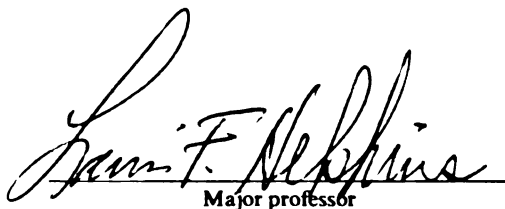**This is to certify that the**

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THE DEMAND FOR INDEPENDENT HIGHER EDUCATION
IN THE STATE OF NEW YORK FROM 1975 TO 1989:
A CONSUMPTION APPROACH TO STUDY ENROLLMENT
AND COSTS OF HIGHER EDUCATION

presented by

Louis Beaufort Metellus

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by

Louis Beaufort Metellus

A DISSERTATION

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ABSTRACT

THE DEMAND FOR INDEPENDENT HIGHER EDUCATION
IN THE STATE OF NEW YORK FROM 1975 TO 1989:
A CONSUMPTION APPROACH TO STUDY ENROLLMENT
AND COSTS OF HIGHER EDUCATION

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This study focuses upon the factors which impacted undergraduate enrollment of independent colleges and universities in New York state. Independent variables examined in relation to enrollment, the outcome variable, included average tuition and fees in real value, number of high school graduates, per capita disposable personal income, the Tuition Assistance Program (TAP), the Supplemental Educational Opportunity Grants (SEOG), and unemployment rate in New York state. Several other factors presenting some effects on enrollment were examined.

The methodology of this research was descriptive. The multiple regression analysis was used for a cross-sectional analysis for 1988 and a time series analysis for the years 1975-1989. The researcher's intent was to report what, if any, relationships exist between the predictors and the dependent variable. The data for the time series study were gathered from the database of the New York State Department of Higher Education, Albany, New York. Cross-sectional data were collected using a small survey instrument designed by the researcher and administered to a sample of 78 four-year independent colleges and universities in New York. Of that sample, 72% responded.

Data analysis was accomplished by applying regression analysis, one-way ANOVA, t-tests and F-tests. Significance level was determined at $\alpha = .05$. Major findings included:

1. Enrollment in independent colleges and universities was negatively related to SEOG amounts.

2. Financial aid in general (federal, state, local and so forth) was positively related to enrollment in independent colleges and universities.

3. Enrollment in independent colleges and universities was positively related to family income.

4. Attendance at colleges and universities was negatively related to tuition, taken alone. There is no statistically significant relationship between attendance at independent colleges and universities and tuition when the latter is taken in conjunction with financial aid and other variables.

5. Overall, there is a significant relationship between attendance at independent colleges and universities, family income, financial aid and tuition, taken together.

This document concludes with a number of implications and recommendations related to retention of students, competitive pricing, recruiting of students, and marketing programs to increase enrollment and acquire additional revenues.

I lovingly dedicate my efforts to my wife

Del L. Metellus

and to my two children

Edmond L. and Rendell E. Metellus

who consented to immense sacrifices and

provided valuable support in every respect.

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First, I want to give honor, praise and glory to God, who empowered me with physical strength, mental capacity, and intellectual vision to complete this research endeavor.

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I am profoundly grateful to my committee and dissertation chairs, Louis F. Hekhuis, Ph.D. and Kenneth F. Neff, Ph.D., who advised, nurtured and guided me throughout this study; to Mun Tsang, Ph.D., who encouraged me, provided his technical knowledge along the way, and who always granted time to me for consultation; to Eldon Nonnamaker, Ph.D., who taught me to love school finance and encouraged me in my studies at MSU; and to Betsy Becker, Ph.D., who taught me statistics and consented to serve on my committee in spite of her tight schedule. I express my deep gratitude and heartfelt appreciation to Pastors Merlin G. Kretschmer, President, León D. Thomassian, Treasurer, Dr. Linford Martin, Executive Secretary, and all my

colleagues and friends of the Greater New York Conference of Seventh Day
Adventists for their prayerful and supportive role in this process.

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CHAPTER I

INTRODUCTION AND BACKGROUND

Introduction

Colleges and universities hold a key position in their relationship to the society around them. They constitute the fountainheads which supply the labor market with intellectuals, physicians, teachers, researchers, technicians, and so forth. Higher education in the United States has always been vested with the function of providing avenues of social and economic opportunities. Through their scholarship and financial aid programs, they attempt to redress some of the economic and social inequities and biases that may hamper the development of talent and skills in the society.

Private colleges and universities are particularly recognized as pioneers of higher education in the United States. Since the colonial era, the private college sector has provided a variety of programs and maintained a high quality of instruction which affords students of different backgrounds an opportunity to choose an education in the desired environment (Henderson & Henderson, 1974). However, higher education, like any other social institution, does not survive, prosper and grow in a vacuum. Thus, careful attention must be paid to the environment and market conditions. Rath (1968) indicates that it is the role of management science to study such diverse areas as the technology of administration, resources, research, registration, teacher load, class scheduling, and so forth. As the concern for student enrollment has increased, leaders of higher education have come to realize that retaining and attracting students are equally important. Therefore, the need to

manage and induce college enrollment, especially in the private sector, from the point of contact to the point of graduation, has become increasingly apparent.

Statement of the Problem

The genesis of this research emerged from the assumption that the demand for private higher education is inelastic. That is, students do not change their plans to enroll in a private college or university, regardless of increases in levels of tuition. Although many studies have shown that there exists a strong positive relationship between tuition and family income, and a negative relationship between tuition and the rate of attendance, many private education leaders, nonetheless, seem to believe otherwise, since they continue to increase tuition levels.

In that respect, Breneman (1983) points out that a recent national survey of college and university presidents reported that only 16% of these presidents expected their institution to lose enrollment, while 42% expected an enrollment increase, and the remainder saw their enrollment as holding steady. Most presidents are either incurable optimists or they possess a secret plan that is unknown to the rest of the administrators. In their optimism, many private college administrators keep increasing the tuition, perhaps every year, to keep pace with the rise of inflation. Also, it has been shown that the ratio of average tuition in private institutions to that of their public counterparts has increased from 4.1:1 in 1961-62 to 5.0:1 in 1974-75 (The Federal Role in Post-Secondary Education, 1974, p. 3). It appears that the gap has become wider in the 1980s. This tuition hike in the private sector likely would generate an enrollment decline accompanied by a loss of revenue in that sector. It

appears to be very difficult for those institutions to break even when comparing the loss in number of matriculants and the revenue generated by the tuition increase. Moreover, students are sensitive to net price when they choose between two or more colleges (Hearn, 1980; Jackson, 1979). Furthermore, Jackson (1979) contends that receiving aid is more important than the amount received. Also, a .86 correlation was discovered between receiving aid and attendance (Manki & Wise, 1983, p. 101). Although tuition and financial aid play an important role in the college choice, as a result of student application patterns, tuition is more influential than financial aid or net price in terms of its impact on the application decision (Elliot, 1980; Hearn, 1980; Hyde, 1977; Jackson & Weathersby, 1975). From the foregoing, it seems that, all other things being equal, tuition stands out as the most effective tool to attract students. By increasing tuition, these private colleges and universities may be losing more matriculants. Therefore, there is an increasing need for a realistic appraisal of the student market. With the predicted decline in college enrollment, it becomes necessary to plan for and manage enroll-ment. And professionals must begin with an understanding of the demand for higher education and of the factors that influence the student's decision to enroll in a specific college or university.

Purpose of the Study

The study aimed at investigating enrollment factors at the under-graduate level in four-year independent colleges and universities in the state of New York. The focus of this research was on enrollment patterns. The variables pertaining to this study included numbers of high school graduates from New York not enrolled in the armed forces, tuition rates

and fees in New York colleges and universities, state and federal aid to students attending New York higher education institutions, per capita disposable personal income for New York, and the unemployment rate in New York. These variables generated a demand function for private higher education in New York by using appropriate data from 1975 to 1989 for a time series analysis, and data from 1988 for a cross-sectional treatment. The data analysis helped to estimate the significance of the effects of these variables on college attendance behavior.

Some research concerning the impact of financial aid and tuition on enrollment reveals that relative value placed by students on tuition decreases is about equal to that for financial aid increase (Breneman, 1983).

The primary purpose of this study was to investigate the effects of tuition increase and financial aid on the demand for independent colleges and universities in New York, pointing out their influence on enrollment prediction. A major intent of this research was to inquire about the relationships between enrollment, tuition and fees, and revenues in recent years. The research intended to clarify to what extent private colleges and universities depend on state and federal aid for their continued existence. It also looked at the impact on student enrollment of significant cuts in grants and financial aid programs. Another objective of this study was to investigate how annual tuition and fees at private colleges and universities in New York have changed over the years relative to consumer price index and personal income over the decade. Lastly, this research allows one to discover whether private college pricing drastically changed in comparison to that of the public institutions with which these private institutions are competing for students' enrollment.

Research Questions and Hypotheses

In view of the preceding theoretical bases, the study is guided by the following questions and hypotheses:

Questions

1. Does per capita personal disposable income determine attendance in independent colleges and universities?

2. Do tuition and fees influence attendance in independent colleges and universities?

3. Does federal aid (SEOG) impact on attendance in independent colleges and universities?

4. Does state aid (TAP) determine attendance in independent colleges and universities?

5. Does the unemployment rate influence attendance in independent colleges and universities?

6. Do the predictors (per capita personal disposable income, tuition, federal aid SEOG, state aid TAP and unemployment rate), taken together, determine attendance in independent colleges and universities?

Hypotheses

Hypothesis 1: There is no significant relationship between attendance at independent colleges and universities and per capita personal disposable income.

Hypothesis 2: There is no significant relationship between attendance at independent colleges and universities and tuition and fees.

Hypothesis 3: There is no significant relationship between attendance at independent colleges and universities and federal aid (SEOG).

<u>Hypothesis 4</u>: There is no significant relationship between attendance at independent colleges and universities and state aid to independent colleges and universities.

<u>Hypothesis 5</u>: There is no significant relationship between attendance at independent colleges and universities and the unemployment rate.

<u>Hypothesis 6</u>: There is no significant relationship between attendance at independent colleges and universities and the predictors (per capita personal disposable income, tuition, federal aid SEOG, state aid TAP and unemployment), taken together.

Definition of Terms

A set of definitions is necessary for an understanding of the present research. Definitions of the variables used in this study follow.

Demand

Demand for private higher education refers to the aggregate number of high school students in a region who decide to attend private colleges and universities (Corazzini et al., 1972). Thus, demand studies examine relationships among the price of higher education, employment opportunities for colleges graduates, and the number of spaces private colleges and universities have available for new matriculants.

Elasticity

The elasticity of demand measures the degree of responsiveness of one variable y to change in another variable x. Thus the price elasticity of demand is the degree of change in demand for a quantity of a good based on changes in its price. In this case the variable y represents the number of applicants who enroll, and x stands for the rates of tuition.

The elasticity of *y* with respect to a change in *x* equals

$$\frac{\textit{Proportional changes in y}}{\textit{Proportional changes in x}}.$$

If the measure of elasticity is greater than 1, the good has an elastic demand. It is said to have unit elasticity if it is equal to 1. If it is less than 1, it is said to have inelastic demand. "In other words, if the student demand changes very little in the face of a 15% tuition increase, the demand for private education at these institutions can be described as inelastic" (Hossler, 1984, pp. 15-16). If elasticity, then, suggests price responsiveness on the part of the consumer, inelasticity suggests a lack of price responsiveness.

Full-Time Equivalent Enrollment

As defined in this study, full-time equivalent enrollment is the total number of full-time students plus the full-time equivalent of part-time enrollment reported by the colleges and universities.

Eligible College-Age Population

This notion represents the percentage of undergraduate enrollment of those youth in the 18-to 24-year-old age group who possess high school diplomas and who are not enrolled in the armed forces (Campbell & Siegel, 1967).

Tuition/Price

In this study, the price refers to tuition. The basic price of education in a given school is estimated by the cost of a credit hour multiplied by the number of credits required for a full-time student.

Prediction

Prediction research emphasizes practical applications. It is concerned primarily with using available information to build a regression equation to predict the criterion variable which is usually measured by the index of performance or accomplishment. "The term prediction refers to the process of determining the magnitude of statistical variables at some future point in time" (Kendall & Buckland, 1971, p. 177).

