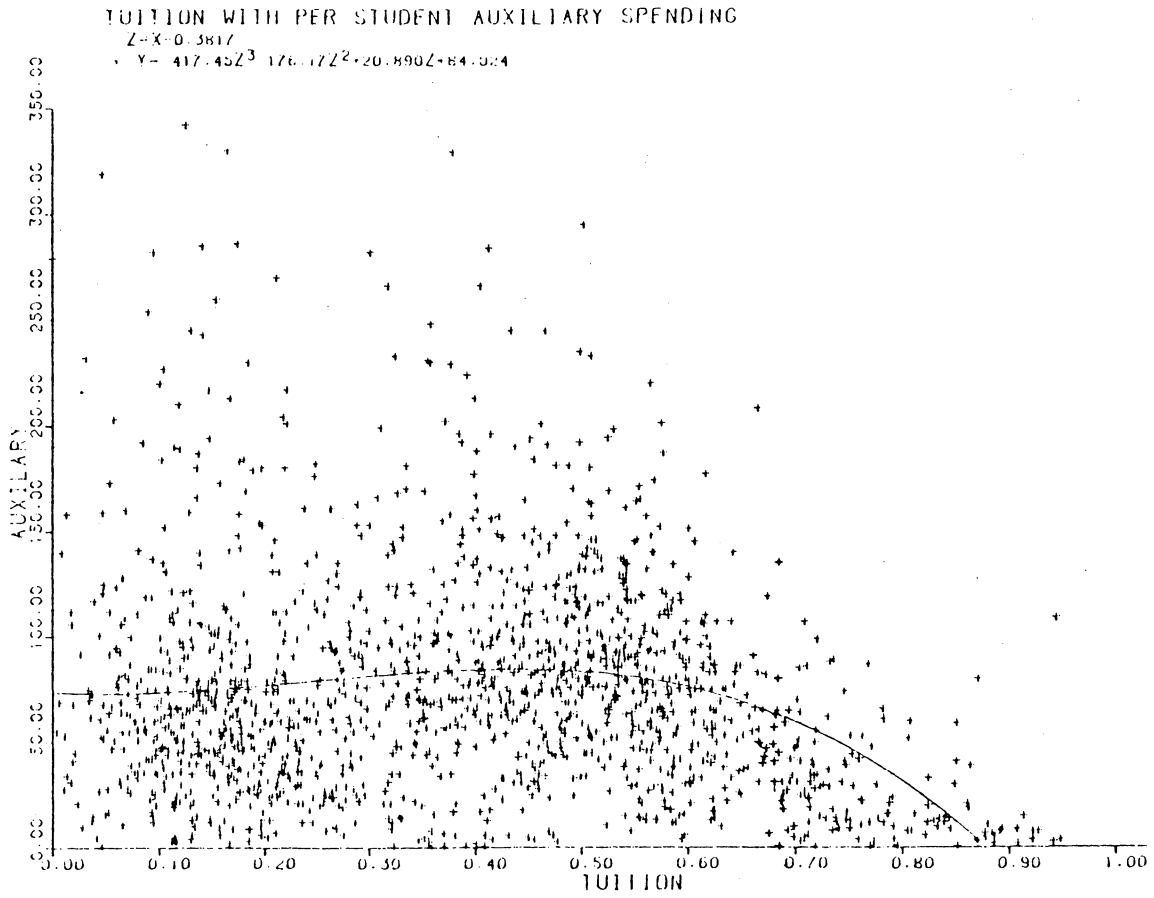

Figure 4: Per-Student Auxiliary Enterprise Spending vs. Tuition as a Percent of Total Revenue

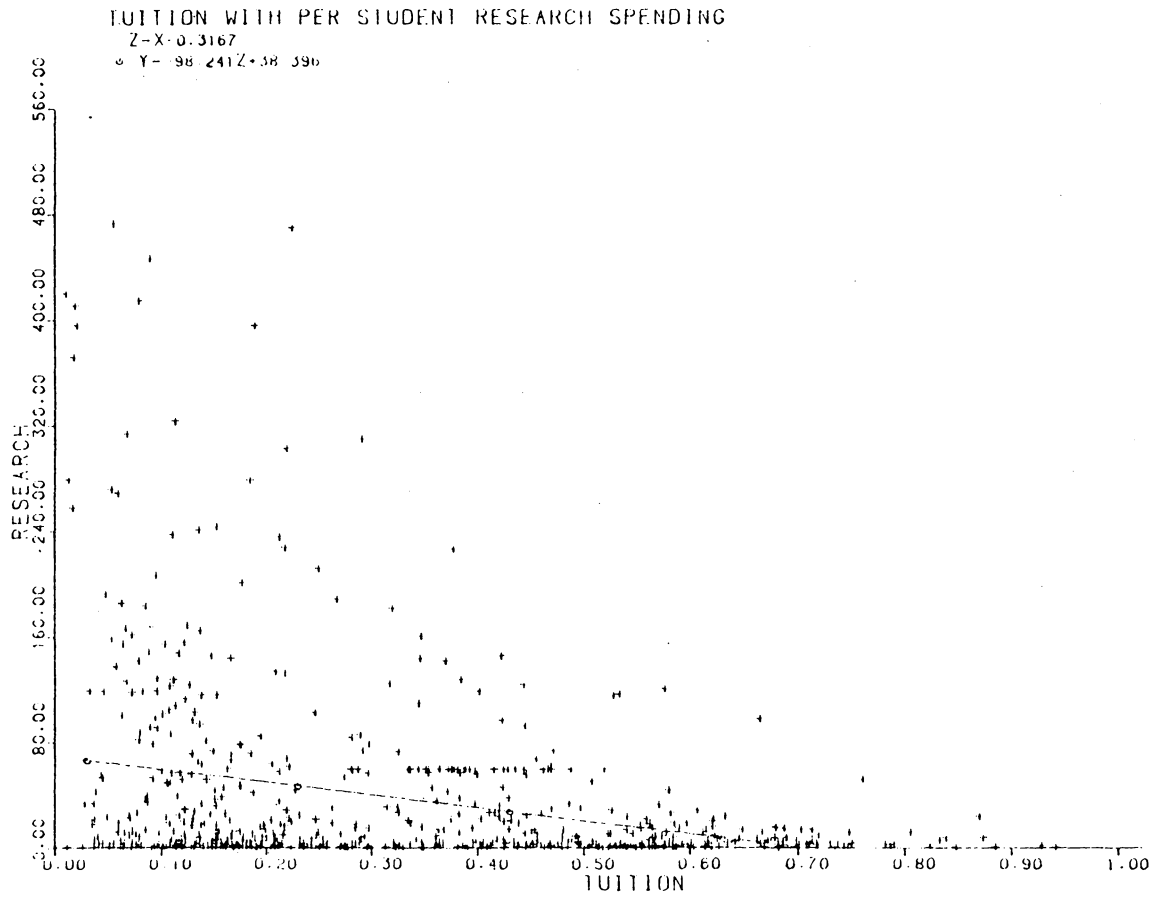

Figure 5: Per Student Research Support Spending vs. Tuition as a Percent of Total Revenue

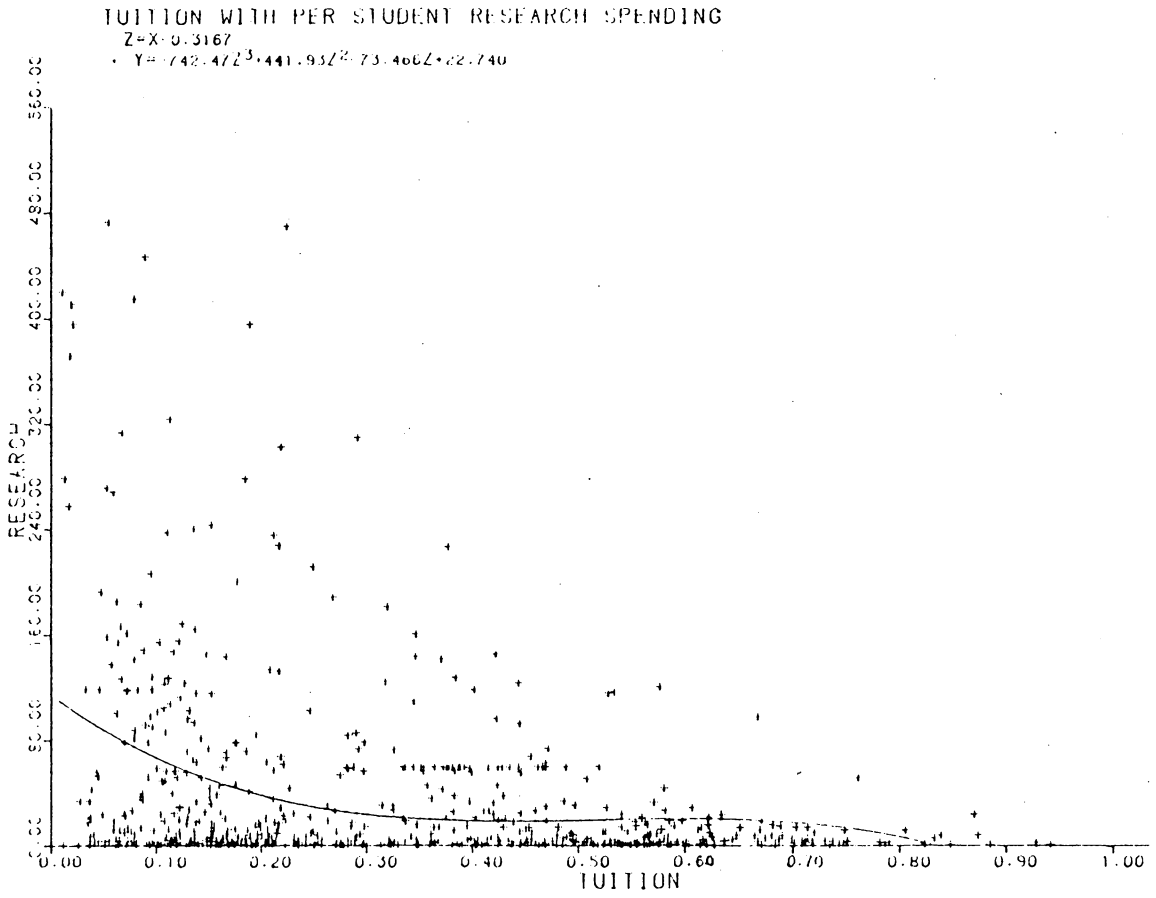

Figure 6: Per Student Research Support Spending vs. Tuition as a Percent of Total Revenue

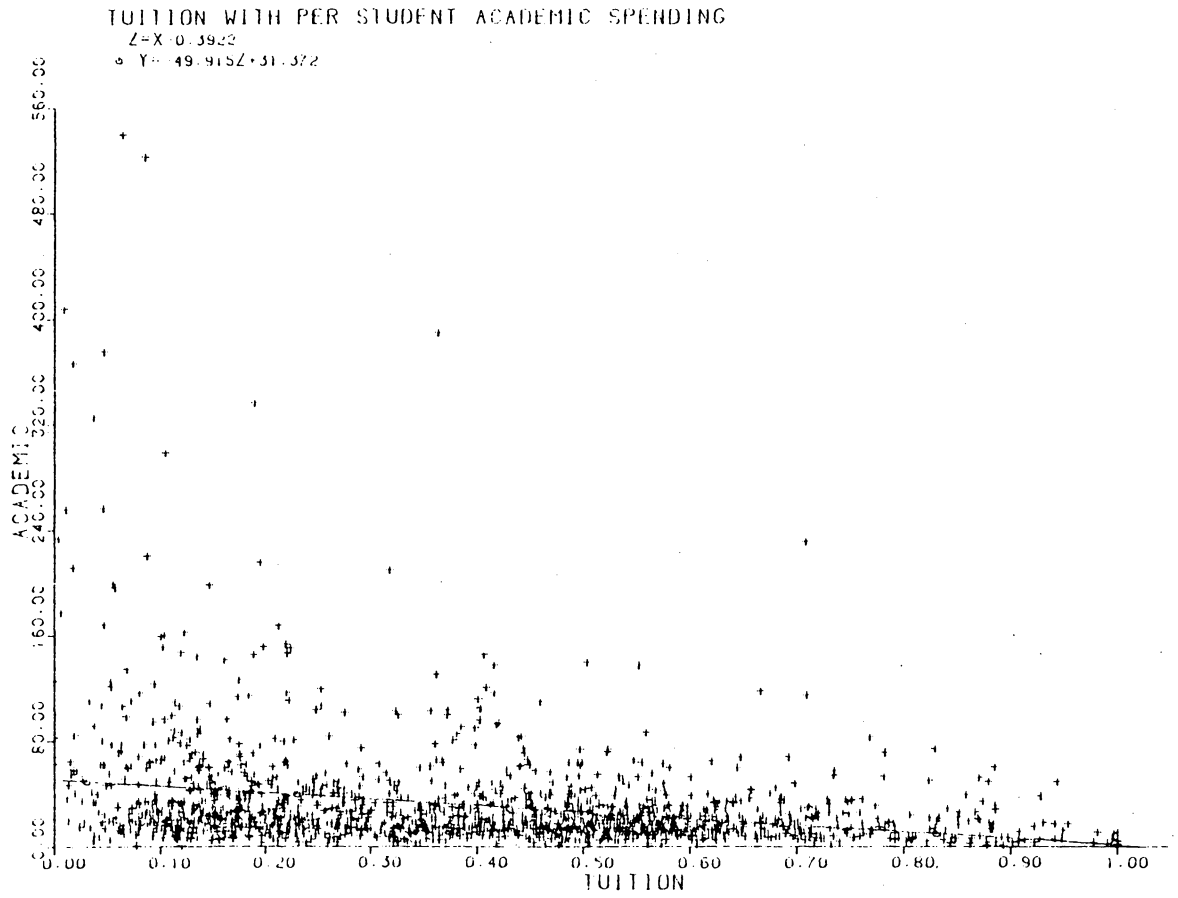

Figure 7: Per-Student Academic Support Spending vs. Tuition as a Percent of Total Revenue

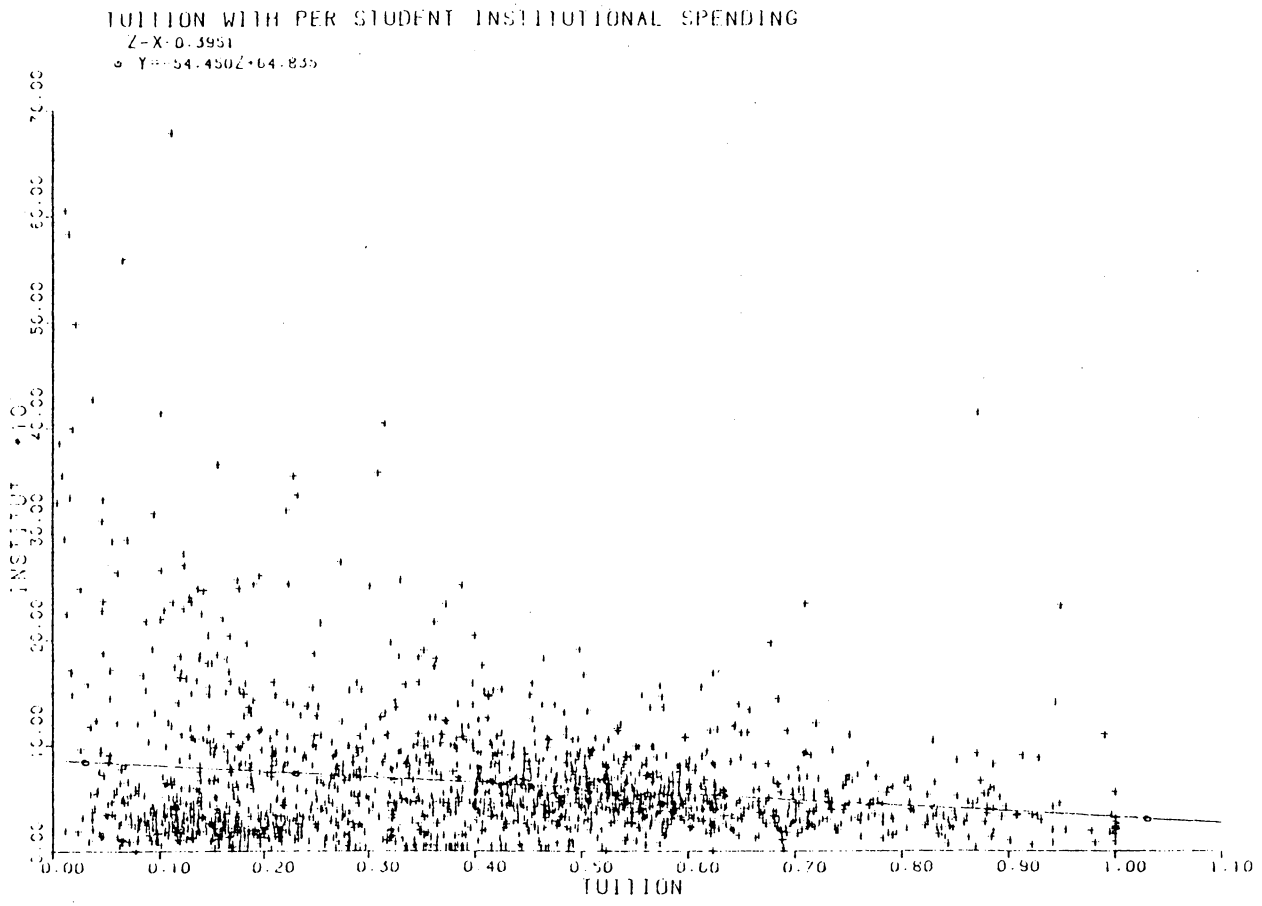

Figure 8: Per Student Institutional Support Spending vs. Tuition as a Percent of Total Revenue

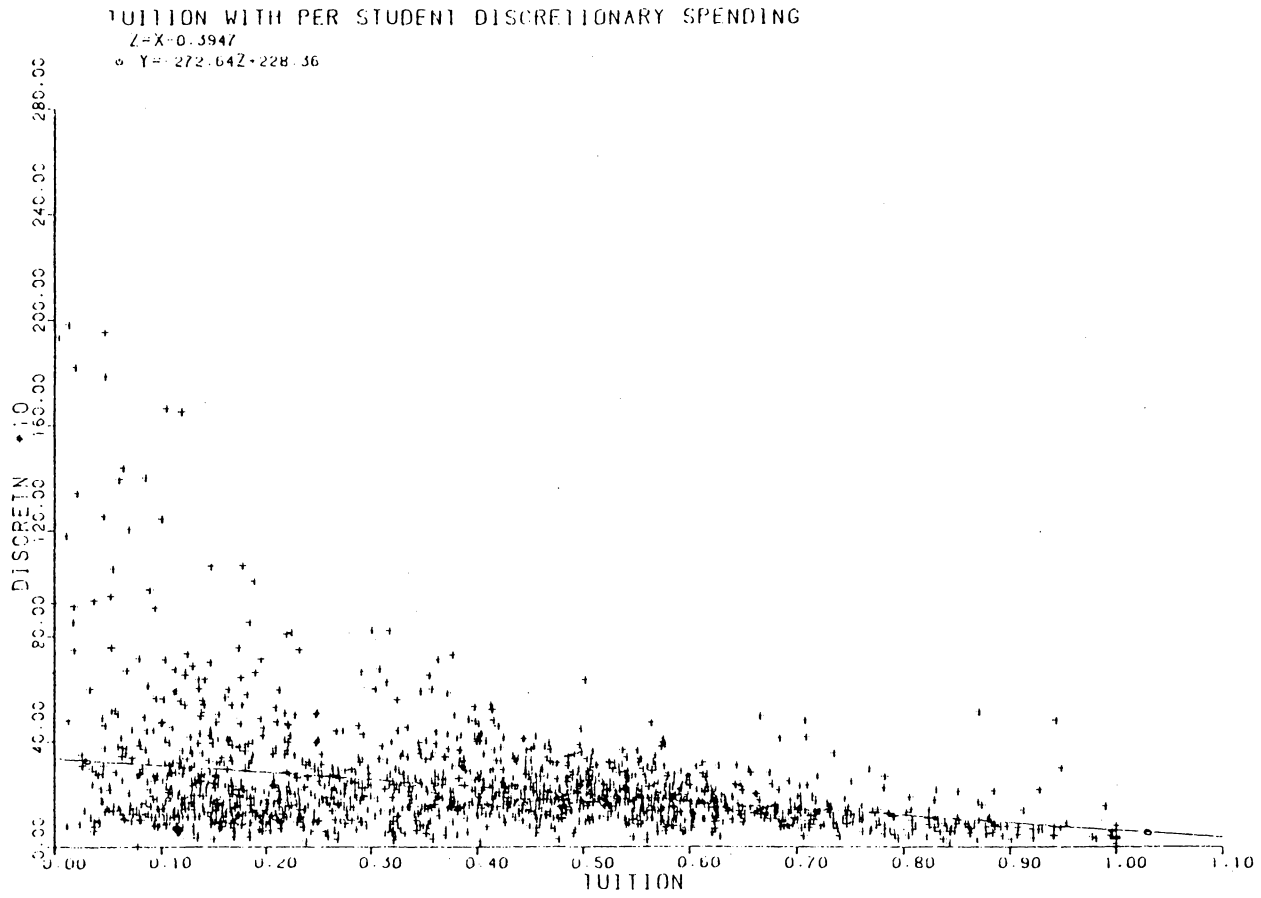

Figure 9: Per-Student Discretionary Spending vs. Tuition as a Percent of Total Revenue

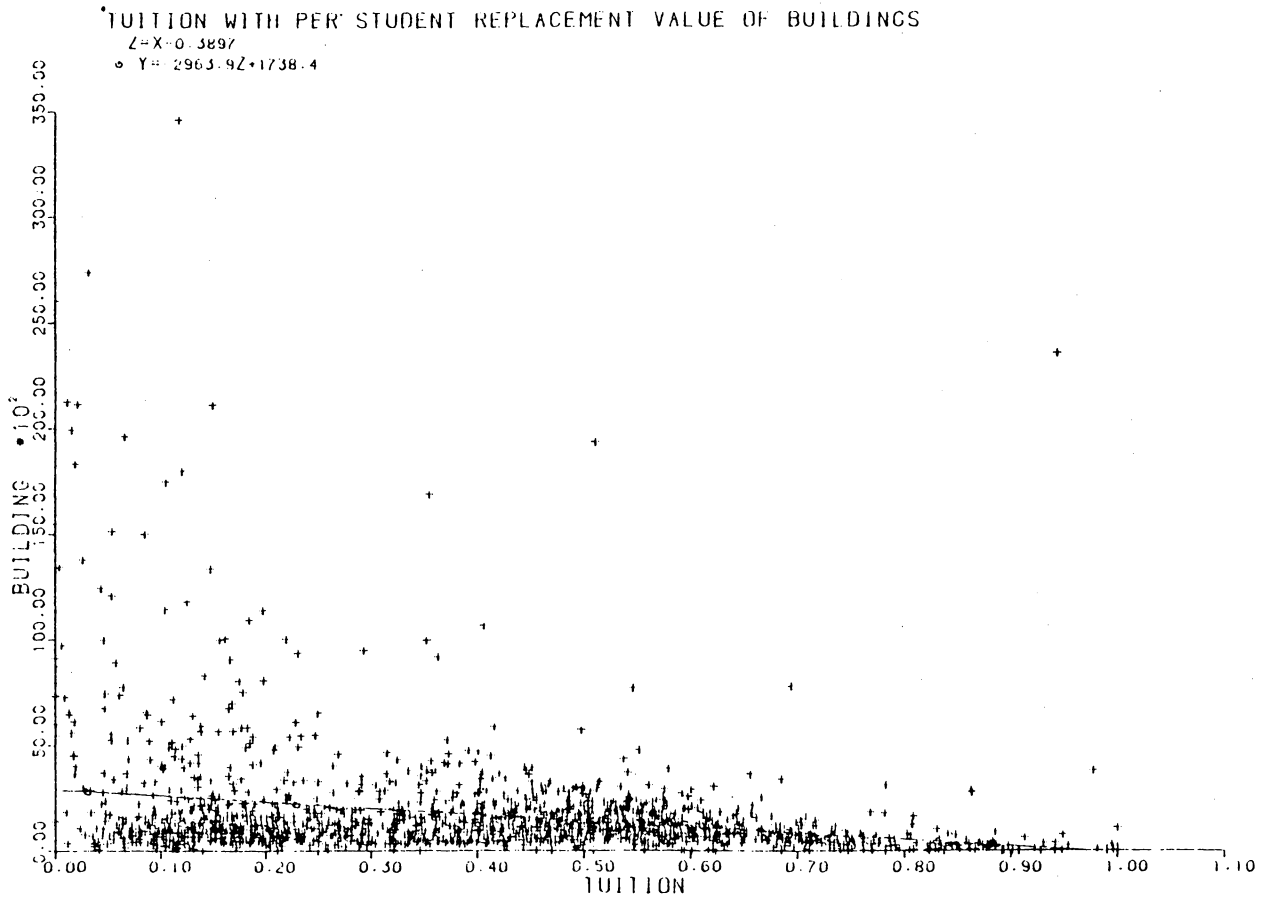

Figure 10: Per-Student Replacement Value of Buildings vs. Tuition as a Percent of Total Revenue

3.3 RESOURCE ALLOCATION WITHIN THE UNIVERSITY: SPENDING IN VARIOUS CATEGORIES AS A PERCENT OF TOTAL SPENDING

The preceding evidence supports the claim that state universities spend more per student in all categories; however, this evidence says nothing about the predicted relative shift of resources to auxiliary and non-educational support spending as universities become more public, i.e., as tuition revenue as a percent of total revenue falls.