Significance of the Study

To the best of this writer's knowledge, no previous attempt has been made to examine, estimate, and document in detail a global and integrated research of the scope of this study on the demand for higher education from private colleges and universities in the state of New York. The concerns for the future of private higher education as a result of enrollment decline and increased costs have always been perplexing for administrators of those institutions. Throughout the 1950s and 1960s, however, enrollment in higher education greatly increased. Baldridge, Remerer and Green (1984) contend that the postwar expansion of American higher education was fostered by three cardinal factors: the baby boom, the growth of government support for post-secondary education, and the demand for a trained, credentialed labor force, stimulated by the growth of the American economy. Commenting on the enrollment increase, McGrath (1968) wrote that so many students were seeking admission to colleges that the problem that liberal arts colleges were facing was finding enough room for them and having enough teachers to teach them.

Today, many leaders and administrators in higher education are concerned about the predicted enrollment crisis. Whiteman (1985)

indicates that this concern gradually increased through the early and mid 1970s to include not only predictions of smaller enrollment increases, but also enrollment decreases. Moreover, there exists a widespread agreement that post-secondary education has moved into the decade of the 1980s facing other complex problems including cuts in state and federal aid and the reduction of private gifts and endowment income. This state of increasing pressure is forcing a growing institutional dependence on tuition as a viable source of revenue to keep pace with higher education costs and with the general inflationary trend in the national economy. Because of the weak financial state of many private colleges and universities and their high dependence on tuition as a source of revenue, it is believed that the private college sector is in serious jeopardy. "These colleges have been singled out as being particularly vulnerable to predicted enrollment drops and economic recessions" (Minter & Bowen, 1980, p. 1).

According to Berg (1981), reasonable and accurate predictions of college and university enrollment are essential in order to plan for many facets of university operations, including class scheduling, operating budgets, and so forth. Usually, such predictions are made one or two years in advance of actual enrollments. In the long range, the author contends that knowledge of future enrollment is essential for both academic and physical planning. The employment of new faculty, by type or area of specialty, and the granting of promotions and tenure, should not be accomplished without regard to expected enrollments. He further states that the development of new curricula or new departments should not be undertaken without some sound and reasonable assessment of the projected needs. Because enrollment constitutes a major aspect of the financial

well-being of the private sector, enrollment management therefore becomes
necessary. As Bowen and Minter (1975) put it, "almost two thirds of
private four-year institutions derive at least 70% of their unrestricted
educational and general revenue from tuition and fees" (p. 21). There are
reports in the literature highlighting the fact that the private college
sector faces increasing competition from hundreds of new public institu-
tions. The gap in tuition between private and public institutions has
widened and income from gifts and endowments have shrunk and have not kept
pace with rising costs. Consequently, the pool of available students in
the private sector is contracting. It is even asserted that these circum-
stances threaten to destroy some private colleges and universities, to
drive some into the public sector, and to weaken most (Bowen & Minter,
1975).

In the light of the foregoing, the result of this study should be
beneficial in at least the following ways:

1. For marketing and recruiting purposes, it will provide enrollment
    managers with data that will enable them to identify current trends
    in the student market, in order to make appropriate adjustments and
    become more competitive.

2. Since pricing and financial aids seem to exert a significant
    influence on attendance, it will provide helpful insight to
    enrollment managers with regard to the setting of tuition levels and
    the awarding of financial aids, in order to maximize student
    enrollment (Hossler, 1984).

3. A conceptual understanding of the demand for private higher
    education is a major component of the expertise of enrollment
    management. It should allow enrollment managers to monitor and

anticipate the variables that may adversely affect student demand in private college and university sectors.

4.   It will provide data for private colleges and universities when working with potential donors, and with private and public colleges with regard to the revenues needed to possibly cover expenses beyond tuition costs.

5.   Specific agencies, such as the Association of Independent Colleges and Universities of the State of New York, may find the study useful for their own information.

Furthermore, policy implications should emerge from the results of this study.   Given the social importance and the vulnerability of the private college sector, it has become an object of deep concern not only for private donors and sponsors, but also for state and federal governments.   According to Bowen and Minter (1975), "many states have acted on behalf of the private colleges and universities within their borders and the federal government is showing increasing interest also" (pp. 1, 2). A policy to which the result of this research should be relevant is the following: Should subsidies be directly allocated to students which they may use to pay tuition at the private institution they freely choose to attend, or should direct grants be given to institutions for the purpose of reducing their tuition costs (Feldman & Hoenack, 1969)?   This issue is connected with portable grants.   Another policy issue in that regard is the tax credit to the donors of the private college sector.   Hopefully, this research may help to throw light on whether the federal government should continue to grant tax credits to the donors of these private institutions in order to encourage them to do so.

Methodology

The population of this study consisted of 141 independent colleges and universities in the state of New York. Of that population, the 79 conferring bachelor's and higher degrees were selected. Those institutions conferring associate or master's degrees only, proprietary institutions, and theological seminaries were excluded because they fell into different categories. Evidently, the study aimed at estimating the demand for higher education in the state of New York. However, there are many possible and plausible approaches to exploring the demand for higher education. The two prominent ones are the investment and the consumption theories. In this study, the consumption approach will be utilized, or applied. This approach considers higher education to be a consumable, durable good which yields a stream of future services for the lifetime of the individual. This method of evaluation implies that the cost of current consumption benefits varies directly with the prices of the consumer goods in general (Campbell & Siegel, 1967). This approach presents some advantages to this study because it allows one to argue that educational demand is sensitive to money costs of enrollment relative to current consumer goods prices.

In fact, the effect of income on consumption received much less emphasis in standard economic theory before the 1930s. However, in the mid 1930s, John Maynard Keynes proposed a theory of the consumption function describing the relationships between income and consumption for an entire country. For economic and marketing analysis, consumption is sometimes defined in terms of quantities of goods and services taken from the market. Therefore, standard economic theories of consumer behavior have dealt primarily with consumers' purchases in response to variations

in price and income (Burk, 1968). Since the theory of demand is a theory about the behavior of consumers in the marketplace, its purpose is to explain the process by which consumers make choices from among alternative commodities available to them. The consumer in this theory is perceived as an entity whose object is to maximize the best possible combination of commodities he can afford (Clarkson, 1963).

The concept of utility is viewed as basic to the standard theory of consumer behavior, and most of the formal economics of consumption is built upon it (Burk, 1968). By incorporating into the theory the postulates of a Cardinal utility function and a principle of diminishing marginal utility, two properties of the demand function are postulated. First, it is shown that for any given consumer there is a unique collection of commodities which maximize his satisfaction or utility. It follows that the point of maximization of utility corresponds to a single combination of commodities. This combination of commodities in turn corresponds to a particular set of price income. Second, the demand function can be shown to be homogeneous of zeroth degree in both prices and income. That is to say that all prices and income change in the same direction and in the same proportion then the quantity will remain the same. In general terms, the demand function for x can be written:

$$x = \phi(P_x, P_m, Y^o)$$

In order to examine, independently of each other, the effects of price and income changes, the first order conditions for the maximization of ability is applied. After suitable differentiation computations, a final equation can be deduced which is known as the Slutsky Equation.

$$\frac{\Delta X}{\Delta P_x} - \frac{\Delta X}{\Delta P_x} \quad U - constant, \quad and \quad -n(\frac{\Delta X}{\Delta Y}) \; price - constant$$

In this equation the term on the left hand side, $\frac{\Delta X}{\Delta P_x}$, represents the rate of change of the consumer's purchases of X with respect to changes in the price of X, P_x, while everything else is held constant. $(\frac{\Delta X}{\Delta P_x}) \; U - constant$ stands for the change in the amount of commodity X purchased that is due to what is called the substitution effect. While $-n(\frac{\Delta n}{\Delta Y}) \; price - constant$ represents part of the change in the consumption of X that is due to what is called the Income Effect (Clarkson, 1963). Moreover, the fundamental law of demand indicates that as the price falls a consumer is expected to take increasing quantity, and vice versa. Hence, this fundamental law of demand provides a simplified abstract view of consumer response to price.

In mathematical notation, this statement becomes

$$QG_1 = f(PG_1, \; Y, \; P_r, \; X, \; Z, \; T)$$

where QG_1 = quantity of item G_1 demanded

f = function of or related to

PG_1 = price of item G_1

Y = income of the consumer

P_r = prices of related items, either substitutes or complements

X = tastes and preferences

Z = all other factors

T = time period

$(Y, \; P_r, \; X, \; Z, \; T)$ means that these factors are not permitted to vary.

Furthermore, economists use the term cross-elasticity of demand to describe the responsiveness of consumer's purchase of good G_1 to change in price of good G_2.

$$\frac{Percentage\ change\ in\ quantity\ of\ G_1}{Percentage\ change\ in\ price\ of\ G_2}$$

If the value of the ratio is positive, G_2 is called a substitute for G_1. If the value of the ratio is negative, G_2 is considered to be a complementary product for G_1 (Burk, 1968).

In summary, the educational demand theory states that for a given population, enrollment demand varies positively with expected money and real yield from education, and negatively with the real cost of education.

The descriptive method and the multiple regression were utilized in this study. T-tests, F-tests and Pearson correlation matrices were used to measure the significance of the effects of each independent variable.

The data sources for this study are the following:

1. New York Department of Education (college and university opening fall enrollment, distribution of high school graduates and college-age going rate, tuition and fees in New York state, Tuition Assistance Program (TAP), SEOG)

2. Directory of Higher Education HEP (a listing of all the independent colleges' names and addresses, and administrators' names)

3. New York State Higher Education Corporation (Tuition Assistance Program expenditures, the number of recipients for the TAP)

4. New York State Department of Economic Development (per capita disposable personal income in New York)

5. New York State Statistical Yearbook (unemployment rate in New York state)

6. <u>Statistical Abstract of the United States</u> -- U.S Department of Commerce -- U.S. Census Bureau (current population reports, eligible college-age population)

7. <u>The Fact Book of Higher Education</u>, Washington, DC (tuitions)

In addition to these sources mentioned above, an eight-item questionnaire was mailed to the presidents of these private institutions to investigate trends in their enrollment and their financial status.

Limitations of the Study

This study focuses on enrollment demand for four-year independent colleges and universities in the state of New York. One of the purposes of this study was to look carefully at college and university enrollment and financial revenue over a period of 15 years for four-year independent colleges and universities in New York state undergraduate level as a group. No attempt was made to compare these colleges and universities among themselves, nor did the study purport to determine why differential costs and tuition exist among those institutions and their public counterparts. Moreover, the number of years for the time series analysis was shortened from 1975 to 1989 due to the fact that some of the data for years prior to 1975 were not available. However, some efforts were made to determine how those private colleges and universities were different from the public colleges and universities in New York.

The recommendations and conclusions reached in this study can serve only as guidelines for future enrollment planning for this specific class of colleges and universities in this specific state. However, the findings of the study can be generalized for private colleges and universities in different states.

Overview of the Study

This study is organized in five chapters. Chapter II reviews research and literature related to the conceptual framework and development of prediction of enrollment. Chapter III includes discussions of the methodology and design employed in this study. The sources for this study are clarified. The data description is presented and sampling technique of the population is specified. Chapter IV presents and analyzes the data and the findings of the study in different statistical sections. Chapter V offers conclusions, reflections and recommendations based on these findings and provides suggestions and recommendations for future research.

CHAPTER II
REVIEW OF RELEVANT LITERATURE

Introduction

The general basis to the present study is to investigate those factors which come in to play in the prediction of freshman enrollment in private colleges in the state of New York. Therefore, the review of literature is focused upon the following areas: the demand for higher education, students' choices of colleges and universities, the tuition impact on attendance of colleges and universities, and the effects of per capita financial aid, per capita personal disposable income, and unemployment rate on college and university enrollment.

Demand for Higher Education

There exists a wide and growing body of literature regarding the demand for higher education. The bulk of those studies use common economic variables of income and price to explain the dynamics of the demand. Galper and Dunn (1969) showed that the existing literature had given "scant attention to the non-market forces which play a major role in determining undergraduate" enrollment. They estimated a demand function for undergraduate education which reflected non-market forces. Their research focuses on those short-run forces which vary the proportion of these potential enrollees who ultimately go to college. Taking high school graduates as given begs, their underlying assumption is that the short-run factors affecting the proportion of high school graduates enrolling in college can be examined in more detail. And this is due to the fact that the "longer-run influences on demand for undergraduate education are already represented by the decision to complete high

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school." From this point of view, two short-run constraints on enrollment were examined, one of which is economic and one institutional.

The first constraint cited derived from the financing of college education. And the argument has been put forth as follows: "In the absence of highly developed capital markets for investment in education, potential college students are forced to rely primarily on individual family resources for financing, although scholarship aid may mitigate this for a relatively small group of students" (p. 767).

The institutional constraint is the armed services. Large changes in military manpower requirements could be expected to have a strong negative effect on the number of current high school graduates continuing their education. In time of mobilization, for example, the military tends to respond to its growing needs both by more vigorous recruitment policies in order to encourage enlistments, and by more stringent application of deferment regulations in order to increase the number of draftees. Both effects will tend to absorb high school graduates into the armed forces and postpone, if not preclude, their entrance into college. The converse would occur in times of demobilization. The growth of the armed forces, therefore, is a second variable influencing college enrollments in the short run" (pp. 767-68). In addition to current high school graduates, the number of discharges from the armed forces is viewed here as a source of college enrollments.

The statistical orientation to the demand for higher education seems to have had its impetus in the work of Campbell and Siegel (1967) who bring to view the two approaches of estimating the demand for institutions of higher learning: the investment approach and the consumption approach. According to the former approach, "an individual will purchase a college

education if the present value of the expected stream of benefits resulting from the education exceeds the present costs of education. In that regard, the components of the cost of a college education include direct money outlays in the form of tuition and fees, books, differential living costs and other outlays incident to going to school, such as opportunity costs, the burden of study, and so forth." The rate of return which constitutes the backbone of the theory is composed of two parts: one relating to the stream of monetary benefits and another relating to the non-monetary benefits and costs. This theory enables an individual to compare his expected rate of return with some appropriate interest rate on the existing market. Consequently, an education will be purchased if the expected rate of return exceeds that rate of interest. The education will not be purchased if the reverse is true. From the foregoing, Campbell and Siegel state that the total enrollment will equal the aggregate of all enrollees for whom the rate of return exceeds the rate of interest. And they say that variations in the rate of interest will lead to inverse variations in enrollment demand.

The consumption approach, as these authors described it, takes into account the benefits that an enrollment may bring including social, intellectual, and athletic activities in most colleges and universities in the United States. That theory allows one to argue that educational demand is sensitive to the money costs of an enrollment relative to current consumer goods prices. Hence, it is said that "a rise in the price level of all consumer goods relative to current tuition charges and other enrollment costs," implies a reduction in the cost of the future consumption benefits from an education relative to the cost of present goods in general. And following general demand theory that reduction will

lead to substitution of future consumption for present consumption" (p. 485).

In a continued effort to clarify the demand for higher education, Lehr and Newton (1978) generated an enrollment demand function, making use of both

> aggregate and disaggregate data in one state. In a time series analysis, they explored the economic environment affecting freshman enrollment over time. Their underlying contention is that the demand for higher education rests upon an analysis of individual choice behavior. Moreover, it is assumed that the potential enrollee rationally evaluates the perceived costs and benefits of alternatives of action and chooses the activities with the highest expected rate of return. (p. 421)

Furthermore, they dissected the total benefits from the purchase of higher education in future pecuniary and psychic return as well as current consumption aspects. This implies that before attending an institution of higher learning, the student takes into consideration expected non-monetary benefits which include such elements as broadened occupational opportunities, ability to adjust to changing economic circumstances and prestige. In this respect, the purchase of higher education includes the options of attending school-sponsored activities, as well as partaking of the atmosphere and experience of the educational process itself. Thus tuition, fees, books, supplies and transportation are regarded as the most obvious component of private costs, while financial aid in the form of tuition revision grants, low or zero interest loans, or government benefits serve to reduce educational expenses of individuals by increasing the expected returns of pursuing further education. In a nutshell, their main thrust is that the enrollment choice is influenced by direct and psychic costs, alternative opportunities, current and future benefits and the individual perception. And "evaluation of these costs and benefits is

influenced by taste, ability to pay, and the availability of information on both higher education and alternative activities" (p. 412).

Bishop (1977) conducted a study in which he made a serious effort to fill gaps in the literature by estimating a model of college entrance that focuses on the influence of public policy, the economic environment and the interaction of these factors with student ability and parental income. The policy instruments examined in his document are the following: tuition, admissions requirements, location of different kinds of colleges and draft deferments. Among the aspects of the economic and social environment indirectly influenced by government, he mentions the social status of the student's neighborhood, the opportunity cost of the student's study time and the size of the anticipated earnings payoff to college graduation. Consequently, Bishop found that tuition, high admission standards, foregone earnings and travel, room and costs had a significant negative effect on attendance. And the per dollar effect of tuition is larger than any other cost for low- and middle-income students.

In an attempt to estimate the demand for higher education at certain private institutions Knudsen and Servelle (1978) compared tuition in private and public colleges and universities. In their comparison, it was brought to view that in 1950 one half of the students enrolled in higher education attended privately sponsored institutions, while in 1974 less than one fourth of all students were enrolled in private colleges and universities. Notwithstanding the variety of factors that has influenced the upward trend in the proportion of students enrolled in public institutions, they state a primary reason for this divergence in growth has been the large disparities in tuition charged by private and public institutions. They argue that "in the public sector the tuition is set at

about one fifth of the full cost of the higher education, while in private institutions, tuition is set so as to cover three fifths of the full cost. In 1973-74, the average difference in tuition charged by the two sectors was $1,499" (p. 30). They concede that this disparity in tuition has given institutions in the public sector an overwhelming competitive edge in attracting and retaining students.

Many of the demand studies for higher education focus on economic features of college and university attendance. Strickland et al. (1984) are no different. In traditional economics, they agree that the demand for service is assumed to be a function of primary economic and environmental characteristics. They provide a list of key economic and environmental factors which include prices, tastes, and preferences, numbers of consumers, consumers' income, price of related goods, and range of goods available. In the light of the theory of human capital, they subscribe to the view that "an individual will decide to invest or enroll in higher education if the present value of the expected stream of benefits associated with enrollment is at least equal to the present value of the direct and indirect cost of education." Students are presumed to enroll in higher education based on a rational educational calculus, or an internal rate of return equalizing the costs and benefits of alternative investment options (pp. 35-36).

Measure of Demand and Empirical Formulation

The literature is replete in measure and empirical formulation of demand for higher education. Campbell and Siegel (1967) are credited with the development and the presentation of the first comprehensive and statistical formulation of the demand for higher education. In their

pioneering work, they contend that "a statistical test of the theory of enrollment demand would require data on both educational costs and finance as well as expected differential income streams of those eligible to enroll" (p. 485).

A formal statement of their model is provided by the equation

$$N_t - f_i(\frac{Y}{H_t}, P_t, E_t)$$

where N_t is undergraduate degree enrollment in four-year institutions in the year t, Y/H_t is the real disposable income per household in the year t, and E_t is the number of 18- to 24-year-olds eligible in year t. P_t is the average tuition charged in year t. Since the authors wish to study "the ratio of enrollments to eligibles, the equation is converted into the general form

$$\frac{N_t}{E_t} - R_t - f_i(\frac{Y}{H_t}, P_t).$$

This equation requires f_i to be homogeneous of degree one in E_t. That is to say changes in E_t do not carry with them compositional changes in the population of eligibles which might affect R_t (pp. 487-89).

The research dealing with the individual demand for higher education in the state of California reported by Hoenack (1967) includes both the option of attending public state or community colleges as well as California private colleges. The individual lifetime utility maximization theory is used as a basis for his demand estimates. Using 1965 cross-sectional data, the independent variables employed were:

(a) the cost p to the student of attending various UC campuses, (b) the cost to the student of attending the nearest state college PSC or community college PJC, (c) the average rate of unemployment u and wages w in each high school district, (d) the median family income

y in each high school district, and (e) the number of graduates *G* in the high school. (pp. 628-30)

The outcome variable was the ratio of enrollment to eligible high school graduates.

Due to the fact that "spare-equations" were estimated for residents and commuters for each campus, the aggregate demand therefore represented the sum of individual demand estimates. Furthermore, Hoenack and his associates reported a somewhat similar study of private demand for the University of Minnesota. In this study, longitudinal data from 1948 to 1972 were utilized. The author developed an analysis regarding the effects of cost-related tuition policies on size and composition of enrollments and associated revenues and costs at the university under consideration.

Hence, his general model is given by the following equation

$$A = b_0 + b_1 lny + b_2 lnT + b_3 (lny*lnT)$$

where A = ratio of enrollments to eligible high school graduates
     T = tuition, fees and room and board
     y = per capita Minnesota real income.

Partial derivative of the equation becomes

$$\frac{DA'}{DA} = \frac{1}{T}(b_2 + b_3 lny)$$

and

$$\frac{(DA)^2}{\delta TDy} = b^3(1/Ty).$$

"This latter partial derivative describes the sensitivity of attendance rate to tuition which varies with average income level" (p. 631).

The approach of human capital theory was used by Corrazzini et al. (1972) to generate student enrollment demand for higher education based on national and Massachusetts data. Their equation of demand for enrollment

being subject to non-price rationing by academic admission standards is expressed in linear form as follows:

$$E_i = A_0 + a_1 T_{y_i} + a_2 T_{u_i} + a_3 T_{c_i} + a_4 T_{p_i} + a_5 W_i + a_6 W_i + a_7 U_i + a_8 A_i + \epsilon$$

In this respect,

> E_i is the percentage of 10th grade high school students in state i who enrolled in college in 1963. T_{y_i}, T_{u_i}, T_{c_i}, and T_{p_i} are state junior colleges, public four-year universities, teacher colleges and private four-year universities respectively, W_i is the average earnings of production workers in state i, T_i is the average level of the father's education in state i, and A_i is the ability as measured by performance on achievement tests and e_i is the statistical error. (p. 45)

It was found that (a) the price and opportunity cost effect is negative, and (b) the father's education has a positive effect and achievement has a positive impact on enrollment. Moreover, it was shown that tuition and unemployment, empirical counterparts of the price variable, are statistically significant determinants of total enrollment. In another comprehensive approach, the authors present a formal statement of demand for higher education including both investment and consumption aspects. The form of the model is

$$Q_i = f(r_i, y_i, z_i, P_i, C_i, n_i)$$

> where Q_i is the number of high school graduates in region i who wish to attend college, y_i is the expected economic value in terms of increased earnings in region i resulting from higher education, z_i is the expected economic value from direct consumption benefits resulting from higher education in region i, P_i are the direct costs of higher educational service in region i, C_i are the direct opportunity costs of higher educational services in region i, r_i is a representative discount rate for the group, and n_i is the eligible population in region i.

Under the assumption that the demand function is homogeneous of degree one in n_i, the previous equation can be converted into the following general form

$$\frac{Q_i}{n_i} = D_i = F(x_i, y_i, z_i, P_i, C_i) \; .$$

The conclusions that emerged from the foregoing are the following:

A general rise in the expected benefits, either in the stream of earnings or consumption benefits, should increase the percentage of students finding it economically desirable to pursue higher education; while an increase in the cost of education investment, either in the form of an increase in the opportunity cost of attending, should lead to a reduction in the enrollment decision (p. 41).

Lehr and Newton (1978) devised a theory of the demand for higher education on an analysis of individual choice behavior on freshman enrollment for the state of Oregon. The study aimed at measuring the following variables: numbers of high school graduates, segmental tuition levels and enrollment, annual unemployment rate and per capita income, and participation in the armed forces. Freshman enrollment was selected because it was thought to be more sensitive to change in relative cost and benefits than was total enrollment. In other words, the assertion of these investigators is that "demand elasticity might be expected to decrease with the amount of time which has already been devoted toward obtaining a degree" (p. 413).

A formal statement of their demand relationship is
$$E_t = f(P_t, Y_t, U_t, D_t, HSG_t)$$

where E_t = fall term freshman enrollment in an institution of higher education in year t

P_t = average annual real tuition in year t weighted by institutional enrollments

y_t = mean real per capita personal income in the region for year t

U = annual rate of unemployment in Oregon in year t

D_t = the number (in thousands) of 18- to 21-year-olds in the armed forces in year t

HSG_i = total number of high school graduates as a proxy for eligible population in the region.

The expectation here is that average annual tuition P will have a negative influence on enrollment demand and "this hypothesized relationship between price and demand is obvious, reflecting economists' beliefs in a downward sloping demand curve" (p. 415).