As has been argued, managers within state universities will find it less costly to purchase on-the-job non-pecuniary amenities than will managers within private universities, implying that relatively more of these non-pecuniary, non-educational support resources will be found within state universities than within private universities.

To test this hypothesis, the following linear relationship is assumed:

$$S_i/TS = \alpha + \beta T + \varepsilon, \qquad (3)$$

where S_i denotes university spending in category i, TS denotes total university spending, T denotes tuition revenue as a percent of total revenue, and ε denotes the stochastic error term.

Here the slope coefficients are predicted to be negative for all of the non-educational categories and positive for instruction spending.

Table 3 lists the estimated regression equations for the appropriate variables; t values are in parentheses.

As can be seen from Table 3, all of the signs are as predicted except for the case of institutional support spending. Three of the seven coefficients with the correct sign, including instructional spending with the predicted positive sign, are significant at the .01 level or better. Furthermore, discretionary spending is significant at the .07 level and operation and plant maintenance is significant at the .107 level. Only one variable, auxiliary enterprise spending, is not close to being significant, even though the sign is as predicted.

One difficulty with the above regression results is that there is little confidence that the variance of the error term is constant for all observations. Significant total revenue differences between state and private universities lead to the conclusion that the disturbances are heteroskedastic and not homoskedastic. Although coefficient estimators are unbiased and consistent, they are not efficient or asymptotically efficient under conditions of heteroskedasticity. This means that the confidence intervals derived to measure significance levels are incorrect; however, the type of error, whether the estimated confidence intervals are wider or narrower than the "true" confidence interval, is unknown.

TABLE 3

Regression Results for Spending as Percent of Total Spending vs. Tuition as a Percent of Total Revenue

1. Auxiliary Enterprise Spending/Total University Spending:

$B14/B19 = 0.1636 - 0.0097T$ $\quad R^2 = 0.0005$
$\quad (1.005)$ $\quad$ Cases = 1812

2. Research Spending/Total University Spending:

$B2/B19 = 0.5309 - 0.0731T$ $\quad R^2 = 0.0818$
$\quad (161.17)^{**}$ $\quad$ Cases = 1812

3. Academic Support Spending /Total University Spending:

$B4/B19 = 0.7255 - 0.0151T$ $\quad R^2 = 0.0055$
$\quad (9.961)^{**}$ $\quad$ Cases = 1812

4. Institutional Support Spending/Total University Spending

$B7/B19 = 0.1108 + 0.0883$ $\quad R^2 = 0.0527$
$\quad (100.74)^{**}$ $\quad$ Cases = 1812

5. Operation and Plant Maintenance Spending/Total Spending:

$B8/B19 = 0.1015 - 0.0069T$ $\quad R^2 = 0.0009$
$\quad (1.554)$ $\quad$ Cases = 1812

6. Discretionary Spending/Total Spending:
(B14 + B2 + B4 + B7 + B8)/TS:

$DISC/B19 = 0.5016 - 0.0165$ $\quad R^2 = 0.0011$
$\quad (1.987)^{*}$ $\quad$ Cases = 1812

Table 3, continued

7. Instructional Spending/Total University Spending:
B1/B19 = 0.3215 + 0.0300T R^2 = 0.0039
(7.080)** Cases = 1812

*Significant at the .10 level.

**Significant at the .01 level.

Naturally, it is difficult to hold certain environmental and institutional variables constant; however, it can be argued with some confidence that the hypothesis that private universities will spend less, in percentage terms, on non-educational amenities than will state universities is supported by the evidence.

3.4 EVIDENCE ON PRICING WITHIN STATE AND PRIVATE UNIVERSITIES

The final theoretical implication concerning the university as a whole is that private universities will tend to price auxiliary enterprise services closer to marginal costs than state universities. Although no measurements of prices charged and operation costs were made, one way to test this hypothesis is to see how much of the auxiliary service expenditures were covered by auxiliary service revenues. Therefore, a test of this hypothesis can be made by estimating the following equation:

$$P = \alpha + \beta T + \varepsilon; \quad f' > 0, \tag{4}$$

where P denotes the ratio of auxiliary enterprise revenues to auxiliary enterprise expenditures (A16/B14), T denotes tuition revenue as a percent of total university revenue,

and ε, the stochastic error term. That is, it is predicted that private universities will raise a higher percent of auxiliary enterprise revenues through explicit service charges to students, meaning that P will be directly related to T.

The following estimates shown in Table 4 were made for two- and four-year colleges and universities and for four-year institutions. Again, t values are given in parentheses.

Here all of the coefficient signs are as predicted. Furthermore, the slope coefficient is significant at the .01 level for two of the four estimates and significant at the .05 level for a third estimate; however, because the slope coefficient for the sample of four-year universities is significant at only the .21 level, it may be premature to claim that the evidence supports the university pricing hypothesis. We must look to the next section on the organization of student health clinics for more evidence on this issue.

TABLE 4

Regression Results for Two- and Four-Year and Four-Year Universities: AER/AEE versus Tuition as % of TR[a]

---

1. All Two- and Four-Year Colleges and Universities:

$P = 0.9227 + 0.1911T$ $\quad R^2 = 0.0016$
$\quad\quad\quad (4.863)^*$ $\quad$ Cases = 3,055

2. Four-Year Colleges and Universities:

$P = 1.0006 + 0.0963T$ $\quad R^2 = 0.0034$
$\quad\quad\quad (0.635)$ $\quad$ Cases = 1,812

3. Two- and Four-Year Colleges and Universities Excluding Two-Year Branch Campuses of Other Multi-Campus Institutions:

$P = 0.9146 + 0.2303T$ $\quad R^2 = 0.0023$
$\quad\quad\quad (6.878)^{**}$ $\quad$ Cases = 3,037

4. Two- and Four-Year Colleges and Universities Excluding All Two- and Four-Year Branch Campuses of Multi-Campus Institutions:

$P = 0.9102 + 0.2444T$ $\quad R^2 = 0.0025$
$\quad\quad\quad (7.167)^{**}$ $\quad$ Cases = 2,868

---

*Significant at the .05 level.

**Significant at the .01 level.

[a]AER = auxiliary enterprise revenues, AEE = auxiliary enterprise expenditures; TR = tuition revenue.

3.5 HEALTH CLINIC SERVICES, RESOURCE ALLOCATION AND PRICING POLICIES

Another test of the theory of university resource allocation and pricing policies can be found in the analysis of a specific auxiliary enterprise within the university. This section proposes to analyze the resource allocation and pricing policy differences between student health clinics within private and state colleges and universities.

The study of university student health clinics or infirmaries was decided upon because there is probably very little difference between universities in students' tastes and preferences for health care services. Therefore, differences in the resources devoted to student health clinics as well as health clinic pricing policies should not have resulted from variations in students' demand for the services but from differences in the constraints that university managers face. Of course, the degree of competition in the health care field, i.e., the number and proximity of health clinics and/or hospitals and the percent of population living on or near campus will predictably affect aggregate student demand for health care services. The following tests will attempt to hold these differences relatively constant.

To choose a sample of university student health clinics, the 1,812 four-year colleges and universities were separated into two groups: private and state institutions. Private

universities were defined as those whose tuition revenue, as a percent of total revenue, exceed 70%. State universities were defined as those whose tuition revenue, as a percent of total revenue, was less than 20%. Table 5 gives the frequency distribution of colleges and universities satisfying these criteria at different enrollment levels.

As can be seen, even with the asymmetric definitions of state and private universities, the number of state universities within most of the enrollment ranges are greater than the number of private universities; however, it does not make a lot of sense to attempt to define the intervals so that the number of universities within the two classifications are roughly equal. The above definitions of state and private universities are arbitrary but reasonable.

Because the first two enrollment levels, 1-199 and 200-499, were considered too low to warrant investigation, no attempt was made to collect information on these colleges and universities. Furthermore, because student demand for health clinic services is affected by the number of students living on or near campus, only those universities which had more than 35% of total enrollment living on campus were chosen. Finally, questionnaires were sent to colleges and universities that satisfied these criteria: of these 32 state universities and 27 private universities, 12 state

TABLE 5

Frequency Distribution of State and Private Universities at Different Enrollment Levels

State Universities: Tuition/Total Revenue < 20%		Private Universities: Tuition/Total Revenue > 70%	
Number	Enrollment	Number	Enrollment
70	1 - 199	22	1 - 199
32	200 - 492	25	200 - 499
33	500 - 993	37	500 - 999
64	1,000 - 2,494	48	1,000 - 2,499
70	2,500 - 4,999	23	2,500 - 4,999
95	5,000 - 9,999	14	5,000 - 9,999
50	10,000 - 19,999	6	10,000 - 19,000
55	20,000 and over	0	20,000 and over

universities and 11 private institutions responded. Two of the state universities fell within the enrollment category 500-999 and none of the responding private universities fell into this enrollment category, so this information was not utilized. One of the private universities, Goddard College, did not have a student health clinic but did provide information about its contracting arrangements with a local health clinic. Table 6 lists the remaining 10 state and private universities that were used in this investigation.

For the 10 state and private universities chosen, the mean enrollment was 4,491.5 and 4,581.6, respectively. Furthermore, the mean percent of total enrollment living on campus was 62.7% for state universities and 55.5% for private universities. Naturally, the slightly larger percent of students living on the campuses of state universities may partially explain why these universities spend more per student on health clinic services, but this is not likely.

The regression results of total health clinic budget per student versus percent of total enrollment living on campus were interesting. It was expected that a positive relationship would exist between these variables; however, for the 10 private universities, the correlation coefficient equalled 0.0865 and the F-statistic equalled 0.060. For state universities, the results were quite different: the

TABLE 6

Characteristics of the Chosen Sample of State and Private Universities

Institution	1976-77 Tuition/TR	1979-80 Enrollment	1976-77 % on Campus
Private Universities			
Beaver College	.7029	1,791	60%
Franklin Pierce College	.7100	988	78%
New Hampshire College	.7298	2,996	86%
Columbia College	.9078	1,961	60%
Bentley College	.7587	6,466	44%
Bryant College	.7132	5,160	64%
Merrimack College	.7160	2,963	40%
Fairleigh-Dickinson (Teaneck)	.7081	8,055	41%
Villanova University	.7182	9,557	47%
Loyola Marymount	.7303	5,879	35%
State Universities			
Lake Superior State	.1543	2,261	49%
Berea College	.0257	1,449	80%
St. Mary's College of Maryland	.1846	1,299	72%
No. Georgia College	.1543	1,850	50%
Frostburg State College	.1710	3,433	60%
Bowie State College	.1722	2,442	37%
Grambling University	.1008	3,372	66%
University of Delaware	.2274	17,563	53%
Princeton University	.1841	5,972	95%
SUNY at Geneseo	.1712	5,274	65%

correlation coefficient equalled 0.7163 and the F-statistic equalled 8.429 (level of significnce = 0.0198). For both state and private universities, the correlation coefficient equalled 0.5348 with an F-statistic of 7.209 (level of significance = 0.0151). Even with a significant positive relationship between these variables, significant differences in the percent of total enrollment living on campus between state and private universities must exist before results would be seriously affected.

A two-tailed t-test for differences in the percent of total enrollment living on campus within state and private universities yielded following results:

		Private	State
t(separate) = -0.95	Mean	55.50	62.70
Significance = 0.355	S.D.	17.08	16.85
F(for variances) = 1.03	Maximum	86.00	95.00
Significance = 0.969	Minimum	35.00	37.00

We cannot reject the hypothesis that the means of these two samples are equal with any degree of confidence. Furthermore, it is even more difficult to reject the hypothesis that the variances of these samples are equal. Because of the insignificant differences in variances, the pooled and

separate t-statistics will be equivalent; however, the separate t is appropriate when variances are significantly different and will be used for the remainder of the t-tests.

A two-tailed t-test for differences in total enrollments of state and private universities yielded the following:

		Private	State
t(separate) = 0.05	Mean	4581.6	4491.5
Significance = 0.960	S.D.	2888.5	4849.3
F(for variances) = 2.82	Maximum	9557.0	17,563.0
Significance = 0.139	Minimum	988.0	1,299.0

Again, it is difficult to reject the hypothesis that the sample means are equal; however, there is weak evidence that the variances are different. Later on, smaller samples that better satisfy the conditions of equivalent means and variances will be chosen. The above results, however, provide adequate evidence that the samples are similar enough in these dimensions to warrant tests of differences in other areas.

It should be noted that one of the state universities, the University of Delaware, has been included in the sample even though its tuition revenue/total revenue ratio exceeds 20%. The reason for this is simple: there were only two

universities with enrollments exceeding 5,000, T/TR ratios less than 20%, and percentages of the total enrollment living on campus greater than 35%. The University of Delaware was included simply to increase sample size; besides, Delaware's T/TR of 0.2274 does not miss the mark by much. Furthermore, Princeton University, generally considered a private university, has also been included in the sample of state universities. Again, the relative scarcity of state universities prompted this addition; however the relatively low T/TR ratio implies that Princeton will behave as a state university no matter what its appellation.