College Enrollment

Many studies of college enrollment in the literature focus on student choices. Some of the variables related to college and university enrollment which have been investigated are adult participation in higher education, women's desire to obtain a degree, the number of high school diplomas granted, and so forth. Bishop and Van Dyk (1977) conducted a study in which they examined institutional and individual determinants of adult participation in higher education. Using linear regression, they successfully predicted the 1970 degree-credit college enrollment of a sample of 57,689 married men and women 25 years of age and older living in metropolitan areas. The results of their study indicated that in October of 1972, adult students constituted 20% of undergraduate credit enrollment. They also showed that over 12 million adults surveyed in May of 1972, 7 million of whom were over 35 and engaged in part-time study of some kind at some time during the 1871072 academic year. Furthermore, it was brought to view the factors contributing to the rising participation of adults in higher education such as

increased numbers of conveniently located colleges offering courses tailored to meet the special needs of adults, the need to learn a new skill as old ones due to technical progress and the increasing desire of manual women to obtain training that will make possible professional advancement.

Moreover, their findings indicated that the 18- to 24-year-old age group which constituted over 80% of higher education enrollment in 1976 "was projected to drop roughly 78% by 1980 and 74% by 1990, even without an increased emphasis on adult education" (p. 40). Thus, the heightened interest in adult students was viewed as a pragmatic response to the hope that in the 1980s non-traditional students would fill the gap left by the 18- to 24-year age cohort. The researchers used data from the standards metropolitan statistical areas (SMAS). They found that, in these areas with free public two-year colleges, the enrollment rate in private colleges was between one half and one third of the enrollment rate in SMAS where two-year colleges charged $400 in tuition. Also, the costs charged by the private sector represented only a small part, or one fifth, of the overall enrollment gained by the public sector when tuition was reduced (p. 47). And the black men had attendance rates that were lower than those of non-Spanish white men by a statistically significant margin of 130 per 10,000.

Some implications and discussion for projections of future enrollment put forth by the researchers include establishing colleges in cities that had none before, keeping tuition low, liberalizing admission requirements, the GI Bill of public policy and the establishment of new two-year colleges. Also, it was found a very high elasticity of demand for adults. The high elasticity of demand for adults means that "for a given government budget, tuition reduction will have a larger impact on

adult college enrollment than on enrollment of high school graduates" (p. 54).

Jackson (1978) conducted another study exploring the trade-off existing between student enrollment and financial aid. He then developed a model of student choice which identified four forces motivating a student to go to college. And they are: "his or her desire to preserve or attain a given social status, to invest wisely for the future, the attractiveness of higher education as a way to spend one's time, and socioeconomic conditions" (p. 549). Moreover, he emphasized unsurprising generalities which would increase the likelihood a student would attend college such as living in a better neighborhood, attending a better school, having a more prosperous family or being more able academically. However, he contended that students seem less inclined to attend expensive or distance colleges than inexpensive and local ones. But the argument is put forth that institutions "which provide student aid are more likely able to attract students than their counterparts equally expensive providing no such aids." Thus, he readily translated these theories into a general model of the student post-secondary decision process as follows: Decision = f (place, background, school, students, friends, occupation, aspiration, plans, colleges, jobs) (p. 551). Furthermore, the decision process was summarized as comprising three steps. First, the prospective students develop utility function reflecting their taste, and the first eight factors in the general model affecting student inclination toward or against college. Second, students make thorough choices among college and non-college options, thus maximizing the utility of their college and non-college options. Finally, students make an assessment of these

preferences or utilities in the light of their inclinations and options. In other words, students make investment decisions.

Dealing with the competition for high school graduates in the 1980s, Arbeiter (1985) delineates two sectors which seemed to be responsible for the uneven effects of the coming enrollment decline in attracting high school graduates. They are the military and industry. Taking a demographic stance on the issue, he ascertained that "the baby boom of the post World War II period moved to the baby bust of the birth death of the late 1960s and '70s."

This had led to a decline in elementary school enrollment. According to the researcher, this decline will echo through secondary schools and colleges during the remainder of this decade and half way into the 1990s. However, colleges and universities are singled out as the institutions which will be most affected by the phenomenon. Moreover, it was shown by way of projection that "the number of 18-year-olds will decline from 3,917,000 in 1983 to 3,199,000 by 1994. This decrease constitutes an 18% loss of the 18-year-old population and the reverbera-tion of this decline will be widely felt in the groves of academe" (p. 16). It is also made crystal clear that the disproportionate share of the decline was only 1.7% for public institutions and 9.9% for private institutions in 1983. A projection made for high school graduates from 1979 to 1995 indicates that the United States will witness an 18% decline by 1991 and a 22% decline by 1995. However, the Northeast region will absorb a 40% decline in public high school graduates by 1994 -- Rhode Island with 49%, the District of Columbia with 60% and New York with 43%" (p. 18). It is said that the armed forces, "the second great competitor

to higher education" with regard to the market of high school graduates, attracts approximately 20% of male high school graduates.

Hopkins (1974) explored the variation of the propensity to enroll in colleges across the state population of high school graduates. During the 1963-64 academic year, it was shown that the percentage of the state's recent high school graduate programs ranged from a low 26% to a high 48%. Moreover, it is believed that changes in variables such as tuition and fees may have a dual effect on enrollment -- "a substitution effect and a new discouragement effect." That is, "when tuition is increased at one type of college, some students may choose simply to enroll in a different type college (substitution effect) while others may decide against enrollment altogether (net discouragement effect)." The author pinpointed the influences of three public policy variables affecting college enrollment. These are tuition, institutional location, and institutional educational expenditures per enrollee. Therefore, it is argued that the decision to enroll in an institution of higher education is treated as a market phenomenon. Hence the potential enrollee is the buyer, the institution is the seller, and the academic year the commodity. A further analysis showed three distinguishing features between public and private enrollment. First, public institutions of higher education charge substantially lower tuition than private institutions. Second, there remain some questions whether students perceive public and private enrollment as essentially equivalent commodities. Third, while all public institutions of higher education within a single state are financed and controlled by and large by a single governing body, the private institutions are more autonomous. Thus, the enrollment demand factors were

estimated by using the enrollment ratio as dependent variables. The equations are converted into these general forms:

$$\frac{N_1}{R} : \underline{\text{In-state public enrollment of residents}}$$
$$\text{Eligible residents}$$

$$\frac{N_2}{R} : \underline{\text{Private enrollment of residents}}$$
$$\text{Eligible residents}$$

$$\frac{N_1 + N_2}{R} : \underline{\text{Eligible residents minus non-enrolled}}$$
$$\text{Eligible residents}$$

Furthermore, eligible resident is defined here as the total number of high school diplomas granted by all private and public secondary schools located within a given state during a given period. Consequently, the "measure of those who choose employment and other non-enrollment pursuits is defined residually by the expression

$$1 - [(N_1 + N_2)/R] \text{ (p. 52-56)}.$$

The study shed light on different factors which appeared to influence strongly the demand for public enrollment, such as: (a) proximity of private institutions of higher education, (b) family educational attainment, (c) high income incidence, and (d) public tuition.

On the other hand, the demand for private enrollment appeared to be influenced rather by two of these factors: "private institution proximity and high income. In addition, higher private tuition is associated with the lower likelihood of enrollment in private institutions of higher education" (p. 59). Therefore, the following conclusions had emerged from the discussion. College-eligible individuals are less likely to enroll in public institutions of higher education (IHE) if (a) private institutions of higher education are geographically accessible, (b) their parents did not go to college, (c) their parents earn over $10,000 per year, and (d) public tuition is higher. And "such individuals are less likely to enroll

in private institutions of higher education if (a) private institutions of higher education are less geographically accessible, and (b) their parents earn less than $10,000 per year" (pp. 62, 63).

In the realm of the Twin Cities campus of the University of Minnesota, Hoenack and Weiler (1976) presented a study which focused on institutional enrollment forecasting. Their model included "(a) an enrollment demand equation with both tuition and labor market variables, (b) equations to forecast values of the labor market variables which influence demand, and (c) procedures to calculate the statistical confidence interval in an enrollment forecast" (p. 89). Among the variables representing the complete enrollment forecasting model are entered: (a) the proportion of eligible high school graduates in and outside the Twin Cities metropolitan area who attend the University of Minnesota, (b) the proportion of high school graduates attending other institutions in Minnesota, (c) starting salaries of college graduates, (d) salaries of non-college graduates, (e) the national unemployment rate for 18- and 19-year-olds, and (f) the overall national unemployment rate .... It was found that enrollment demand functions and functions explaining the influence on demand could be estimated with readily available data and that the estimated coefficients were mostly statistically significant and of the expected signs" (p. 110).

Investigating the linkage which exists between state appropriations and enrollments, Leslie and Ramey (1986) generated a mathematical model in this general form

$$RAPP_t = \alpha EnR_t\beta$$

where $RAPP_t$ is real (inflation-adjusted) appropriations in the year t and ENR_t represents enrollment for that year. β is the enrollment elasticity

of appropriations, and α_t represents factors that affect funding but do not depend on enrollments. Adding the cyclical factor *ECON* to the model, the appropriations enrollment relationship becomes

$$lnRAPP_t - lnz + \beta lnENR + \delta (ln\overline{z} + \overline{\beta} lnENR_t) + WECON$$

It was shown here that rapid enrollment growth may be related to long-term changes in population to long-term economic conditions, such as high technology, research, and so forth. Conversely, it is said that slow enrollment growth may occur where population growth is slowing where institutional programs are becoming outmoded, and so on. The overall enrollment elasticity was found to be less than 0.3. Therefore, it is conceived that "adding students will be a losing proposition in most cases the marginal cost of educating additional students will be greater than the marginal revenue" (p. 17). The bone of contention here is the plea for state appropriations to amount to a good deal more than institutions spend per student; otherwise new enrollment will represent a loss.

Dealing with the coming enrollment crisis, Breneman (1983) brought to view the different factors that have to be included in making enrollment projections. These are: "(a) high school graduation rates, (b) college retention rates, (c) enrollment rates for older age groups, (d) enrollment of foreign students, and (e) enrollment of graduates and professional students full-time versus part-time attendance" (p. 15).

The predicted enrollment decline has received widespread attention. Frances (1980) put forth several strategies for increasing enrollment in the year ahead. These techniques included:

1. Increase high school graduation rates of students who would otherwise drop out.

2. Increase credentialling by testing of high school dropouts.

3.　　Increase enrollment of low- and middle-income students.

4.　　Increase enrollment of minority youth.

5.　　Increase enrollment of traditional college-age students.

6.　　Increase retention of current students.

7.　　Increase enrollment of adults.

8.　　Increase enrollment of women aged 20 to 24.

9.　　Increase enrollment of men aged 35 to 64.

10.　　Increase enrollment of graduate students.

11.　　Increase enrollment of persons currently being served by industry.

12.　　Increase enrollment of foreign students (p. 14-16).

In addition to these demographic considerations, it is also discussed here a number of other factors which will affect enrollment patterns during the 1980s and beyond. Among those factors it is mentioned:

> The state of the economy, both nationally and locally; trends in federal and state student aid; the rate of increase of college price to the rate of inflation and the growth of family income; employment prospects for new graduates; and the relative attractiveness of alternatives to college, such as military service and the labor market.

Moreover, it is said that "factors such as quality and diversity of programs, location, prestige, price relative to competition and recruitment policies will largely determine how the students distribute themselves among the various campuses" (p. 17). However, the broad and growing consensus which exists here is that two groups of colleges and universities were being put at risk. First, non-selective private liberal arts colleges, and public state colleges and universities. Second, private junior colleges are also highly vulnerable to enrollment

decline. With respect to the location factor, it is argued that "institutions located in an urban setting will have more opportunities to offset enrollment decline than will those located in rural areas" (p. 18). Nonetheless, the general agreement is that no group institution will escape the need to plan for and adjust to the difficult circumstances in which higher education will find itself over the next 15 years.

There exists a growing concern about the enrollment decline in higher education. Investigating the aspects of vulnerability of enrollment in higher education, Wharton (1983) contended that "the most damaging aspect of the coming enrollment crisis may eventually be the smoke screen it offers for significant reversals of social and political policy concerning access and excellence in higher education (p. 20). Indications are that in New York, more than one third of all public and private higher education enrollments are accounted for by persons over the age of 25. The author agrees that there will be a shortfall in higher education enrollment. However, he made clear that this shortfall will not affect different types of institutions uniformly like "Saint Matthiew's rain which falleth on just and in just alike." This is viewed as an irony that New York, the nation's second most popular state, is ranked fifth in the proportion of the population enrolled within the state and has one of the highest net student "export" rates to other states. In conclusion, it was emphasized that the current government abandonment of social programs is putting an unprecedented burden on private giving by diverting to other purposes some portion of gifts that would support institutions of higher learning.