Tables 7 through 12 list the health clinic data derived from the questionnaires and follow-up telephone calls for the sample private and state universities. The letters A through Z are used in place of the university names to protect the identities of these institutions. Eleven private universities are listed because Goddard College health clinic data is included.

The hypothesis developed in this study states that state universities will tend to spend more and charge less per student on health care or other auxiliary services than will private universities. To test this hypothesis, health clinic service data and financial statistics have been separated into the following categories:

TABLE 7

Health Clinic Data: Private Universities, A-D

	A	B	C	D
Number of Doctors	0.5	0	0.125	0
Number of Nurses	3	2	1.5	0
No. Lab Technicians	0	0	0	0
No. of Secretaries	0	1	0	0.5
No. Other Workers	0	0	1	1
Total Staff Salaries	$30,880	$26,000	$32,500	$18,000
Health Fee/Year	$50	none	$25	none
Operating Hours	24 hours	8 hours	9 hours	5 hours
Number of Beds	9	3	1	0
Patient Flow Rate	15/day	8.3 day	6.7 day	10/day
Salary % of Budget	76%	65%	71%	90%
Medical % of Budget	---	12.5%	12%	0%
Equipment % of Budget	---	12.5%	12%	0%
Travel % of Budget	0.5	1%	1%	0%
Other as % of Budget	23.5%	9%	4%	10%
Total Annual Budget	$40,580	$40,000	$46,000	$20,000
Total Services	10	6	12	11
# of Service Charges	4	2	0	8
Nearest Health Clinic	0-2 miles	14 miles	3-5 miles	6 miles
Square Feet of Space	1,500	800	200	300
Health Fees/Budget	---	1%[a]	---	0%

[a] This is a guess. The term used was "negligible." Furthermore, plans are being made for a student health fee that will cover 100% of health clinic budget.

TABLE 8

Health Clinic Data: Private Universities, E-H

	E	F	G	H
Number of Doctors	0.33	1[b]	1[b]	1
Number of Nurses	0	3	4.66	3
No. Lab Technicians	0	0	0	0
No. of Secretaries	1	1[b]	2	1.5
No. Other Workers	1	0	0	0
Total Staff Salaries	$77,600[c]	$42,914	$81,650	$118,000
Health Fee/Year	none	none	none	---
Operating Hours	7.5 hours	15 hours	24 hours	24 hours
Number of Beds	1	0	10	5
Patient Flow Rate	6.6/day	50/day	27.7/day	28.8/day
Salary % of Budget	93%	82.5%	80.6%	94%
Medical % of Budget	1%	---	---	4%
Equipment % of Budget	1%	---	---	0.5%
Travel % of Budget	0%	---	---	1%
Other as % of Budget	5%	---	---	1%
Total Annual Budget	$83,000	$52,000	$101,350	$125,000
Total Services	10	9	7	8
# of Service Charges	4	0	4	3
Nearest Health Clinic	3-5 miles	5 miles	6-10 miles	0-2 miles
Square Feet of Space	1,650	1,500	8,000	2,000
Health Fees/Budget	0%	0%	0%	100%

[b]Described as "part-time" but counted as one full time.

[c]Includes "purchased services."

TABLE 9

Health Clinic Data: Private Universities, I-K

	I	J	K
Number of Doctors	2	1	2.5
Number of Nurses	6.5	2	2
No. Lab Technicians	0	0	1
No. of Secretaries	1	1	0
No. Other Workers	0	5[d]	0
Total Staff Salaries	$107,100	$80,839	---
Health Fee/Year	none	$30	none
Operating Hours	24 hours	9 hours	8 hours
Number of Beds	10	1	---
Patient Flow Rate	35.7/day	40/day	---
Salary % of Budget	74%	79%	---
Medical % of Budget	20%	8%	---
Equipment % of Budget	0%	0%	---
Travel % of Budget	0%	0%	---
Other as % of Budget	5%	12%	---
Total Annual Budget	$145,160	$102,353	$30,000
Total Services	9	17	13
# of Service Charges	2	3	4
Nearest Health Clinic	0-2 miles	0-2 miles	---
Square Feet of Space	4,300[e]	800	---
Health Fees/Budget	0.1%	---	---

[d]Volunteer workers.

[e]Gross square footage.

TABLE 10

Health Clinic Data: State Universities, Q-T

	Q	R	S	T
Number of Doctors	0.5	2	1	2.5
Number of Nurses	2	2	5	3
No. Lab Technicians	0	0	0	0
No. of Secretaries	1	1	0	0
No. Other Workers	0	3	0.6	1
Total Staff Salaries	$6,027	$94,000	$103,062	$59,591
Health Fee/Year	$8	$60	$50	$60
Operating Hours	8 hours	8 hours	24 hours	24 hours
Number of Beds	0	0	11	21
Patient Flow Rate	18.3/day	27.4/day	42.5/day	50/day
Salary % of Budget	25%	50%	---	80%
Medical % of Budget	50%	6%	---	20%
Equipment % of Budget	25%	1%	---	0%
Travel % of Budget	0%	1%	---	0%
Other as % of Budget	0%	42%	---	0%
Total Annual Budget	$24,107	$106,000	$136,912	$77,986
Total Services	6	12	16	8
# of Service Charges	1	3	1	0
Nearest Health Clinic	0-2 miles	0-2 miles	6-10 miles	0-2 miles
Square Feet of Space	550	1,762	4,267[e]	2,400
Health Fees/Budget	75%	54%	47%	---

[e]Gross square footage.

TABLE 11

Health Clinic Data: State Universities, U-X

	U	V	W	X
Number of Doctors	1	1.5	0.5	7.5
Number of Nurses	4	5	7	17
No. Lab Technicians	0	0	0	1
No. of Secretaries	1	0	1	5
No. Other Workers	6	4.5	9d	23.5f
Total Staff Salaries	$70,880	$118,635	$96,000	$541,320
Health Fee/Year	none	none	$33	$50
Operating Hours	14 hours	24 hours	24 hours	24 hours
Number of Beds	2	2	35	14
Patient Flow Rate	10/day	30/day	17.6/day	119.8/day
Salary % of Budget	88%	50%	64%	72.02%
Medical % of Budget	4%	25%	15%	9.79%
Equipment % of Budget	0%	25%	15%	0.94%
Travel % of Budget	0%	0%	2%	0.47%
Other as % of Budget	8%	0%	4%	13.78%
Total Annual Budget	$81,000	$237,270	$150,000	$721,566
Total Services	6	7	12	17
# of Service Charges	1	0	0	2
Nearest Health Clinic	0-2 miles	7 miles	5 miles	0-2 miles
Square Feet of Space	5,000	2,000	8,061	13,040
Health Fees/Budget	20%	0%	74%	100%

[d]Volunteer workers.

[f]12.5 of these are volunteer workers.

TABLE 12

Health Clinic Data: State Universities, Y & Z

	Y	Z
Number of Doctors	5	2.5
Number of Nurses	12	9.5
No. Lab Technicians	3	0
No. of Secretaries	7	4
No. Other Workers	16[g]	43[h]
Total Staff Salaries	$796,585	$220,000
Health Fee/Year	$225	$6
Operating Hours	8 hours	24 hours
Number of Beds	21	17
Patient Flow Rate	100/day	100/day
Salary % of Budget	53.1%	84%
Medical % of Budget	3%	6%
Equipment % of Budget	---	6%
Travel % of Budget	1.2%	0.5%
Other as % of Budget	42.7%	3.5%
Total Annual Budget	$1,500,000	$256,000
Total Services	14	15
# of Service Charges	1	0
Nearest Health Clinic	0-2 miles	0-2 miles
Square Feet of Space	49,524	12,112
Health Fees/Budget	89.6%	12.4%

[g]Four of these are volunteer workers.

[h]All volunteers.

1. number of doctors/student,
2. number of nurses/student,
3. total annual staff salaries/student,
4. total annual health clinic budget/student,
5. number of beds/student,
6. square feet of area devoted to the health clinic/student,
7. total staff (including volunteers)/student, and
8. the percent of total health clinic services offered for which students must pay user charges.

A summary of these data is given in Table 13.

The t-test results for the 10 private and 10 state universities are found in Table 14. Here the one-tailed test is appropriate, so significance levels will be half of those that would be appropriate for the two-tailed test. Furthermore, a negative t-statistic implies that the mean value of the state variable is greater than the private variables; a positive t-statistic implies that the mean value of the state variable is less than the mean value of the private variable. Finally, theory predicts negative signs for the first seven variables and a positive sign for the eighth variable, number of fee charges per services offered.

It can be seen that all the signs are as predicted, all but three of the t-statistics are significant at the 1% level, and all are significant at the 5% level.

TABLE 13. Summary of Health Clinic Data

	M.D.s/ student	Nurses/ student	Wages/ student	Total Budget/ student	Beds/ student	Sq.Ft./ student	Total Staff/ student	# Fees/ services
				Private Universities				
A	.000279	.001676	17.24	22.66	.005028	0.83799	.001955	.40000
B	.000000	.002025	26.33	40.51	.003038	0.81013	.003038	.33333
C	.000042	.000501	10.85	15.35	.000334	0.06676	.000876	.00000
D	.000000	.000000	9.18	10.20	.000000	0.15298	.000765	.72727
E	.000052	.000000	12.00	12.84	.000155	0.25518	.000261	.40000
F	.000194	.000581	8.32	10.08	.000000	0.29070	.000872	.00000
G	.000337	.001573	27.56	34.21	.003374	2.69997	.002585	.57143
H	.000124	.000372	14.65	15.52	.000621	0.24829	.000683	.37500
I	.000209	.000680	11.21	15.17	.001046	0.44993	.000994	.22222
J	.000170	.000340	13.75	17.41	.000170	0.13608	.001531	.17647
				State Universities				
Q	.000221	.000885	2.67	10.66	.000000	0.24325	.001548	.16666
R	.001380	.001380	64.87	110.42	.000000	1.21601	.005521	.25000
S	.000770	.003849	79.34	105.40	.008468	3.28483	.005370	.06250
T	.001351	.001622	32.21	42.15	.011351	1.29730	.003514	.00000
U	.000291	.001165	20.39	23.59	.000582	1.45645	.003495	.16666
V	.000614	.002048	48.58	97.16	.002457	0.81900	.004505	.00000
W	.000148	.002076	28.47	44.48	.010379	2.39057	.005190	.00000
X	.000427	.000968	30.82	41.08	.000797	0.74247	.003075	.11765
Y	.000837	.002116	133.39	251.17	.003516	8.29270	.007200	.07143
Z	.000474	.001801	41.71	48.54	.003223	2.29655	.011187	.00000

TABLE 14

t-test Results: 10 Private versus 10 State Universities, Enrollments from 988 to 17,563

			Private	State
1. Number of Doctors per Student				
t(separate)	= -3.57	Mean	.0001	.0006
Significance	= 0.003	S.D.	.0001	.0004
F(for variances)	= 14.72	Maximum	.0003	.0014
Significance	= 0.000	Minimum	.0000	.0001
2. Number of Nurses per Student				
t(separate)	= -2.87	Mean	.0008	.0018
Significance	= 0.005	S.D.	.0007	.0009
F(for variances)	= 1.41	Maximum	.0020	.0038
Significance	= 0.619	Minimum	.0000	.0009
3. Total Staff Salaries per Student				
t(separate)	= -2.78	Mean	15.114	48.245
Significance	= 0.010	S.D.	7.564	37.029
F(for variances)	= 30.02	Maximum	27.56	133.39
Significance	= 0.000	Minimum	8.37	2.67
4. Total Clinic Budget per Student				
t(separate)	= -2.59	Mean	19.395	77.465
Significance	= 0.014	S.D.	11.047	70.150
F(for variances)	= 46.94	Maximum	40.51	251.17
Significance	= 0.000	Minimum	10.08	10.66
5. Number of Beds per Student				
t(separate)	= -1.81	Mean	.0014	.0041
Significance	= 0.048	S.D.	.0018	.0044
F(for variances)	= 6.02	Maximum	.0050	.0113
Significance	= 0.013	Minimum	.0000	.0000

Table 14, continued

			Private	State
6. Health Clinic Square Footage per Student				
t(separate)	= -2.08	Mean	0.5949	2.2039
Significance	= 0.031	S.D.	0.7866	2.3223
F(for variances)	= 8.72	Maximum	2.6997	8.2927
Significance	= 0.004	Minimum	0.0667	0.2432
7. Total Number of Staff per Student				
t(separate)	= -4.16	Mean	.0014	.0051
Significance	= 0.001	S.D.	.0009	.0027
F(for variances)	= 9.01	Maximum	.0030	.0112
Significance	= 0.003	Minimum	.0004	.0015
8. Number of Fees Charged per Total Number of Services				
t(separate)	= 3.08	Mean	.3206	.0835
Significance	= 0.006	S.D.	.2310	.0889
F(for variances)	= 6.74	Maximum	.7273	.2500
Significance	= 0.009	Minimum	.0000	.0000

Note that the hypothesis that state universities will tend to utilize marginal cost pricing of services less frequently than will private universities is also supported by the evidence; the sign of the t-statistic is positive, as predicted, and significant at better than the 0.01 level.

A possible objection to the foregoing results would be that the enrollment variances were too large: comparison of universities with similar enrollment levels may provide a better test of the hypothesis. Naturally, one problem is the significant loss of degrees of freedom that will tend to lower the t-statistics. With this difficulty in mind, the 10 private and state universities were divided into two groups of five to reduce the enrollment variance.

The first group of five private and state universities, group I, represent those with the lowest enrollment levels. To more rigorously identify the characteristics of these 10 universities, two-tailed t-tests for differences in the percentage of students living on campus and total enrollment were performed. Table 15 below provides the results of these t-tests; as can be seen, no significant differences between these characteristics exist.

TABLE 15

t-Test Results, Group I: Five Universities Each, Percentage and Total Enrollment

			Private	State
1. Percentage of Students on Campus				
t(separate)	= -0.64	Mean	64.80	57.60
Significance	= 0.542	S.D.	17.92	17.78
F(for variances)	= 1.02	Maximum	86.00	80.00
Significance	= 0.988	Minimum	40.00	37.00
2. Total Enrollment				
t(separate)	= 0.64	Mean	2139.8	1860.2
Significance	= 0.547	S.D.	850.1	495.8
F(for variances)	= 2.94	Maximum	2996.0	2442.0
Significance	= 0.321	Minimum	988.0	1299.0

Table 16 lists the results of the one-tailed t-tests for the five private and state universities with enrollments from 988 to 2,996.

Again, all of the t-statistic signs are as predicted; however, only four of the variables are significant at the 4% level. One other is significant at better than the 6% level; however, for the remaining variables, mean differences are not statistically significant.

The second group of five private and state universities is composed of those with the higher enrollments. Table 17 below provides the two-tailed t-test results for differences in the percentage of students living on campus and total enrollment.

Unlike the preceding group, there exists a significant difference in the percentage of students on campus between private and state universities. Furthermore, the state universities' mean percentage is greater than that of the private universities. Unfortunately, this weakens our confidence in the t-test results because of the positive relationship between the total budget per student variables and the percentage of students living on campus.

There is no significant difference in the means of total enrollment, so results should not be affected much even though there is a significant difference in the variances.

TABLE 16

t-Test Results, Group I: Five Private versus Five State Universities, Enrollments from 988 to 2,996

			Private	State
1. Number of Doctors per Student				
t(separate)	= -3.14	Mean	.0001	.0009
Significance	= 0.014	S.D.	.0002	.0005
F(for variances)	= 9.27	Maximum	.0003	.0014
Significance	= 0.053	Minimum	.0000	.0002
2. Number of Nurses per Student				
t(separate)	= -1.26	Mean	.0012	.0020
Significance	= 0.124	S.D.	.0000	.0009
F(for variances)	= 1.75	Maximum	.0020	.0038
Significance	= 0.602	Minimum	.0000	.0009
3. Total Staff Salaries per Student				
t(separate)	= -1.97	Mean	18.23	45.53
Significance	= 0.056	S.D.	8.51	29.75
F(for variances)	= 1.75	Maximum	27.56	79.34
Significance	= 0.033	Minimum	9.18	2.67
4. Total Clinic Budget per Student				
t(separate)	= -0.095	Mean	24.58	73.16
Significance	= 0.035	S.D.	12.67	44.36
F(for variances)	= 12.21	Maximum	40.51	110.42
Significance	= 0.032	Minimum	10.20	10.66
5. Number of Beds per Student				
t(separate)	= -0.84	Mean	.0024	.0045
Significance	= 0.219	S.D.	.0021	.0052
F(for variances)	= 5.87	Maximum	.0050	.0114
Significance	= 0.115	Minimum	.0000	.0000

Table 16, continued

			Private	State
6. Health Clinic Square Footage per Student				
t(separate)	= -0.66	Mean	0.914	1.372
Significance	= 0.265	S.D.	1.061	1.148
F(for variances)	= 1.17	Maximum	2.700	3.285
Significance	= 0.883	Minimum	0.067	0.243
7. Total Number of Staff per Student				
t(separate)	= -2.62	Mean	.0018	.0041
Significance	= 0.081	S.D.	.0010	.0016
F(for variances)	= 2.61	Maximum	.0030	.0055
Significance	= 0.376	Minimum	.0008	.0015
8. Number of Fees Charged per Total Number of Services				
t(separate)	= 2.35	Mean	.4064	.0958
Significance	= 0.032	S.D.	.2742	.1098
F(for variances)	= 6.23	Maximum	.7273	.2500
Significance	= 0.104	Minimum	.0000	.0000

TABLE 17

t-Test Results, Group II: Five Universities Each, Percentage and Total Enrollment

			Private	State
1. Percentage of Students on Campus				
t(separate)	= -2.61	Mean	45.00	67.80
Significance	= 0.034	S.D.	11.11	16.05
F(for variances)	= 2.09	Maximum	64.00	95.00
Significance	= 0.494	Minimum	35.00	53.00
2. Total Enrollment				
t(separate)	= -0.04	Mean	7023.4	7122.8
Significance	= 0.973	S.D.	1773.1	5946.1
F(for variances)	= 11.25	Maximum	9557.0	17563.0
Significance	= 0.038	Minimum	5160.0	3372.0

Table 18 provides the one-tailed t-test results for the five private and state universities of this second group.

All of the t-statistic signs are as predicted; however, only two, nurses per student and total staff per students, are significant at the 3% level or better. Furthermore, two more t-statistics, number of doctors and number of fees charged, are significant at the 5% level or better.

It is easy to see, however, that the "disappointing" results for the other variables have been caused by the large variance estimates for the state universities. It could be argued that the population variance has been overestimated because of the sample outliers of university Y. To put this problem in perspective, t-tests were performed on groups of four universities; university Y was taken out of the sample of state universities and the "lowest scoring" private univesrity was taken out of its group. Table 19 below provides the results of these tests.

It is obvious that the t-test results have improved significantly by eliminating the outlier: the above t-statistics are significant at better than the 2% level. Of course, it could be argued that the sample variances found in Table 19 are better estimates of the population varianc-

TABLE 18

t-Test Results: Five Private and State Universities, Enrollments 3,372-17,563

			Private	State
1. Number of Doctors per Student				
t(separate)	= -2.40	Mean	.0001	.0004
Significance	= 0.034	S.D.	.0001	.0003
F(for variances)	= 16.54	Maximum	.0002	.0008
Significance	= 0.019	Minimum	.0001	.0001
2. Number of Nurses per Student				
t(separate)	= -4.66	Mean	.0004	.0016
Significance	= 0.002	S.D.	.0003	.0005
F(for variances)	= 4.06	Maximum	.0007	.0021
Significance	= 0.203	Minimum	.0000	.0010
3. Total Staff Salaries per Student				
t(separate)	= -1.86	Mean	11.99	50.96
Significance	= 0.068	S.D.	2.46	46.71
F(for variances)	= 359.8	Maximum	14.65	133.39
Significance	= 0.00	Minimum	8.32	20.39
4. Total Clinic Budget per Student				
t(separate)	= -1.59	Mean	14.20	81.77
Significance	= 0.094	S.D.	2.82	95.17
F(for variances)	= -----	Maximum	17.41	251.17
Significance	= 0.000	Minimum	10.08	23.59
5. Number of Beds per Student				
t(separate)	= -1.85	Mean	.0004	.0037
Significance	= 0.069	S.D.	.0004	.0040
F(for variances)	= 85.26	Maximum	.0010	.0104
Significance	= 0.001	Minimum	.0000	.0006

Table 18, continued

			Private	State
6. Health Clinic Square Footage per Student				
t(separate)	= -2.05	Mean	0.2760	3.0357
Significance	= 0.056	S.D.	0.1132	3.0146
F(for variances)	= 709.34	Maximum	0.4499	8.2927
Significance	= 0.00	Minimum	0.1362	0.7425
7. Total Number of Staff per Student				
t(separate)	= -3.44	Mean	.0009	.0060
Significance	= 0.013	S.D.	.0004	.0033
F(for variances)	= 58.85	Maximum	.0015	.0112
Significance	= 0.002	Minimum	.0004	.0031
8. Number of Fees Charged per Total Number of Services				
t(separate)	= 2.05	Mean	.2347	.0711
Significance	= 0.045	S.D.	.1625	.0732
F(for variances)	= 4.93	Maximum	.4000	.1667
Significance	= 0.151	Minimum	.0000	.0000

TABLE 19

t-Test Results: Four Private versus Four State Universities, truncated sample from Group II

			Private	State
3. Total Staff Salaries per Student				
t(separate)	= -3.91	Mean	12.90	30.35
Significance	= 0.014	S.D.	1.58	8.79
F(for variances)	= 31.14	Maximum	14.65	41.71
Significance	= 0.018	Minimum	11.21	20.39
4. Total Clinic Budget per Student				
t(separate)	= -4.34	Mean	15.24	39.42
Significance	= 0.011	S.D.	1.88	10.99
F(for variances)	= 34.32	Maximum	17.41	48.54
Significance	= 0.016	Minimum	12.84	23.59
6. Health Clinic Square Footage per Student				
t(separate)	= -3.61	Mean	0.3110	1.7214
Significance	= 0.018	S.D.	0.0945	0.7761
F(for variances)	= 67.49	Maximum	0.4499	2.3905
Significance	= 0.006	Minimum	0.2482	0.7424

es; unfortunately, this is conjecture. No matter how reasonable it seems, we have no evidence that this is the case.

Another possible objection to the larger 10 university t-test is that although the means of enrollment and the percentage of total enrollment living on campus are not significantly different, the same cannot be said for the enrollment variance differences. Therefore, it should be useful to choose a truncated sample of the 10 universities that will reduce the differences between the means and variances of enrollment and percentage on campus.

Furthermore, the possible objections to having Princeton University, a non-state affiliated institution, and the University of Delaware, a high enrollment institution, included in the sample of 10 universities can be satisfied by excluding them here. Two private universities with the highest enrollment levels were excluded so that the test for differences in enrollment would yield insignificant results. Table 20 below shows the two-tailed t-test results for differences in total enrollment and the percent of total enrollment on campus.

As can be seen, what has been gained in the percentage of students on campus has been lost in results concerning total

TABLE 20

t-Test Results: Truncated Sample of Eight Universities Each, Percentage and Total Enrollment

			Private	State
1. Percentage of Students on Campus				
t(separate)	= -0.19	Mean	.5837	.5987
Significance	= 0.855	S.D.	.1803	.1391
t(for variances)	= 1.68	Maximum	.8600	.8000
Significance	= 0.510	Minimum	.3500	.3700
2. Total Enrollment				
t(separate)	= 0.99	Mean	3525.2	2672.5
Significance	= 0.341	S.D.	2047.9	1315.7
F(for variances)	= 2.42	Maximum	6466.0	5274.0
Significance	= 0.266	Minimum	987.0	1299.0

enrollments; however, because the former variable is considered to be more important, a net gain can be claimed.

Table 21 shows the one-tailed t-test results for the truncated sample of eight private and state universities.

Again, all of the t-statistic signs are in the predicted direction. Furthermore, only one variable, the number of beds per student, is not significant at the 5% level; and only one other, health clinic square footage per student, is not significant at the 2% level. All other t-statistics are significant at the 1.7% level or better.

TABLE 21

t-Test Results: Eight Private versus Eight State Universities

			Private	State
1. Number of Doctors per Student				
t(separate)	= -2.81	Mean	.0001	.0007
Significance	= 0.012	S.D.	.0001	.0002
F(for variances)	= 18.44	Maximum	.0003	.0016
Significance	= 0.001	Minimum	.0000	.0001
2. Number of Nurses per Student				
t(separate)	= -2.38	Mean	.0008	.0018
Significance	= 0.017	S.D.	.0008	.0009
F(for variances)	= 1.29	Maximum	.0020	.0038
Significance	= 0.748	Minimum	.0000	.0009
3. Total Staff Salaries per Student				
t(separate)	= -2.66	Mean	15.65	39.78
Significance	= 0.014	S.D.	7.50	24.54
F(for variances)	= 10.70	Maximum	27.56	79.34
Significance	= 0.006	Minimum	8.32	2.67
4. Total Clinic Budget per Student				
t(separate)	= -2.80	Mean	20.41	60.30
Significance	= 0.012	S.D.	11.35	38.61
F(for variances)	= 11.56	Maximum	40.51	110.42
Significance	= 0.005	Minimum	10.08	10.66
5. Number of Beds per Student				
t(separate)	= -1.67	Mean	.0015	.0046
Significance	= 0.064	S.D.	.0020	.0048
F(for variances)	= 5.73	Maximum	.0050	.0113
Significance	= 0.035	Minimum	.0000	.0000

Table 21, continued

			Private	State
6. Health Clinic Square Footage per Student				
t(separate)	= -2.09	Mean	0.6562	1.6255
Significance	= 0.028	S.D.	0.8783	0.9750
F(for variances)	= 1.23	Maximum	2.6999	3.2848
Significance	= 0.790	Minimum	0.0667	0.2432
7. Total Number of Staff per Student				
t(separate)	= -3.38	Mean	.0015	.0050
Significance	= 0.005	S.D.	.0010	.0028
F(for variances)	= 8.71	Maximum	.0030	.0112
Significance	= 0.011	Minimum	.0004	.0015
8. Number of Fees Charged per Total Number of Services				
t(separate)	= 2.51	Mean	.3261	.0807
Significance	= 0.017	S.D.	.2583	.0999
F(for variances)	= 6.69	Maximum	.7273	.2500
Significance	= 0.023	Minimum	.0000	.0000

3.6 HEALTH CLINIC BUDGET AS A PERCENT OF TOTAL UNIVERSITY EXPENDITURES

Up until now only per student spending within state and private universities in various health clinic categories has be analyzed; however, theory also predicts that state universities will spend relatively more of their scarce resources on health clinic services. Table 22 provides information on the ratios of health clinic budgets to the total expenditures for the sample of state and private universities.