Musting (1985) reported a research on institutional marketing and enrollment management in which he examined the enrollment management

strategies and programs among major universities in the United States. The initial population of that study consisted of the 61 largest university users of American College Testing (ACT) student profile services in 1982. And the specific objectives of the study included the following:

1. To determine the use of market research and information systems in enrollment management.

2. To determine the use and scope of institutional plans for enrollment management.

3. To determine consistency of central administration leadership and direction in enrollment management planning.

4. To identify significant relationships between critical role performance factors and enrollment management outcomes (pp. 371-72).

According to the results obtained from campus interviews "the three most frequently reported officers" involved in final review of institutional outreach and retention plans were "vice presidents for academic affairs (84%), vice presidents for student services (97%) and collegiate deans (64%)." The results of the study suggest that participation and involvement of the central administration officers in enrollment planning is often more "a reflection of structural authority than policy initiation" (p. 375).

Perry and Rumpf (1984) undertook a study of survey data for 1981 and 1982. The analysis of those data were directed toward eliciting those characteristics and attributes which affect the matriculation decision, such as "physical characteristics of institutions, tuition charges, financial aids, appeals to specific minority groups and less tangible

images determining factors" (p. 317). Using factor analysis, "all the predictor variables" were grouped into four composite variables reflecting institutional admissions office activities, family attributes and the cooperative education plan." It was then argued that intense competition for qualified students will lead universities to accurately predict enrollment, effectively influence student choices and aggressively engage in student marketing in order to survive the environment.

Exploring the relative efficacy of personnel and enrollment policies on size and composition of a university's faculty, Hoenack and Weiler (1977) conducted a study clustered around four main objectives. First, the authors expanded the use of the faculty flow model to an exploration of the effects of enrollment policies on the size and composition of faculties with particular emphasis on comparison of the effects of personnel and enrollment policies. Secondly, a description of enrollment and personnel policies that could be used, singly or together, to alter the size or tenure composition on an institution's faculty was represented. Thirdly, the faculty flow model was introduced and followed by the integration and discussion of enrollment forecasting. Fourthly, the results of the alternative enrollment and personnel policies were examined. The results based on data for the University of Minnesota highlighted the fact that policies which affect enrollments can have a significant effect on the size of an institution's faculty. In that respect, it was conceivable that the inevitable decline in the size of the traditional college-going age group of population can be translated into automatic annual revenue decrease. In the final analysis, it is said that neither the size of the faculty nor the level of enrollment is directly controllable by an institution.

In an attempt to identify those factors affecting college atten-
dance, Christensen et al. (1976) provided a list of three salient factors
that may impact on high school graduates' decision to attend college.
These included (a) their ability, (b) the cost of attending college, and
(c) the socioeconomic variables. The low elasticity of demand for college
implied that "unrestricted income transfers to low income population would
not be an effective way of increasing their rate of college attendance"
(p. 10). Furthermore, they listed four separate variables in the area of
socioeconomic status which impacted on college attendance, such as family
income, occupation of the father, and the educational level of the father
and mother. Hence, it is asserted here that family income is the primary
determinant of resources available to finance an education and the level
of education and perhaps the occupation of the parents would be closely
related to the amount of parental encouragement to attend college. These
three factors were found to be positively related to college attendance.

Braun (1983) investigated the characteristics of geographic areas
which impinge upon a high school graduate's decision to "(a) pursue
further education, (b) persist in college, and (c) transfer from one
institution to another" (pp. 131-32). In that setting, the following null
hypotheses were tested:

1.   That no significant differences would be found among group
      countries on the college-going rate of high school graduates.

2.   That no significant differences would be found among students
      from each group of countries on their enrollment persistence
      and transfer among the state-supported institutions of higher
      education.

3.   That no significant differences would be found at institutions on the enrollment, persistence and transfer.

4.   That no significant differences would be found among students from each group of countries on high school academic achievement based upon quartile representation and ACT Composite Scores (p. 134).

Thus, all these hypotheses were accepted or rejected at the .01 level of significance.

Given the competition to attract students at the university and the shrinkage of the number of high school graduates in most geographic regions in the mid-1980s, Cook and Zallucio (1983) conducted a study which aimed at expanding on these more recent predictive models of the student college selection process by "(a) presenting a linear compensatory multi-attribute attitude model for the prediction of university preference and (b) predicting which school the student will attend" (p. 198-99). Moreover, it was uncovered here several predictors of college choice, such as financial aids, parent's preference, specific academic programs, size of school, location of campus, athletic facilities, religious affiliation, good faculty, high academic standards, special curricula, costs and social activities.

The computational model adapted for purposes of identifying selection criteria is presented as follows:

$$A_j = \sum_{i=1}^{n} I_i B_{ij}$$

where J is the university, $i = 1$ to n are the measured university attributes or characteristics, A_j is the individual's attitude score for university J, I_j is the importance the individual attached to the ith

attributes and B_{ij} is the individual's belief as to the extent attribute i is offered by university j. This model holds that "an individual's overall attitude toward a university is a composite of his or her attitudes toward the many attributes that the university possesses" (p. 200).

Table 2.1 presents all the characteristics of universities by order of their importance.

Table 2.1 Characteristics of Universities Used as Criteria in the Attitude Model

Criteria	Mean Importance Score
Excellent academic reputation	5.74
Existence of a specialized program of study exactly suiting my needs	5.17
Appealing size and makeup of surrounding city	4.90
Close to home	4.85
Low total cost of attendance	4.72
Little university regulation of my life	4.41
Close faculty-student association	4.38
Active social life (dances, parties)	4.31
High admission standards	4.03
Readily available financial aid	3.47
Family influence	3.46
Recommendation of high school counselor	2.91
University places heavy emphasis on intercollegiate athletics	2.84

Table 2.1 (cont'd).

Criteria	Mean Importance Score
University places heavy emphasis on intramural athletics	2.72
Low flunk-out rate	2.62
University spent a great deal of time and money to persuade me to attend	2.56
College attendance plans on my high school friends	2.46

Note. From "Predicting university preference and attendance: Applied marketing in higher education administration" by R. W. Cook and R. L. Zalluccio. 1983. Research in Higher Education, 19(2), pp. 197-203.

Tierney (1983) perceived the decision to matriculate at a particular institution as the termination of a sequential choice process. Table 2.2 displays the summary characteristics of student choice set. The average standard deviation represents the average standard deviation of student choice sets for a particular variable.

Table 2.2 Summary Statistics for Selected Attributes of Student Choice Sets

Variable	M	SD	Skewness
Number of test scores sent	3.12	1.20	.56
Selectivity	1,073.8	52.9	.21
Size	9,334.5	1,186.0	.24
Tuition	1,947.0	132.8	.10
Distance	187.4	123.1	3.06

Note. From "Predicting university preference and attendance: Applied marketing in higher education administration" by R. W. Cook and R. L. Zalluccio. 1983. Research in Higher Education, 19(2), p. 238.

It was shown that most federal and state policies oriented toward providing equality of opportunity through student financial aid are not even relevant at this stage in the choice process. Furthermore, it is stated that "the irrelevance of student financial aid would be a moot point if students were making fully informed decisions at this stage in the college choice process" (p. 283).

In an attempt to identify prospective student needs in today's competitive environment, Discenza et al. (1985) conducted a research study with a threefold purpose: "(a) to show how the student decision criteria can be identified, (b) to determine if decision criteria are different among different student groups, and (c) to show how understanding these decision criteria can help an institution effectively respond to the needs of its market (p. 19).

In the same vein, Hoy (1980) identified appropriate decision criteria and utilized them in a marketing plan capable of maintaining a focus that would ensure desired enrollment.

Table 2.3 presents a listing of all important variables used in selecting a college or university.

Table 2.3 Importance of Various Considerations in Selecting a College or University

Variable	Mean Rating	Rank
Quality of the faculty	6.227	1
Availability of specific academic programs	6.212	2
Number and variety of courses offered	6.139	3
Academic reputation	6.080	4

Table 2.3 (cont'd).

Variable	Mean Rating	Rank
Basic cost of attending	5.937	5
Availability of financial aid	5.730	6
Location	5.613	7
Size and terms of student per class	5.413	8
Housing facilities	5.365	9
Social/cultural entertainment activities	5.303	10
Campus size	4.854	11
Opinions of friends who are attending	4.707	12
Athletic facilities	4.604	13
Dining facilities	4.549	14

Note. From "To market to market..." by J. D. Hoy, 1980, Connection, 2, p. 20.

"The number in the first column represents the mean rating for that variable on a scale from (1) extremely important. The second is the rank order of 14 variables based on the mean rating ranging from most important to 14 least important" (p. 20).

Table 2.4 consists of two components. This is said that "the four most important dimensions are all directly related to academic consideration and all have means rating above 6.00" (p. 22).

Table 2.4 College Choice Factors

Factor 1 Academic Value	Factor 2 Social Considerations
Academic reputation	Athletic facilities
Availability of financial aid	Campus size
Availability of academic programs	Dining facilities
Cost	Housing facilities
Location	Opinions of friends
Variety of courses offered	Social/cultural entertainment
Quality of faculty	activities
Class size	

Note. From "To market to market..." by J. D. Hoy, 1980, Connection, 2, p. 22.

Table 2.5 indicates "what factors are important to college-bound high school seniors and lower divisions of college students."

Table 2.5 Mean Rating of College Choice Variables Showing Significant Differences Between High School and College Students

Variable	High School	College
Academic reputation	6.16	5.60
Athletic facilities	4.71	4.00
Dining facilities	4.60	4.14
Housing facilities	5.43	4.95
Social/cultural entertainment activities	5.36	4.98

Note. From "To market to market..." by J. D. Hoy, 1980, Connection, 2, pp. 2-4.

In conclusion, the authors pointed out three significant trends which appear to be evolving in the marketing of a college or university:

1. Student recruitment is becoming a more highly sophisticated marketing function in many institutions of higher education.

2. Many institutions are spending a great amount of effort and money to attract and accommodate special interest groups such as women, the aged, the handicapped and members of ethnic minority groups.

3. Student bodies are becoming more mobile and highly fragmented, resulting in a diminishing sense of cohesiveness and collegiality on many campuses.

"Programs must address the needs of these diverse groups ... such as food health care, personalized academic advising, housing, child care, and developmental counseling to calculating consumers shopping for the best buy in higher education" (pp. 23-24).

In the setting of enrollment management, Hossler (1985) presented a model describing a paradigm that is useful to institutions having budgets dependent on enrollment. Enrollment management is further defined as "a process or activity which influences the size, shape and characteristics of the student body by directing institutional efforts in the areas of marketing, recruitment and admission, as well as pricing and financial aid. In addition, it is argued that the process exerts a significant influence on academic advising, the institutional research agenda, orientation, retention studies and student services" (p. 3).

Furthermore, it is delineated here the responsibility of enrollment management as follows: "(a) student marketing and recruitment, (b) pricing and financial aids, (c) academic and career advising, (d) academic assistance programs, (e) institutional research, (f) orientation, (g)

retention programs, and (h) students services such as athletics, activi-
ties, career planning, counseling and residence life" (p. 4).

Tuition and Pricing in Higher Education

Tuition and pricing constitute major responsibilities of enrollment
management. A review of related literature reveals an increasing amount
of research has dealt with these subjects. With respect to price tuition,
Deitch (1981) asserted that there exists "a distinct possibility that
American higher education will experience a price war in the coming
period. But the recent growth in awarding of financial aid based is
perceived as either its precursor or its prologue or its early major
phase" (p. 25). The author identified the interaction of four contribut-
ing factors enhancing the likelihood of a price war. First, the emerging
excess capacity of higher education is expected to materialize because of
declining basic college age (18 to 24 years). Second is the system of
need-based financial aid which removes the element of price from the
competition zone for students in expanding access and choice. Third is
the absence of one universally employed procedure for determining tuition;
families in specified economic circumstances should be expected to pay
with the basic topic of need analysis. Fourth is the growing attention
focused on pricing in higher education in connection with two aspects,
namely tuition and discounts. Thus, publicity is viewed as a catalyst for
a price war" (p. 24-25). Moreover, the author underlied two wide and
broad possibilities in the scope of the duration of this price war. One
is that the interested parties, including government as well as institu-
tions, will work out a covenant to put an end to this price war before it
has run its course. The second is that once started, the price war will

have to run its course regardless of the consequences. However, it is argued that the price war is likely to be more muted in the public than in the private sector for the following reasons. "First, the financial aid officer in the public sector typically operates worth more constraints than does his or her private sector counterpart." Secondly, the "political power to insulate institutions from the pain of declining exists and state legislatures will sometimes have especially strong incentives to use it on behalf of public institutions" (p. 26).