Again, t-tests were performed to see if state university health clinics controlled relatively more of the total university budget than did private university health clinics. The one-tailed t-test results for the previously given combinations of universities can be found in Table 23.

As can be seen, in all four cases the signs are as predicted and are all significant at the .06 level. Furthermore, two of the four t-test results are significant at the .02 level or better. The results are consistent with the predictions of theory.

TABLE 22

Ratios of Health Clinic Budgets to Total University Expenditures

Private	Health Clinic Budget/Total Expenditures	State	Health Clinic Budget/Total Expenditures
A	.008211	Q	.003129
B	.009334	R	.018782
C	.006171	S	.034031
D	.002253	T	.016373
E	.007085	U	.007121
F	.005161	V	.023628
G	.016671	W	.010786
H	.005604	X	.008329
I	.005186	Y	.012165
J	.006093	Z	.009765

TABLE 23

t-Test Results: Health Clinic Budget as Percent of Total University Expenditures

			Private	State
1. Health Clinic Budget/Total University Expenditures (ten Universities; enrollment 988-17,563)				
t(separate)	= -2.31	Mean	.0072	.0144
Significance	= 0.019	S.D.	.0038	.0091
F(for variances)	= 5.65	Maximum	.0167	.0340
Significance	= 0.017	Minimum	.0022	.0031
2. Health Clinic Budget/Total University Expenditures (Five universities; enrollment 988-2,996)				
t(separate)	= -1.92	Mean	.0085	.0192
Significance	= 0.054	S.D.	.0053	.0112
F(for variances)	= 4.52	Maximum	.0167	.0340
Significance	= 0.173	Minimum	.0022	.0031
3. Health Clinic Budget/Total University Expenditures (Five universities; enrollment 3,372-17,563)				
t(separate)	= -3.98	Mean	.0058	.0096
Significance	= 0.005	S.D.	.0008	.0020
F(for variances)	= 6.17	Maximum	.0071	.0122
Significance	= 0.106	Minimum	.0052	.0071
4. Health Clinic Budget/Total University Expenditures (Eight universities, Princeton and Delaware excluded)				
t(separate)	= -2.04	Mean	.0076	.0154
Significance	= 0.035	S.D.	.0042	.0100
F(for variances)	= 5.61	Maximum	.0167	.0340
Significance	= 0.037	Minimum	.0022	.0031

3.7 CONCLUSION

Attempts have been made to test the resource allocation and pricing policy hypothesis both at the university and auxiliary health clinic level. First, with respect to the health clinic, in no case has the t-statistic sign contradicted theory. In most cases, the comparisons yielded t-statistics significant at the 5% level or better. In every case, at least two of the "important" variable comparisons such as number of doctors per student, number of nurses per student, total clinic budget per student, or total staff per student, had t-statistics that were significant at the 3% level. In all cases, the comparison of the number of fees charged per total number of services yielded t-statistics that were significant at the 5% level. Second, with respect to the university as a whole only one of the regressions coefficients had the "incorrect" sign and most of the regression coefficients were significantly different from zero at the .05 level of significance or better. Thus, theoretical implications both with respect to the resource allocation hypothesis and the pricing hypothesis have been supported by the evidence.

Chapter IV

INSTITUTIONAL ANALYSIS OF PRIVATE AND STATE UNIVERSITY HEALTH CLINICS

The purpose of this chapter is to analyze and describe in greater depth the institutional characteristics of health clinics within private and state universities. Considerable detail concerning health clinic institutions must be sacrificed when quantifying characteristics for statistical tests; however, a more descriptive or institutional analysis should mitigate some of the difficulties created by this omission. Naturally, such institutional analysis lacks the rigor of statistical tests, yet it will certainly help to put into perspective the picture painted in the preceding chapter.

This chapter is divided into three sections: (1) a general description of the differences and similarities of health clinics within private and state universities, (2) specific institutional analysis of a representative private university's health clinic (Villanova University), and (3) specific institutional analysis of a representative state university's health clinic (University of Delaware). These two universities have been chosen not just because it is felt that they are representative of the population but because the author has had a significant degree of experience with the health clinics of each.

4.1 GENERAL DESCRIPTION OF STATE AND PRIVATE DIFFERENCES

One of the major differences between the state and private universities surveyed is that state universities tend to build separate buildings specifically designed as health clinic facilities, while private universities tend to utilize existing structures such as dormitories and houses which were originally designed for other uses. Of the 10 private universities, 70% were using structures originally designed for other uses, while only 30% had built a new structure specifically designed as a health clinic. For instance, most of the private universities answered the questionnaire in the following manner: "ground floor of dormitory made over to two exam rooms, bedroom, and offices"; "converted private home"; "two reconverted dormitory suites in new building"; "part of a dorm--remodeled into exam rooms, bedroom, reception area, and utility room."

Of the 10 state universities, only 30% were using structures not originally designed as a health clinic; the remaining 70% had built new student health clinics as separate structures. Table 24 identifies the universities which did and did not have separate health clinic structures built.

Of course, it should come as no great surprise that the state universities are relatively more capital intensive in the provision of health care service than are the private

TABLE 24

Status of University Health Clinic Structures

Private	Separate Health Clinic Constructed	State	Separate Health Clinic Constructed
A	yes	Q	no
B	no	R	no
C	no	S	yes
D	no	T	no
E	yes	U	yes
F	no	V	yes
G	yes	W	yes
H	no	X	yes
I	no	Y	yes
J	no	Z	yes
K	no		

universities. Unfortunately, there was no attempt here to get a measure of the market value of the state and private health clinic structures to see how much more capital intensive state universities might be.

Another measure of capital intensity, and other differences, in the health services offered would be the frequency of x-ray, surgery, family planning, gynecology, and laboratory tests. Table 25 below describes these differences.

It can be seen that in this dimension the differences are relatively insignificant. The state universities offer x-ray services one more time than private universities and offer surgical services three more times than private universities. State universities also have a slight edge in family planning and gynecological service offerings, while private universities offer more laboratory services. Table 26 summarizes the differences in service offerings between state and private universities.

Although state universities provide more services in most categories, again the differences are not significant. It would be difficult to argue that the state universities spent more per student because quality was higher or more services were being offered. The t-test results, for a one-tailed test, showed that the null hypothesis could be rejected only at the .320 level of significance.

TABLE 25

Status of Health Clinic Services within State and Private Universities

Univ.	X-ray	Surgery	Family Planning	Gynecology	Laboratory Tests
			Private Universities		
A	no	no	no	yes	yes
B	no	no	yes	yes	yes
C	no	no	yes	yes	yes
D	no	no	yes	yes	yes
E	yes	no	yes	yes	yes
F	no	no	no	no	yes
G	yes	no	no	no	yes
H	no	no	yes	yes	no
I	no	no	no	yes	no
J	yes	yes	no	yes	yes
			State Universities		
Q	no	no	yes	yes	yes
R	yes	yes	yes	yes	yes
S	yes	no	yes	yes	yes
T	no	no	no	yes	yes
U	no	no	yes	no	no
V	no	no	no	yes	no
W	no	yes	no	yes	no
X	yes	yes	yes	yes	yes
Y	yes	no	yes	yes	yes
Z	no	yes	yes	yes	yes

TABLE 26

Summary of Services Offered within State and Private University Health Clinics

Medical Service	Private	State
Physical by Doctor	8	8
Nonprescription Drugs	10	9
Prescription Drugs	8	10
Laboratory Tests	8	7
Vaccinations	7	6
In-Patient Care	5	8
Dietary Care	4	5
Dermatology	6	3
Allergy	9	9
Family Planning	5	7
Gynecology	8	9
Dental	0	0
X-Ray	3	4
Neurology	1	0
Internal Medicine	5	6
Surgery	1	4
Orthopedics	2	6
Opthalmology	2	1
Podiatry	1	0
Psychiatry	1	1
Physical Therapy	1	1
Total Services	95	105

Another element of the university health clinic is the average number of hours it is open to serve the student population. It is expected that the state universities may be open for a longer time period, if only to increase the number of student visits. The number of visits is possibly an argument in the manager's utility function because it is easier to lobby for larger future budgets if it appears to university officials that student demands for health care are not being adequately met. Of course, the greater number of hours open may simply be a reflection of the greater spending per student by state universities and may not be a lobbying strategy.

Table 27 shows the number of hours the health clinic is open for specific state and private universities.

Even though there is an expectation that health clinics within state universities would be open longer (although the sign is as predicted), no significant difference exists; a t-test found a t-statistic of -0.43 and a significance level of 0.338 for the one-tailed test. Therefore, we cannot reject with any degree of confidence the hypothesis that the mean number of health clinic hours for private universities is equal to that of state universities.

TABLE 27

State and Private Health Clinic Operating Hours

Private	Hours	State	Hours
A	24	Q	8.5
B	8	R	8
C	9	S	24
D	5	T	24
E	7.5	U	14
F	15	V	24
G	24	W	24
H	24	X	24
I	24	Y	7
J	9	Z	24

4.2 UTILIZATION RATES

Another predicted difference between state and private university health clinics concerns student utilization rates or frequency of visits. In Chapter III it was found that a significantly greater percentage of the private health clinics charged user fees for medical services. This and other non-price resource economizing devices will tend to be used more frequently by private than by state universities because the incentives to reduce resource dissipation is greater in private than in state universities. This also implies that student utilization rates will be lower in private universities than in state universities.

Unfortunately, the data collected on the frequency of student visits to the health clinic has a number of serious flaws. First, no uniform time period was reported so all had to be adjusted to the per day figure. This figure will also be affected by the size of summer sessions as well as the percent of the students living on campus during the summer and may vary dramatically from university to university. Second, it is felt that many of the questionnaire respondents simply guessed at this figure to avoid spending the time estimating or looking it up. Guesses, if not randomly distributed about the true mean, would give misleading results. Finally, even geographic location can affect the

frequency of visits; colder climates or those with greater temperature fluctuations may mean a higher incidence of colds and influenza; no attempt to control for these differences has been made. Naturally, utlization rates will be affected by the number of students enrolled in the university so the daily frequency, reported in Table 28, was divided by the total enrollment to form a new variable, rate of utilization per enrollment. Recognizing the difficulties with these data, t-tests were performed with results described in Table 28. The significance level is for the one-tailed test.

As can be seen, a significant difference exists between private and state health clinic utilization rates and, as predicted, the mean of the state universities is greater than the mean of the private. Even though the t-statistic is significant at less than the 1% level, greater caution in accepting these results must be exercised because of the reasons outlined above.

A result more difficult to explain is found in the differences in the health insurance prices that students have an option to purchase. Table 29 lists this information.

One may expect the insurance fees paid by volunteering students in the private universities, ceteris paribus, to be lower than in the state universities; however, just the op-

TABLE 28

t-Test Results for Private versus State University Student Utilization Rates of Health Clinic Services

			Private	State
t-statistic	= -2.82	Mean	.0058	.0150
Significance	= 0.009	S.D.	.0031	.0098
F(for variances)	= 9.79	Maximum	.0097	.0327
Significance	= 0.002	Minimum	.0010	.0029

TABLE 29

Annual Health Insurance Charges for State and Private University Health Clinics

University	Fee/Year	University	Fee/Year
A	none	Q	*
B	$110	R	none
C	$ 52	S	*
D	$ 54	T	$ 35
E	$150	U	*
F	$ 65	V	$ 35
G	$ 88	W	none
H	$ 72	X	$ 70
I	$ 97	Y	$ 56
J	$102	Z	$ 64

*Information not provided.

posite appears to be the case. This simply may be a result of differences in the coverage or the extent of student health services offered, and not a result of different incentives to search for the lower cost insurance alternative; however, this issue was not investigated.

4.3 INSTITUTIONAL ANALYSIS OF A PRIVATE UNIVERSITY: VILLANOVA UNIVERSITY

Villanova University was founded as a private university in 1842 by a Philadelphia order of Augustinians. The university is situated on a 240-acre campus about 7 miles west of the Philadelphia city limits and has a total enrollment exceeding 10,000 students.

The earliest account of health service provision at what was then Villanova College was related to the author by the University Historian, Father Jenkins. Around the 1870s, a Dr. Gearhard came to Villanova College every other day for an hour or so to check up on students, professors, and the Augustinian monks. Dr. Gearhard would ride out from Ardmore, a town about four miles east of Villanova, in his horse-drawn buggy until the early 1900s. (In 1892, Dr. Gearhard was responsible for the founding of Bryn Mawr Hospital.) During this period, there was, of course, no infirmary or health clinic, or at least there was no record of any. Much later, an infirmary was established in the old

Mendel Hall, the science building that is now called Tolintine Hall, from 1929 until 1950. This infirmary was managed by a number of the Augustinians during this period, although none of them had any formal training in medicine. A Father Brown, one of the Augustinian infirmarians, was known to frequently enlist the help of students in managing the infirmary.

By 1950, the college decided to move the infirmary to a private home, on the edge of campus, which had just been purchased. The infirmary has been in that building ever since; furthermore, there are no current plans to move to a different location or to build a new infirmary.

4.4 DESCRIPTION OF THE VILLANOVA UNIVERSITY HEALTH CLINIC

The private residence now used as the infirmary is a a three-story stone and wood frame house. The first floor contains the following:

1. a waiting room with two couches and a few chairs,
2. a clinic or examination room that includes an area where frequently-used medicines, bandages, crutches, and other medical supplies are kept, (in this room usually one or two nurses are on duty; the doctor is available to examine students from 8:30-11:00 every morning).

3. a treatment room that includes a whirlpool, hydrocollator (a machine that keeps hot packs at a sufficiently high temperature), and an examination table,
4. a small office used by the nursing staff, and
5. a kitchen where the food for inpatients is prepared. The kitchen also contains two refrigerators, a range, meat slicer, sink, and food storage area. University food service supplies the food to the infirmary.
6. The second floor contains the following: four bedrooms and two bathrooms with a shower each. One of the bedrooms has two electrically controlled beds that can be raised and lowered, while all other rooms contain standard beds. In addition, there are three televisions that have been place in three of the four rooms. On this floor, there are a total of 14 beds.
7. The third floor contains three small rooms and one bathroom with shower. One of the rooms is used as a student's dormitory room, while the other two rooms are used as miscellaneous storage areas.

The infirmary does not charge for all services; however, a number of charges are made. The medicine sold to students is priced at wholesale. Table 30 lists the prices charged for the medicine and services supplied by the infirmary.

TABLE 30

Health Service Charges for the Villanova Infirmary

Item	Cost	Item	Cost
Ace Bandage	1.40	Fulvicin tabs ea	0.25
Actifed Tablets (12)	1.00	Gamma Globulin 1 cc	1.75
Afrin Nasal Spray	0.75	Glyoxide	2.00
Afrinol Tabs (6)	1.00	Kwell Shampoo	3.20
Ananase ea	0.19	Librium 5mg	0.10
Aspirin (1000)	4.16	Librium 10mg	0.10
Auralgan Drops	2.50	Lomotil	0.10
Azo Gantrisin	0.09	Lotrimin	3.00
Bacimycin Oint.	3.00	Monistat-7	7.90
Benadryl caps	0.06	Neomedrol	1.80
Butazolidin tabs	0.15	Neosporin Ophth. Oint.	1.80
Butazolidin Alka	0.14	Nupercainal Oint.	1.90
Celestone Soluspan 2cc	3.20	Omnipen (Ampicillin)	0.06
Chloromycetin Ophth. Oint.	2.90	Ornade Spans. (6)	1.00
Combin Spansules	0.25	Penicillin tabs (12)	1.00
Compazine tabs	0.25	Pen Vee K 250mg	0.12
Cortesporin Otic 10cc	7.15	Prednisone 5mg	0.14
Darvocet-N	0.10	Pyribenzamine 50mg	0.07
Darvon N /c ASA	0.10	Tedral tabs	0.12
Darvon N	0.10	Tetanus Toxoid	1.45
Decaspray	5.50	Tetracycline caps (12)	1.00
Diuril 500 mg (100)	7.50	Typhoid	3.00
Domeboro (single pkg.)	0.15	Uticort Gel	2.95
Donnatal tabs	0.05	Valium 5mg	0.10
Drixoral (6)	1.00	Valium 2mg	0.10
Equagesic	0.13	Vectrin 100mg (6)	3.00
Equanil	0.10	Vibramycin caps	0.85
Erythromycin	0.10	Vitamin B12	1.00
Fiorinal tabs	0.08	Vo Sol Otic	4.95
Fleets Enema	0.60		

4.5 INSTITUTIONAL ANALYSIS OF A STATE UNIVERSITY: UNIVERSITY OF DELAWARE

The University of Delaware is a state institution that was founded in 1734. The campus occupies an area of 350 acres and is located in Newark, Delaware, a town with a population of approximately 25,000 and which is about 14 miles southwest of Wilmington, Delaware. Student enrollment is approximately 17,000.

Very little information could be found concerning the history of student health clinic services; however, it is known that before the present health clinic was built, the student health clinic facility was located in Old College, one of the oldest buildings on the campus. In 1958, the University of Delaware administration decided to build an entirely new two-story brick student health clinic.

From 1973 until 1980, major renovations of the student health clinic were undertaken. The available space was almost doubled through the addition of two wings on both sides of the clinic building, and major renovations of interior spaces reduced inpatient rooms from 40 to 4 and increased office space and treatment rooms. At the moment, no new structural renovations are planned.

4.6 DESCRIPTION OF UNIVERSITY OF DELAWARE HEALTH CLINIC

The following provides a room-by-room description of the University of Delaware health student clinic facilities starting with the first floor:

1. The waiting room, the first room encountered upon entering the health clinic, includes 14 chairs, a rack of recent magazines, a table with University of Delaware health clinic pamphlets and other health-related documents, and one wooden bench.
2. Adjacent to the waiting room, separated by a glass window, is the business office. Those working in this office are the receptionist, a file clerk, the office coordinator, the senior secretary, and an assistant secretary: five office workers in all. In the business office was a new filing system, where all current student medical files are kept, three IBM Selectric typewriters, two older IBM typewriters, and wall-to-wall carpeting.
3. On the other side of the waiting room is a smaller room that contains four years of medical records for students who have graduated or otherwise left the university. At the end of each year, the five year old records are shredded to make room for the records of that year's graduating class.

4. The immunization clinic is composed of two rooms: an office and waiting room.
5. Down the hall there are two minor surgery rooms which include operating tables, sinks, medicine cabinets, large overhead light fixtures, sterilization machines, and desks.
6. A laboratory room includes two microscopes, a dextrometer (a device which gives digital readouts on blood sugar content), two centrifuges, test tubes, medicine cabinets, and the equivalent of 1.25 workers providing laboratory service 14 hours each day. Just about all laboratory tests were performed by the health clinic here.
7. The x-ray room includes one x-ray machine that is about six years old (and originally cost over $30,000), an $8,000 Kodak developer, and one x-ray technician or radiologist.
8. The medical director's office includes the standard office equipment and a treatment room.
9. The small copy room includes an SCM 1200 photocopy machine as well as shelves of paper and other accessories.
10. In the center of the building just across from the entrance is the clinic room. It is in this room that

all emergency care is provided. The clinic room includes first aid equipment, a bed, oxygen, and an emergency cardioplumonary crash-cart machine. The clinic room is used mainly for interviewing and diagnosing students.

11. The Director of Nursing's office includes a desk and file cabinets.
12. A utility room contains an incubator and other medical equipment.
13. There is an elevator to the second floor and basement.
14. The kitchen, where meals are prepared, includes a Hobart dishwasher, stove and oven, food warmer, and refrigerator.
15. The pharmacy contains most of the drugs and medicines that are dispensed to students free of charge. Only two employees of the health clinic hold keys to the pharmacy.
16. Finally, there are four separate adjoining doctor's and nurse's offices, each including an examination table, desks, bathroom, and medical equipment.

The second floor of the clinic includes the following:

1. A full-time psychiatrist's office;

2. the office of the half-time psychiatrist and the half-time psychiatric social worker;
3. eight inpatient rooms that averaged two mechanically operated beds for each room (although the clinic also has four electric beds);
4. a nurses station which includes a small kitchen with a sink, refrigerator, and a bathroom with shower;
5. a student lounge and meeting room;
6. two supply rooms, one of which includes an ice machine and sink;
7. a custodial closet with wash basins and cleaning equipment;
8. two more bedrooms with two beds each and adjoining bathrooms;
9. a combination linen closet and bathroom with bathtub;
10. a waiting room for the gynecology department;
11. a gynecology office with two desks, scale, dictation machines, and medicine cabinets;
12. two gynecology examination rooms which include sterilizers, microscopes, bathrooms, desks, cabinets, and stirruped examination tables;
13. and a nurse practitioner's office with desk and filing cabinets.

Finally, in the basement of the health clinic are the ofices of the health education coordinator of Wellspring. Wellspring is a health clinic affiliated organization which attempts to educate students about preventive medicine and nutrition. The organization also publishes a monthly newsletter concerning student health related issues. The basement area includes two small offices, a bathroom, and a waiting room.

4.7 CONCLUSION

As can be deduced from the above description, the University of Delaware Health Clinic is much larger and much more well equipped than the Villanova University health clinic. Furthermore, the University of Delaware health clinic does not charge students for any of the medicines dispensed and for most of the services offered. It should also be noted that the University of Delaware health clinic was one of the lowest cost per student of all the state universities investigated.

Furthermore, although this is no more than anecdotal evidence, the director of the University of Delaware health clinic appeared to want to show off the high standard of health care being provided by the health clinic and also talked of future improvements, whereas the director of the

Villanova University health clnic seemed acutely aware of the budget limitations and felt that health services should not be expanded. It is also noteworthy that the University of Delaware director had just spent a fair sum of money surveying almost 80 university health clinics as a strategy to justify current outlays. The director of the Villanova health clinic, on the other hand, has never considered doing such surveys or research that might allow him to justify larger budgets. Once again, the theoretical implications outlined earlier appear to be supported by this descriptive or institutional evidence.

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 SUMMARY

In this investigation, three basic propositions concerning state and private universities were tested:

1. state university expenditures per student will be greater than private university per student expenditures;
2. relatively more resources will be devoted to educational activities and relatively less to non-educational services within private than within state universities; and
3. explicit prices and user charges (to reduce resource dissipation) will be used more frequently and extensively by private universities than by state universities.

The first proposition may just be a consequence of the society's desire to "solve" the positive externality problem through subsidization and state production; however, this consequence is also consistent with the proposition that state legislators have more to gain from state involvement in education than from a reliance on voluntary market institutions. In fact, legislators also have more to gain from

the state production of education than from the direct subsidization of consumers, as through a voucher plan, which also explains why state production, not direct subsidization, is the major means by which education is provided.

The other two propositions follow from the identification of difference in the constraints managers face within state and private universities.

These propositions about state and private universities were tested on a "micro" and "macro" level. Per student expenditures, resource allocation, and pricing policies for student health clinic auxiliary enterprises were investigated and found to support the theoretical implications. State universities spent more as a percent of the total university budget on student health services than did private universities and spent more per student on health clinic services. Furthermore, state universities did not utilize explicit pricing and user charges for health clinic services as extensively as did private universities. Evidence of reduced resource dissipation within private universities was found in the lower student utilization rates in private as compared to state universities.

Again, on the macro level, empirical support was found for the above propositions. State universities spent more per student in all non-educational areas as well as in edu-

cational areas; however, state universities spent relatively more of their resources on non-educational items and relatively less on education than did private universities. Finally, there is fairly good evidence that private universities price their auxiliary services closer to marginal cost than do state universities. That is, auxiliary enterprise revenues (derived from user charges) of private universities came closer to covering auxiliary enterprise expenditures than did auxiliary enterprise revenues of state universities.

5.2 CONCLUSIONS AND RECOMMENDATIONS

The above evidence would lead many to conclude that state universities are less efficient, i.e., provide equivalent educational services at higher cost; however, it should be noted that higher per student spending rates within state universities does not necessarily imply inefficiency. The real test for inefficiency must be a comparison of the rates of return on human capital investment within state and private universities. If the rate of return on human capital investment were higher for state universities, then it could be argued that, for whatever reason, the higher per student spending rates in state universities may be worth it. Therefore, additional research into these potential differ-

ences in rates of return on human capital between private and state universities would yield important information about the relative efficiencies of these institutions.

Of course, the evidence on resource allocation within the state and private universities and within the health clinic as well as the evidence on pricing policies of these institutions is more difficult to explain without reference to private and state differences in the costs of producing a given level of education; here the reader should weight the evidence and come to his or her own conclusions.

On the other hand, the evidence does not support the claim that the institutional design of state universities has been perfected. The above evidence shows that other institutional designs, such as voucher plans or educational tax credits at least should be considered. Because there is reliable evidence that current state institutions may be less efficient than alternative institutions, we should be willing to take on the risks of experimenting with these alternatives. Hayek has argued that to say we cannot go back to the past means that we cannot learn from our mistakes. Unfortunately, improvement of our present educational institutions means that we must be willing to risk mistakes in order reap the benefits of improved institutional designs.