Exploring the role of higher education in the American economy, Carnevale (1983) purported

> that post-secondary institutions constitute a critical and major component of the nation's economic and social infrastructure and as such should be afforded some form of fiscal buffer to cushion the impact of the temporary tyrannies of economic cycles, demographic shifts, and all the other short-lived vagaries to which social systems are subject (p. 12).

In the quest for an enrollment strategy to reduce prices, the contention here is that enrollments are driven by policy and as much by demography. Reduced tuition and board costs are considered as minor levels. And this is due to the fact that "the principal cost to a student to attend college is not tuition and fees but the income lost from possible employment or foregone income. Statistical data suggested that "average tuition, fees, and room and board costs are roughly $2,500. In private institutions, college costs total about $4,500. And the average student's foregone income is about $8,000." Therefore, price reduction alone is not viewed here as a viable strategy for increasing enrollment in the eighties or nineties. Consequently, there is strong indication in the empirical data that a combination of substantial cost reduction with aggressive marketing will attract some students, especially in recessions or during periods of

labor surplus. A good rule of thumb showing the trade-off between tuition and enrollment is that "a 10% cut in tuition cost will increase enrollment by 1%." It is further asserted that the "demand for adult education is highest among women." These trends are strong indications that increases in tuition aid or cost reductions targeted for minorities and women might have an appreciable effect on enrollment" (p. 14).

A study exploring the rising cost of private higher education was conducted by Suttle (1983). The author provided the informational and analytical basis on which one "high-cost institution," Yale University, sets its annual tuition levels and long-term pricing policies. The rising cost in the levels of private higher education in general, and of Yale in particular, was examined in a context that takes into account historical trends and economic data. Price income inflation -- the financial condition of the institution, comparative cost data from other schools and studies of the impact of cost on enrollment. In this respect, it was maintained that, when expressed in constant dollars, the real growth rates for tuition and room and board charges have been far below the nominal rate. Furthermore, the causes of that rapid growth in the level of the cost of Yale education were identified as "spiraling inflation, explosive energy costs, record wage increases that do not keep pace with the rising cost of living, higher social security taxes, and the like. Because tuition has increased faster than inflation over the past decade, it is said that there is a perception by many families that education costs are rising faster than their ability to meet those costs. Thus "a family's ability to meet the education expenses goes down'" (p. 257).

In an excellent review and critique of the literature in this area, McPherson (1979) has concluded that price affects the decision about

whether to attend college for low-income students and affects about where to attend college for high-income students. It is also argued that the "latter phenomenon appears to be more disturbing for studying from families with a median income -- roughly $25,000 to $50,000." Furthermore, Suttle declared that many low-income students may find private institutions to be cheaper than public institutions because of differences in financial aid policies. The conclusion that has emerged from the discussion is "as the public-private tuition gap widens, high-income students are attracted to public institutions, as evidenced by a distinct drop-off in percentage terms in the representation of upper middle-income students in private higher education in the past decade" (p. 265).

Hossler (1984) carefully examined the role of pricing and financial aid in the enrollment decision in conjunction with trends in financing a college education. The undergirding argument is that students do not carefully weigh the net price of several institutions before determining which college to attend. Fewer than one third of all college applicants have more than one option in terms of college choice (Corwin & Kent, 1978, p. 3).

In the setting of the impact of tuition and financial aid on enrollment, Stampen (1980) declared that a 15% drop in enrollment at the City University of New York (CUNY) took place in 1976 when fiscal crises forced the CUNY system to charge a tuition of $700 or more. With respect to gender in higher education, the argument was put forth that women are generally more price-responsive than are men. However, women of low socioeconomic background at private colleges and universities were considered as less price-responsive than were their male counterparts (Feldman & Hoenack, 1969). Furthermore, Hyde (1977) asserted that

high-income and low-income students are the least sensitive to change in price, and that middle-income and below-poverty level students are the most sensitive to increases or decreases in cost.

Exploring the pricing motif, Dickmeyer et al. (1981) proposed a seven-step "iterative pricing model." These steps are the following:

1. The institution must first project the potential student market by market.

2. The institution must estimate its segment-by-segment share of the market in relation to other educational institutions and commercial employers.

3. As part of an overall marketing plan, an institution must estimate the responsiveness of potential students from each market to changes in the institution's net tuition level for that segment.

4. The institution must project enrollment levels by segment under three or four possible net tuition strategies.

5. Federal, state, and campus-based aid must then be allocated in each of the proposed strategies, based on stated tuition for that strategy.

6. Strategies must be evaluated to determine whether the projected tuition revenue and aid expenditures result in a balanced budget.

7. The tuition and financial aid policy variation must be compared to determine which of the strategies or combinations thereof will result in the best budgetary and enrollment assumptions for the institutions (p. 38).

Troutt (1983) conducted a study on the annual upward revision of tuition charges due to cost inflation. The charge structures were then sectioned into two elements. One was the balance between per-credit hour and per-student types of charges. The other was the differentiation of charges by program or other student grouping.

A linear programming approach or mathematical decision model was used here to suggest "optimal increases under some broad policy constraints and certain necessary constraints dealing with consistency of the rates." This linear function took the form

$$Z = \sum_{i=1}^{n} c_i x_i.$$

Since the x_i are required to be negative, so $x_i > 0$ for all i, with additional constraints on the possible values of the x_i. These must be expressed as linear inequalities of the form

$$\sum_{i=1}^{n} a_{ij} x_i \leq b_j, \quad j = 1, m.$$

The a_{ij} are referred to as technological coefficients and the b_y as resources or restrictions. Hence the standard linear model is maximized subject to

$$\sum_{i=1}^{n} a_{ij} x_i \leq b_j, \quad j = 1, m$$

and

$$x_i \geq 0, \quad i = 1, n.$$

Dealing with pricing and efficiency, Hoenack (1983) defined efficiency as the achievement of maximum total benefits to society from the resources employed in higher education, such as faculty, staff and

student time, and equipment and physical facilities. He further examined the ways prices affect the choices made by faculty, students and other participants in higher education. It is, therefore, asserted that the following conditions must hold for efficient resource allocation in higher education:

1. Academic personnel face incentives to select the most cost-effective combinations of inputs. That is when instruction is produced independently of research selection of faculty assignments, class sizes, staff support, and uses of equipment are made so that the quality of instruction is the highest possible with a given total cost. When instruction and research are produced together, it is necessary to take account of research as well as instructional outcomes when selecting inputs so as to maximize the total value of output with a given value of inputs.

2. The next condition holds whenever there are differences in benefits associated with the education of separate categories of students. Whether due to the program in which they are enrolled or due to the students' own characteristics such as ability or socioeconomic background. When this is the case, the demand for enrollments for each category should lead to a level of enrollments in each category so that the relative marginal benefits and costs for all categories are equal. For example, if external benefits result from the education of students in one category, demand should reflect these benefits as well as those that accrue directly to the students.

The marginal cost and the marginal benefits of enroll-
ments in any category is the change in total costs and
benefits resulting from a unit change in enrollments of the
category. The costs and benefits include all costs regardless
of who pays, and all benefits, whether directly by students or
others.

3. Similarly, incentives within higher education and in the
broader economy lead to relative levels of activity such that
the marginal cost of every higher education program and of the
achievement of every category of enrollments considered
separately equals (pp. 35-37).

Yanikoski and Wilson (1984) seemed to give impetus to differential
pricing. Their study ascertains that "if a university raises its general
undergraduate tuition rates either significantly above its current rates
or significantly above the rates of its competitors, it risks inducing an
unevenly distributed depression of enrollment" (p. 736).

It is said that an increasing number of institutions are adopting
and applying "midway tuition increases, raising service fees, adding
course surcharges, indexing tuition rates to cost and instituting price
differentials on a selective basis. In this respect, the authors provide
the following definitions. Differential pricing refers to the purposeful
variation of changes in relation to differences in academic production
costs and/or market factors .... And the terms tuition charge, tuition
rate and differential price are used to refer to undiscounted tuition
prices published in college and university catalogs" (pp. 736-37).
Moreover, Yanikoski and Wilson (1984) are credited with several rationales
and equity features of differential pricing. These are:

(a) prices scaled in proportion to the costs of specific undergraduate courses, programs, or clusters of courses within a single institution, (b) higher prices for specialized upper-division instruction than for lower-division instruction, (c) higher prices as an indicator of outstanding program quality or selectivity for specific programs within an institution, and (d) prices scaled according to return on investment estimates for a selected field of study.

Furthermore, they highlight the root of the debate with examples of traditional undergraduate differentials which include:

(a) different prices to reflect cost variations of various locations (e.g., on or off campus), (b) lower prices for off-peak seasons or times of day (e.g., January intersession, summer school, evening classes), (c) lower prices for part-time or continuing education students who receive less financial support than full-time students, and (d) prices scaled according to credit loads, a form of volume discounting (pp. 738-39).

Notwithstanding the use of differential pricing by several universities such as the University of Illinois in 1981, the University of Michigan, Michigan State, and so forth, the differential pricing is difficult to predict the effects of a change in price structure, they say. One of the most compelling arguments against differential pricing is "the foremost uncertainty facing institutions considering differential pricing vis-a-vis the effect that a change in tuition rates will have on enrollment" (p. 743).

Dealing with tuition policy toward non-resident students, Morgan (1983) looked carefully at the determinants of student migration and the interrelationship of student migration and tuition rates. He argues that "students are found to be attracted to schools in states with favorable economic and environmental conditions and high tuition rates are found to be a significant deterrent to non-resident students. Based on a series of political and economic factors, he hypothesizes the average non-resident tuition rate of public colleges and universities is as follows:

$$TN = f(TR, CS, TNREG, SN/SQ, SR)$$

where TN   = the average non-resident tuition rate

TR   = the average resident tuition rate

CS   = the average annual cost of education for a student in that state

TNREG = the average non-resident tuition rate at public universities in the region surrounding the state in question

SN/SQ = the ratio of non-residents to residents enrolled in state university.

The non-resident student's demand for higher education is then defined as the "quantity of non-resident students who demand education at a state's public colleges and universities is a function of the price of the product and variables reflecting alternative opportunities, as well as the tastes and preferences of students for various characteristics of institutions and locations" (p. 187).

Thus the expanded form of the equation for the proportion of non-resident in a state is

$$SN = f(TN, SNLAG, EmP, PcPi, TEmP, D)$$

where ST   = the average of non-residents in the state

SNLAG = the lagged ratio of non-resident to resident students

EmP   = the percent change in employment

PcPi = per capita personal income

TEmP = mean temperature

D   = a dummy variable

Thus, tuition rates for non-residents were found to be largely determined "by tradition," although states are found to have a tendency to increase non-resident tuition if they are strong net importers of students.

Financial Aids

Beck (1985) has discussed financial aid in an economic perspective. He says that in the United States the financial aid programs "have been a mixture of need and no need award. However, the amount of financial aid available, the donors of the funds and the mixture of need and no need award have varied over time" (p. 2).

Commenting on the raison d'etre of financial aid, he underscores that

> there is every reason to believe that the mix of financial aid programs will change as will the role of the aid administrator. The equality of opportunity issue will survive as much because it is economically efficient and effective as because it is morally the right thing to do. Education, like any capital investment, raises the production of individual or groups holding that capital as well as the production of society (p. 3).

A continued effort is made here in support of financial aid in reaffirming that "the seeming necessity for many institutions to discount prices at this time is the result of competitively cutting the price of human capital in order to maintain the functioning of the resources now in higher education." Furthermore, it is asserted that even within institutions there is a need to reallocate resources. And this is due to the fact that institutions of higher learning are experiencing a

> decline in student interest in virtually every field of study that is normally associated with a liberal education (humanities, social sciences and natural sciences) for the last 15 years. It is also made crystal clear that a similar decline has taken place in the human service occupations: school teaching, social work, nursing, allied health, law enforcement and the clergy.

Thus the author purports that this allocation of resources can take place through the "statesman-like decisions of educational leaders at the institution, state and federal levels" (p. 5).