Appendix A

CURRENT FUND REVENUES, EXPENDITURES, AND PHYSICAL PLANT ASSETS

(Taken from the Inter-University Consortium for Political and Social Research handbook for Higher Education Finance, 1976, ICPSR 7649, 1978 edition.) Part A. Current funds revenues by source for fiscal year ending 1976.

Current funds revenues include all unrestricted gifts and other unrestricted revenues earned during the fiscal year and restricted current funds to the extent that such funds were expended for current operating purposes.

Line 1. Tuition and fees. Report all tuition and fees assessed against students for current operating purposes. Include tuition and fee remissions or exemptions even though there is no intention of collecting from the student. Include here those tuitions and fees which are remitted to the State as an offset to the State appropriations. (Charges for room, board, and other services rendered by auxiliary enterprises are not reported here. See line 16.)

Lines 2, 3, and 4. Governmental appropriations include all amounts received from or made available to the institution through acts of a legislative body, except grants or contracts. These funds are for meeting current operating expenses and not for specific projects or programs. Examples are Federal land-grant appropriations and Federal revenue sharing funds (line 2). Federal appropriations received through State channels is a subset of line 2 and should be included in the line 2 total for Federal appropriations.

Lines 5-10. Government grants and contracts. Report revenues from governmental agencies which are for specific projects or other types of programs. Examples are research projects, training programs, and similar activities for which amounts are received or expenditures are reimbursable under terms of a governmental grant or contract. Amounts equal to direct costs incurred should be recorded as charges against current restricted funds and reported as restricted current funds revenues (lines 6, 8, and 10). Related indirect costs recovered should be reported as unrestricted revenues (lines 5, 7, and 9). Do not include BEOGs.

Lines 11 and 12. Private gifts, grants, and contracts. Private gifts and grants include revenues from private donors for which no legal consideration is involved. Private contracts include those funds for which specific goods and services must be provided to the funder as stipulation for receipt of the funds. Include only those gifts, grants, and contracts that are directly related to instruction, research, or public service. Moneys received as a result of gifts, grants, or contracts from a foreign government would be reported here. Include the estimated dollar amount of contributed services on line 11.

Lines 13 and 14. Endowment income. Report: (1) the unrestricted income of endowment and similar funds; (2) restricted income of endowment and similar funds to the extent expended for current operating purposes; and (3) income from funds held in trust by others under irrevocable trusts. Do not include capital gains or losses.

Line 15. Sales and services of educational activities. Report revenues derived from the sales of goods or services that are incidental to the conduct of instruction, research, or public service. Examples include film rentals, scientific and literary publications, testing services, university presses, and dairy products.

Line 16. Sales and services of auxiliary enterprises. Report here all revenues generated by the auxiliary enterprise operations of the institution. Auxiliary enterprises are managed as essentially self-supporting activities. Examples are residence halls, food services, student health services, college unions, college stores, barber shops, etc.

Line 17. Sales and services of hospitals. Include the revenues (net of discounts and allowances) of a hospital operated by the institution. Do not include here gifts, grants, appropriations, research revenues, or endowment income. Include revenues of health clinics that are part of the hospital unless such clinics are part of the student health services program.

Line 18. Other sources. Include all items of revenue not covered elsewhere. Examples are interest income and gains (net of losses) from investments of unrestricted current funds. Include revenues resulting from the sales and services of internal service departments to persons or agencies external to the institution.

Line 19. Independent operations. Include all revenues associated with operations independent of or unrelated to the primary missions of the institution (i.e., instruction, reserach, public service) although they may indirectly contribute to these programs. This category generally includes only those revenues associated with major Federally Funded Research and Development Centers.

Line 20. Total current funds revenues. Report here the sum of lines 1 through 19 inclusive.

Part B: Current funds expenditures and mandatory transfers for fiscal year ending 1976.

Report both unrestricted and restricted current funds expenditures in the following functional classifications.

Line 1. Instruction. Expenditures of the colleges, schools, departments, and other instructional divisions of the institution and expenditures for departmental research and public service which are not separately budgeted should be included in this classification. Include expenditures for both credit and noncredit activities. Exclude expenditures for academic administration where the primary function is administration (e.g., academic deams). This category includes the following: general academic; occupational and vocational instruction; special session instruction; community education; preparatory and adult basic education; and remedial and tutorial instruction.

Line 2. Research. This category includes all funds expended for activities specifically organized to produce research outcomes and commissioned by an agency either external to the institution or separately budgeted by an organizational unit within the institution. Do not report nonresearch sponsored programs (e.g., training programs.)

Line 3. Public service. Report all funds budgeted specifically for public service and expended for activities established primarily to provide noninstructional services beneficial to groups external to the institution. Examples are seminars and projects provided to particular sectors of the community. Include expenditures for community services and cooperative extension services.

Line 4. Academic support. This category includes expenditures for the support services that are an integral part of the institution's primary missions of instruction, research,

or public service. Include expenditures for libraries (line 5), museums, galleries, audio/visual services, computing support, ancillary support, academic administration and personnel development, and course and curriculum development. (Include line 5 expenditures in the line 4 total for academic support.)

Line 6. Student services. Report funds expended for admissions, registrar activities, and activities whose primary purpose is to contribute to students' emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instruction program. Examples are career guidance, counseling, financial aid administration, student health services (except when operated as a self-supporting auxiliary enterprise).

Line 7. Institutional support. Report expenditures for the day-to-day operational support of the institution, excluding expenditures for physical plant operations. Include general administrative services, executive direction and planning, legal and fiscal operations, and community relations.

Line 8. Operation and maintenance of plant. Report all expenditures for operations established to provide service and maintenance related to campus grounds and facilities. Do not include expenditures made from the institutional plant funds account.

Lines 9 and 10. Scholarships and fellowships. This category applies only to moneys given in the form of outright grants and trainee stipends to individuals enrolled in formal coursework, either for credit or not. Do not report Federal Basic Opportunity Grants, ROTC scholarships, or other programs where the institution is not allowed to select the recipient of the grant. Aid to students in the form of tuition or fee remissions should be included. (Exclude those remissions which are granted because of faculty or staff status.)

Line 11. Educational and general mandatory transfers. Mandatory transfers from current funds are those that must be made in order to fulfill a binding legal obligation of the institution. Report mandatory debt service provisions relating to academic buildings, including (1) amounts set aside for debt retirement and interest, and (2) required provisions for renewal and replacements to the extent not financed from other sources.

Line 12. Total educational and general expenditures and mandatory transfers. Enter here the sum of lines 1 through 4 plus 6 through 11.

Line 13. Mandatory transfer for auxiliary enterprises. Report the amount transferred from current funds for mandatory debt service provisions relating to auxiliary enterprises. Examples include maintenance reserves.

Line 14. Auxiliary enterprises. This category includes those essentially self-supporting operations which exist to furnish a serivce to students, faculty, or staff, and which charge a fee that is directly related to, although not necessarily equal to, the cost of the service. Examples are residence halls, food services, college stores, and intercollegiate athletics. (Include the mandatory transfers amount on line 1 in the line 14 amount.)

Line 15. Mandatory transfers for hospitals. Report the amount from current funds for mandatory debt service provisions relating to hospitals.

Line 16. Hospitals. Report all expenditures, except depreciation, associated with the operation of the hospital, including nursing expenses, other professional services, general services, administrative services, fiscal services, and charges for physical plant operations. (Include the mandatory transfers amount on line 15 in the line 16 amount.)

Line 17. Mandatory transfers for independent operations. Report the amount transferred from current funds for mandatory debt service provisions relating to independent operations.

Line 18. Independent operations. Include all funds expended for operations that are independent of or unrelated to the primary missions of the institution, although they may indirectly contribute to the enhancement of these programs. This category is generally limited to expenditures of a major Federally Funded Research and Development Center. Do not include the expenditures of operations owned and managed as investments of the institution's endowment funds. (Include the line 17 amount in the line 18 amount.)

Line 19. Total current funds expenditures and mandatory tranfers. Report the sum of lines 12, 14, 16, and 18.

Part C: Physical Plant Assets for Fiscal Year Ending 1976

Report the values of land, buildings, and equipment owned or utilized by the institution. Do not include those plant values which are a part of endowment or other capital fund investments in real estate. Data for your institution which are not kept on the books of account of your institution, but are kept in the records of another organization or agency for your institution, should be included (e.g., State schools should report physical plant even though records are maintained by a State agency).

Lines 1, 2, and 3. Report the book values of land, buildings, and equipment.

Column (2). Book value of plant at the beginning of the fiscal year is intended as the dollar amount of value as shown on the institution's accounting records.

Column (3). Book value of plant at the ending of the fiscal year is intended as the dollar amount of value as shown on the institution's accounting records.

Column (4). Report or estimate the current costs to replace all buildings owned or utilized by the institution. Report recent appraisal value or what is currently carried as insurance replacement value. Do not include the replacement value of those buildings which are a part of endowment or other capital fund investments in real estate. This figure is not a book value figure.

Appendix B

STUDENT HEALTH CLINIC QUESTIONNAIRE

Name of Institution _____

Does your institution have an infirmary or student health clinic? YES ____ NO ____.

If NO student health clinic: Please state what other arrangements are used to satisfy student health care demands; e.g., referral to local health clinics, doctors, or hospitals.

_____

_____

If YES, a student health clinic:

1. How is the health clinic staffed and operated by the institution? Please specify the number in each category in full-time equivalence: e.g., 2-1/2 MDs, 3-1/4 nurses, etc.

   a. _____ Medical Doctors

   b. _____ Nurses

   c. _____ Laboratory Technicians

   d. _____ File Clerks

   e. _____ Secretaries

f. _____ Volunteer Workers

g. _____ Other _____

2. Total wages paid to staff for the latest fiscal year 19__. $_____

3. Do students pay a health service fee? (YES ____,NO ____) If so, how much (_____) per _____.

4. Describe eligibility requirements for undergraduate, graduate students, and staff and the pricing of separate services for individual members of these groups.

_____

_____

5. What are your operating hours during the school year _____, during summer sessions _____ and during holidays _____.

6. How many beds do you have in the health clinic? _____

7. What is your patient flow rate? _____ per _____ during the school year.

8. What is the average number of beds occupied during the school year? _____.

9. Do students have the opportunity to purchase health insurance through the university? YES _____ NO _____.
If YES, what do they pay $_____ per _____.

10. What percent of the total health clinic budget goes to:
    a. Staff Salaries _____%
    b. Medicine _____%
    c. Medical Equipment _____%
    d. Maintenance of Plant and Equipment _____%
    e. Travel to Seminars _____%
    f. Other _____, _____%

11. What is the total annual budget for the student health clinic? $_____

12. Of the following services, please check the ones you supply. On the right hand side specify fee charged. If no fee, leave blank.

		Fee
a.	_____ Physical by Doctor	_____
b.	_____ Non-prescription drugs	_____
c.	_____ Prescription drugs	_____
d.	_____ Laboratory tests	_____
e.	_____ Vaccinations	_____
f.	_____ In-patient care	_____

g. _____ Dietary care _____

h. _____ Dermatology _____

i. _____ Allergy _____

j. _____ Family planning _____

k. _____ Gynecology _____

l. _____ Dental _____

m. _____ X-ray _____

n. _____ Neurology _____

o. _____ Internal medicine _____

p. _____ Urology _____

q. _____ Surgery _____

r. _____ Oncology _____

s. _____ Orthopedic _____

t. _____ Opthalmology _____

u. _____ Podiatry _____

v. _____ Other _____

_____

13. List medical clinics or hospitals nearest your institution.

0-2 miles _____

3-5 miles _____

6-10 miles _____

10-20 miles _____

More than 20 miles _____

14. How many square feet of space are devoted to the student health clinic? _____.

15. How old is the student health clinic? _____. Describe the building or facilities. _____

_____

16. Do students need appointments to see the doctor or do they just come in and wait? _____

17. What is the average waiting time before a student is able to see a doctor? _____

18. What percent of total budget comes from student fees and charges for health care services and supplies? ___%

19. In what areas, if any, are you planning changes in the organization or services provided by the health clinic?

_____

_____

20. Additional Comments. _____

_____

_____

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MANAGERIAL BEHAVIOR, PRICING POLICIES, AND RESOURCE ALLOCATION WITHIN AMERICAN UNIVERSITIES AND AUXILIARY HEALTH CLINIC ENTERPRISES

by

John F. Stehle

(ABSTRACT)

This dissertation proposes to explain differences in resource allocation and pricing policies within state and private universities, as well as within associated auxiliary health clinic enterprises.

Economic theory predicts that managers within state universities will choose to spend relatively more of the university's scarce resources on non-educational goods and services and relatively less on educational services than will managers within private universities. Theory also predicts that private universities will tend to explicitly price goods and services more extensively than will state universities. Private universities will price auxiliary services closer to marginal cost than will state universities, meaning resource dissipation and welfare losses will be less within private universities and greater within state universities.

Theoretical implications are tested at two levels: (1) the university as a whole, and (2) auxiliary health clinic enterprises. Empirical support is found for all tested propositions at both the university and auxiliary health clinic level.