The contribution of Gladieux (1986) places the financial aid motif in the realm of the history of democratization of college opportunities in America. His contention looms large in the sense that state government, in the American system, "probably always will be the largest source of indirect aid to students in the form of subsidized, low tuition." While the federal government, on the other hand, for at least the past 20 years, has been by far the largest source of direct aid to help students meet their costs of attendance, including tuition, living costs, transportation, books and supplies. He further ascertains the fact that the larger mission of federal aid is to "help people realize their educational aspirations -- to equalize college opportunities regardless of individual economic or social origins." He then subscribes to the view that support for higher education will continue in the face of a $200 billion annual federal deficit and a cumulative national debt exceeding $2 trillion because higher education is "part of the American promise, too much imbedded in the public values" (p. 9). In that regard, he provides a comprehensive list of sources and programs in support of financial aid institutions. These are: the National Defense Student Loan (NDSL) Program, the State Student Incentive Grant (SSIG) Program, the Guaranteed Student Loan (GSL) Program, the Middle Income Student Assistance Act (MISAA) and the Auxiliary Loans to Assist Students (ALAS). Regarding the matter of equalizing college opportunities, the author affirms that there is a continued need for national policies to address a national priority. From his conclusion emerges a *modus operandi* for future educational plans. He contended that

> a number of states and institutions are advancing their own strategies including "tuition futures" plans. Parents would be enabled to invest in a fund that would guarantee prospective college

> tuition payments for their young children. The state or college
> would in turn invest the money and seek a return that matches the
> cost of instruction in the years hence when the children matriculate
> (p. 15).

The idea, it is said, is welcomed by parents whose children attend private

colleges and universities in the wake of the rising costs of higher

education. And the state of Michigan has led the way in developing

legislation that would implement the idea on a statewide basis. In his

assessment, the author argued that

> the good news about this bandwagon phenomenon is that the "tuition
> futures" concept sends exactly the right signal to the public at
> large: plan ahead for your children's education. The bad news is:
> the plans that are being developed may not be sound financially for
> families, institutions or states; such plans will help only the
> small proportion of families who have current resources to invest.
> Parents who buy tuition futures will have predetermined their
> children's college choice (p. 15).

Olivas (1986) explores need-based college aid programs. He asserted

that financial aid is available only to those students already admitted

into an institution. It is brought to view here three dimensions of the

financial aid delivery system that disproportionately discourage minority

students, particularly blacks and hispanics, from seeking admission to

colleges and universities. These are: "information inequities, negative

consequences of system complexity, and institutional aid practices."

Furthermore, it is stated that these issues affect all students to some

extent. However the author declared that because of the structural

features of the higher education system and the historical racism that has

characterized those institutions in the United States, "they affect

minority students most directly and detrimentally." Therefore, he went on

to say that "these parents, even those who desire college for their

children, are not enmeshed in the social network or alumni recruiting

efforts as college graduates" (p. 16). It is suggested here that

"colleges must commit themselves to work for future aid policies which deliver the highest proportion of aid, with maximum accessibility and minimum red tape, to the low-income students who need it most" (p. 18).

Smith's research in the area of financial aid represents a deep exploration of the dominant themes of "private post-secondary education in the United States with regard to expansion, increased access and the democratization of its student body." His thesis is an assessment of merit scholarship and the meritocratic admissions policy. He declared that colleges which have tried small merit grants to recognize, at least in a token way, academic merit have not reported shifts in their yield pattern. He continued by saying "evidence suggests that a yearly no-need award in excess of $5,000 is required to change the minds of outstanding students and to persuade them or their parents on financial grounds to attend a college that was not at or near the top of their preference list" (p. 22).

Smith's main thrust is that the concept does not work regardless of the amount of resources devoted to it. He assumes that the "losers once again would be the poorer and less affluent students, mostly minorities." The bone of contention here is that high SAT scores and educational opportunity have a direct correlation with financial resources, so it is totally reasonable to believe that "merit scholarship would go to middle-class educationally-advantaged students and would take opportunities away from those students who have started with fewer opportunities" (p. 23). Furthermore, it is regarded as "against the grain the fact of denying needed financial assistance to a worthy but needy candidate because these funds have been awarded to another student who already had the resources to attend regardless of the award." However, the author agrees that the

parental contribution should be the central determining figure in deciding upon financial need for each student, and he is also in agreement with the fact that there should be the use of a common methodology in determining that contribution. Thus need-based, meritocratic admission is perceived as a relatively recent and threatened policy.

Hossler (1982) conducted a study on college enrollment and identifies the different components of the financial aid system in the United States which includes scholarships, grants, loans and workstudy. His study throws light on the fact that the system is superimposed on a system of federal, state and campus-based financial aid programs. His research documents the idea that "college matriculants attending public and private four-year colleges and universities typically rely on a mix of financial aid" (p. 55).

Students in both the public and private sector make use of federal, state and institutional grants and scholarships. Although students in private colleges and universities are somewhat more likely to receive gift money, large numbers in both sectors are awarded gifted money (Boyd et al., 1978). However, it is made crystal clear that students entering private institutions are much more likely to use loans to finance their education (Boyd et al., 1979). He then supports the middle-income squeeze motif because family disposable income does not keep pace with increases in tuition. Thus he considers the Middle Income Student Assistance Act of 1980 (MISAA) as a justifiable response to the perceived problems of the middle income family.

Family Disposable Income and Unemployment

In the area of family disposable income and unemployment Carnevale (1983) issued comments on the demographic shortfall and contended that the number of 18- to 24-year-olds will shrink from 29 million in 1980 to 25 million in 1990. In the frame of his argument, the good news is that the "scarcity of young people should increase entry-level wages and lifetime returns from additional education." The underlying assumption here is that employers will begin offering more attractive recruitment packages including larger salaries, educational benefits and job training. Moreover, it is foreseen the added possibility of a revival of the draft and a compulsory national service program that together could absorb as many as 3.5 million 18- to 24-year-olds each year" (p. 14).

In taking into consideration the structurally unemployed and underemployed, it is asserted that in the absence of a dramatic economic recovery, there are likely to be as many as 10 million Americans who will be either unemployed or among the working poor throughout most of the decade (those unable to make $7,412, the poverty threshold for a family of four). Furthermore, it is reported that from 4 to 7% of American factory jobs -- as many as 1 million jobs -- could be filled by robots by 1990. And 2.5 million office workers could be lost to automation by the year 2000.

Private Higher Education in New York

The New York education system is desegregated into three types of institutions: the State University of New York system (SUNY), the City University of New York (CUNY), and the non-public sector which is sectioned into independent colleges and universities and proprietary

institutions. There exist about 30 SUNY state-operated campuses, 30 SUNY community colleges, 12 CUNY senior colleges and 7 CUNY community colleges.

Enrollment Patterns in New York

The post-secondary education sector in New York state differs in many ways from that in other states. One major feature of disparity is the large independent segment existing within the state. It is reported that "42% of New York's total enrollment is in the independent sector," while nationally about 20% of total enrollment is in the independent sector. At the undergraduate level the "New York independent sector is twice as large as the average in the rest of the nation with 35% of degree credit undergraduate enrollment in the independent sector within New York compared to only 18% in the rest of the nation" (The University of the State of New York, 1990, pp. 7-8). It is asserted that, in the public sectors in New York, enrollment is relatively fixed by appropriations so that increased demand for less expensive public sector institutions does not show up as dramatic enrollment increases. Whereas enrollment may be a better indicator of demand and affordability in the independent institutions due to the slow drop in the total undergraduate enrollment since 1983 and the slight decline in minorities enrollment between 1980 and 1986. It is argued that "changes in colleges' application patterns may be better indicators of aggregate demand and should be used to monitor trends in the next decade" (The University of New York, 1989, p. 46).

Financing Independent Institutions (Tuition, Fees, Costs)

Between 1980-81 and 1986-87 it was shown that "the total cost of
attending an independent university within both New York and the nation
increased by over 80%." However, cost increases at public colleges and
universities both across the United States and within New York were
somewhat less than at independent institutions, rising by just under 60%.
During those same periods the consumer price index increased just over 30%
and the median family income increased by 40% in the U.S. and 47% in the
Northeast. With increases exceeding 60% in a 7-year period, it is
asserted that "college costs rose faster than inflation and the family's
capacity to pay." Furthermore, it is made crystal clear that the average
cost of attendance includes the following components: the cost of tuition
and fees, room and board, and other items such as books, supplies, and so
forth. For full-time, full-year New York state undergraduates, the
statewide average expenses in 1986-87 were $6,530, including tuition and
fees, room and board, books and supplies and related expenses.

> The average total cost of attendance for full-time undergraduates in
> New York's independent sector institutions was just under $11,000.
> Total cost for full-time public sector undergraduates was $5,184 at
> SUNY four-year institutions, $3,168 at SUNY community colleges and
> $4,189 at City University four-year institutions. The total cost of
> attendance at degree-granting proprietary sector institutions was
> just over $7,500 (The University of the State of New York, 1991, pp.
> 23-24).

But it was shown that students can reduce attendance costs by living off
campus or living with their parents. The student who chose to "live off
campus could have expected to save on average about $3,000 per year in
1986-87." Students at independent sector institutions within New York
reported that on average the cost of attendance for students living off
campus was "about $3,700 less than the average cost of living on campus,

$9,440 and $12,175 respectively." Proprietary sector students "reported

little in the way of differences between living off campus or with their

parents, $7,483 and $7,543 respectively."

At this juncture, it deemed necessary to clarify that non-tuition

costs

> include room and board, books and supplies, transportation and
> related costs were about $4,700 for on-campus students at New York's
> independent sector institutions and about $4,300 for on-campus
> students at state university institutions. Non-tuition and fee
> costs for students living off-campus or with their parents were
> similar for independent, SUNY and CUNY students, about $3,500 for
> off-campus students and about $2,500 for students living with their
> parents (The University of the State of New York, 1991).

Hence it is brought to view that how much it costs to attend college

depends not just upon where the student decides to live but also upon

which institution he or she attends. It is reported that students at

independent sector institutions within New York, on the average, paid

about $3,700 less than the average cost of living on campus ($9,440 and

$12,175, respectively), while living with their parents reduced the cost

about $100. According to student-reported expenses in the New York

public sector. As study, students at SUNY four-year institutions could

expect to save about $950 by living off campus, and they could reduce the

total cost of attendance by another $800 to just under $4,000 by living at

home with their parents (The University of the State of New York, 1991).

Variations in total cost of attendance appear not just between

public and independent sector institutions but within the independent

sector as well. The four-year independent institutions are divided into

"three categories: high, medium, and low." Thus, it is reported that

"high-cost independent sector institutions were defined to be those with

tuition and fees of over $9,000, medium-cost institutions as those between

$6,000 and $9,000, and low-cost independent institutions those with tuition and fees under $6,000" (The University of the State of New York, 1991).

State Student Financial Aid Programs

It is said that "financial aid programs constitute an integral part of the financing of post-secondary education in New York state has been prominent in establishing scholarships, grants and student loan programs to aid students in the pursuit of post-secondary education." The current state program of financial assistance is regarded as "the largest of all state programs in the nation." It includes a wide system of low-tuition public college scholarships for able high school graduates, professional and graduate students; tuition assistance grants for use at public and independent colleges; and guaranteed loans for post-secondary students" (The University of the State of New York, 1979, p. 11). The state financial assistance programs began in 1913 with the establishment of the "regents college scholarships for outstanding high school students." Between 1936 and the 1960s a vast array of other "special scholarship and award programs were established for children of deceased and disabled veterans and for veterans for World War II, and of the Korean and Vietnamese conflicts. Moreover, special scholarship programs were initiated for the study of nursing, medicine and dentistry, as well as fellowships for college teaching and various other academic programs at the graduate level (The University of the State of New York, 1987). In 1974, the legislature established the Tuition Assistance Program (TAP), which replaced the Scholars Incentive programs with a more liberal scale of awards which provide a maximum annual value of $1,500 not to exceed tuition for

undergraduates. Also the "legislation of 1974" established the New York Higher Education Services Corporation to centralize the administration of state financial aid programs with those of other levels of government, particularly the federal government. It is made crystal clear that, under the law, "the Higher Education Services Corporation is responsible for the repayment of awards and loans, and the Education Department retains the responsibility for the selection of winners and alternates in six programs of scholarships or academic performance awards" (The University of the State of New York, 1979, p. 12). The financial aid program for New York students administered by the Higher Education Service Corporation (HESC) are Liberty Scholarship Grants, Guaranteed Education Loans, loan-related programs, awards, fellowships, and programs with remaining payments. Undergraduate programs are listed as the Tuition Assistance Program (TAP), designed for New York residents attending post-secondary institutions in the state, and the Supplemental Tuition Assistance Program (TAP) grants for educationally disadvantaged undergraduate students. Guaranteed Education Loans are divided into Stafford Loans, Supplemental Loans for Students (SLS), and Parent Loans for Students (PLUS). Loan-related programs comprise the Regents Loan Forgiveness Program, Consolidation Loan Program, Automated Payment Program, and renewed eligibility for financial aid. The scholarship programs are: the Regents College Scholarships, Empire State Scholarships of Excellence, Robert C. Byrd Honors Scholarships, Paul Douglas Teacher Scholarships, Empire State Challenger Scholarships for Teachers, Regents Nursing Scholarships, Health Service Corps Scholarships, Regents Health Care Professional Opportunity Scholarships, Regents Professional Opportunity Scholarships, and Transit Corps of Engineers Program. The awards consist of: Aid for Part-Time

Study (APTS), Vietnam Veterans Tuition Awards (VVTA), Regents awards for children of deceased and disabled veterans, and Regents awards for children of deceased police officers, firefighters and correction officers. The one fellowship program is the Empire State Challenger Fellowship for Teachers. The programs with remaining payments are: Regents awards for children of deceased state correction officers and state civilian employees of a correctional facility (Altica Award), Regents Professional Educational Scholarships, Regents Physician Shortage Scholarships, New York State Loans for Health Professions Students, New York State vocational loans, Herbert H. Lehman Fellowships (New York State Higher Education Services Corporation, 1988-89).

Summary

A review of the related literature indicates that much of the reported research evidence has been generated from the demand for higher education and the enrollment motif. The most-used approaches are the consumption followed by investment theories. A few of the studies have investigated the human capital theory and the linear model. The demand studies reported support the notion that there exists a positive relationship between tuition and the rate of attendance.

Of the several variables relating to the demand for higher education, the number of high school graduates, the tuition rate, and financial aids seem to receive the greatest amount of attention. The results of the studies surveyed in the review of literature indicate that tuition, financial aid and family income are significantly related to college and university attendance. One exploratory study concerned with

the matter of unemployment suggested that draft, Compulsory National Service, and unemployment have a serious impact on attendance.

The wide and broad body of literature related to the independent sector of higher education in New York yields the salient fact that 41% of the state enrollment in confined to private institutions. And the level in the independent colleges and universities is twice as large as the average in the rest of the nation. In that regard, a great deal of emphasis is placed on the following variables: the number of high school graduates, tuition rate, financial aids, and family income as being significantly related to college and university attendance.

In Chapter III a descriptive will be set forth to investigate the relationship of the demand to various variables such as tuition, family income, number of high school graduates, financial aid, and so forth.

CHAPTER III

METHODOLOGY AND RESEARCH DESIGN

Introduction

The purpose of this study was to investigate those factors which impacted on undergraduate enrollment of independent colleges and universities in the state of New York. In this chapter, the methodology and the research design are discussed. First, the data collection procedures are presented including a description of the population. Next, a detailed definition and codification of the variables for measurement is described. Finally, the chapter concludes with a discussion and presentation of the proposed statistical analyses.

Methodology and Research Design

The methodology suitable to this type of research was the correlational method which is a branch of the descriptive research. Correlational studies include all those research projects in which an attempt is made to discover or clarify relationships through the use of correlation coefficients. The purpose of the correlation coefficient is to express in mathematical terms the degree of relationship between any two variables. If the relationship is perfectly positive (for each increment in one variable there is a corresponding increment in the other), the correlation coefficient will be 1.00. If the relation is perfectly negative, it will be -1.00. If there is no relationship, the coefficient will be 0.00. If the two variables are somewhat related, the coefficient will have a value between 0.00 and 1.00 (if the relationship is positive) or between 0.00 and -1.00 (if negative). Thus, the correlation coefficient is a precise way of stating the extent to which one variable is related to

another (Borg & Gall, 1978, pp. 475-76). This method is used for two purposes: 1) to explore relationships between variables and 2) to predict scores on a variable from subjects' scores on other variables. As Ary et al. (1988) put it, "correlational studies are concerned with determining the extent of the relationship existing between variables. They enable one to measure the extent to which variations in one variable are associated with variations in another. The magnitude of the relationship is determined through the use of coefficients of correlation." These studies may be classified as descriptive research "if the intent is to describe relationships or to generate hypotheses and as ex post facto studies if hypothesis testing is the focus" (pp. 327-328).

Research Questions

The research questions were framed and developed following a thorough review of relevant literature on demand for higher education, particularly on private higher education and on higher education in the state of New York. The following questions were researched for serious investigation.

1. Does per capita personal disposable income determine attendance in independent colleges and universities?

2. Do tuition and fees influence attendance in independent colleges and universities?

3. Does federal aid (SEOG) impact on attendance in independent colleges and universities?

4. Does state aid (TAP) determine attendance in independent colleges and universities?

5. Does the unemployment rate influence attendance in independent colleges and universities?

6. Do the predictors (per capita personal disposable income, tuition, federal aid SEOG, state aid TAP and unemployment rate), taken together, determine attendance in independent colleges and universities?

Null Hypotheses

The null hypotheses were developed with respect to the pertinent review of literature on demand for higher education and the research questions listed above. These hypotheses were tested through the analysis of the data and the responses to the survey questions. Hence the research questions presented above and the review of the relevant literature were used as the basis of formulation of the hypotheses presented below.

Hypothesis 1: There is no significant relationship between attendance at independent colleges and universities and per capita personal disposable income.

Hypothesis 2: There is no significant relationship between attendance at independent colleges and universities and tuition and fees.

Hypothesis 3: There is no significant relationship between attendance at independent colleges and universities and change in federal aid (SEOG).

Hypothesis 4: There is no significant relationship between attendance at independent colleges and universities and state aid to independent colleges and universities.

Hypothesis 5: There is no significant relationship between attendance at independent colleges and universities and the unemployment rate.

<u>Hypothesis 6</u>: There is no significant relationship between attendance at independent colleges and universities and the predictors (per capita personal disposable income, tuition, federal aid SEOG, state aid TAP and unemployment), taken together.

Selection of the Population

The main purpose of this research endeavor was to determine the factors which impacted on undergraduate enrollment in the independent colleges and universities in the state of New York. The private sector of higher education in New York state consists of 141 independent institutions and 27 proprietary colleges and universities. Of the number of independent colleges and universities 79 confer bachelor's or higher degrees, and 28 confer associated and specialized degrees. The rest of these institutions include seminaries and professional schools offering only graduate studies.

The convenient sample under investigation included 79 independent institutions ($\underline{N}$=79) conferring bachelor's or higher degrees. <u>The institutions were selected from the HEP 1988 Higher Education Directory, and from Colleges and University Admissions and Enrollment, New York State, 1988</u>. Because of the manageable number of those independent institutions offering a bachelor's degree, the entire sample was included in the study. A final division of the subjects or institutions was made on the basis of tuition charged to students. Thus the three categories of institutions as given by the State Education Department Bureau of Post-Secondary Research and Information Systems/The University of the State of New York were: 1) high-cost independent four-years or more, 2) low-cost

independent four-years or more, and 3) other independent four-years or more.

High-Cost Independent Four-Years or More (N=16)

Bard College	Rensselaer Polytechnic Institute
Barnard College	St. Lawrence University
Colgate University	Sarah Lawrence College
Cornell University-Independent	Skidmore College
Columbia University	Union College
Hamilton College	University of Rochester
Hobart and William Smith Colleges	Vassar College
New York University	Wells College

Low-Cost Independent four-Years or More (N=26)

Albany College of Pharmacy	Medaille College
Boricua College	Mount Saint Mary College
College of Insurance	Mercy College
College of Saint Rose	Nazareth College of Rochester
Concordia College	New York Institute of Technology
Dominican College of Blauvelt	New York School of Interior Design
Dowling College	Nyack College
D'Youville College	Saint Francis College
Friends World College	Saint John's University-New York
Houghton College	Saint Joseph's College-New York
Iona College	Saint Thomas Aquinas College

Manhattan College   Touro College

Marymount Manhattan College

Other Independent Four-Years or More (N=37)

Adelphi University   Manhattanville College

Alfred University-   The Mannes College of Music
Independent

Canisius College of Buffalo   Marist College

Clarkson University   Marymount College

The College for Human Service   New School for Social Research

College of Mount Saint   Niagra University
Vincent

The College of New Rochelle   Pace University

Daemen College   Polytechnic University

The Elmira College   Pratt Institute

Fordham University   Robert Wesleyan College

Hartwick College   Rochester Institute of
                                    Technology

Hofstra University   Russell Sage College

Ithaca College   Saint Bonaventure University

The Julliard College   Saint John Fisher College

Keuka College   Siena College

The King's College   Syracuse University

Le Moyne College   Wagner College

Long Island University   Yeshiva University

Manhattan School of Music

(Report on College Costs and Student Financial Aid in New York, 1989, p.
49.)

Those institutions were chosen for having reported their annual enrollment and tuition to the Department of Education. However, theological seminaries and institutions granting only professional and master's degrees were excluded in the analysis.

Sources of the Data

The data analyzed in the study were part of the statistical selection of the New York State Education Department and the following sources:

1. New York Department of Education [college and university opening fall enrollment, high school graduates, distributions of high school graduates and college going rate, tuition and fees, college costs, budgetary information, and student financial aid, Tuition Assistance Program (TAP), and Supplemental Educational Opportunity Grants (SEOG)]

2. Higher Education Directory HEP (list of all the independent colleges' and universities' names and addresses, and names of all the administrators)

3. New York State Higher Education Corporation (Tuition Assistance Program (TAP) expenditures, the number of recipients for the TAP)

4. New York State Department of Economic Development (per capita disposable income in New York)

5. New York Statistical Yearbook (unemployment rates in New York state)

6. Statistical Abstract of the United States -- U.S. Department of Commerce -- U.S. Census Bureau (current population reports, eligible college-age population)

7. U.S. Department of Commerce (consumer price index)

8. The Fact Book of Higher Education, Washington, DC (tuitions)

In addition to these sources mentioned above, an eight-item question-naire was mailed to the presidents of those independent colleges and universities granting a bachelor's or higher degree.

Data Definitions and Methods of Statistical Estimates

Enrollment Data

College and University Fall Admissions and Enrollment, published by the University of the State of New York/The State Education Department Office of Post-Secondary Policy Analysis, provided enrollment data for independent public and proprietary colleges and universities in the state every year. The total FTE students were obtained from the conversion of the part-time students, added to the number of full-time matriculants, provided the total FTE (full-time equivalent) in these four-year or more independent colleges and universities. The total FTE includes enrollment for freshmen, sophomores, juniors and seniors. The total FTE was chosen over enrollment for freshmen because the financial aids are distributed to all levels.

Eligible College-Age Population

This group was estimated from four-year cumulative totals of high school graduates beginning with the fourth year prior to the year for which the estimate was required. The elements of the cumulative totals were adjusted for armed service rates. Armed Service high school graduates in the 18- to 24-year-old age group were estimated for each year by taking the ratio to the total 18- to-24-year-old group for each year, and in multiplying that ratio by the number of high school graduates in the state. Then the result found for each year was subtracted from the total high school graduates to obtain the eligible college-age population.

The University of the State of New York/The State Education Department Information Center provided distributions of high school graduates and armed service rates.

Per Capita Disposable Personal Income in Real Value

Per capita personal disposable income is New York's aggregate after-tax income divided by the population size. It is computed from special analyses prepared by the U.S. Department of Commerce's Bureau of Economic Analysis for the New York State Department of Economic Development. Income refers to the calendar year in which the academic year begins (A report on student financial aid, The University of the State of New York/The State Education Department, p. 82). The per capita disposable personal income in real value was computed by dividing the per capita disposable personal income by the consumer price index. The per capita disposable personal income was selected because median family income is not available for the state of New York. This type of statistics is published by region. New York belongs to the Northeastern region.

Average Tuition and Required Annual Fees in Real Value

Average annual undergraduate tuition and required fees in four-year independent colleges and universities in New York are computed from institutionally reported data in the Higher Education Data System for typical injuridiction or in state undergraduate charges. The computation of these values in real was obtained by dividing the average tuition and fees for each year by the consumer price index for each year. The New York State Education Department (NYSED), Office of Post-Secondary Education Policy Analysis, published those weighted average tuition and required fees.

Consumer Price Index

These data are from the U.S. Department of Labor Statistics, Washington, DC, adjusted to reflect the calendar year for all urban consumers in New York. The Northeastern region/New York, New England, Boston, Connecticut and New Jersey are included in the same consumer price index for urban consumers. The northeastern index for metropolitan areas was chosen because the price index was not available by states.

Tuition Assistance Program (TAP) in Real Value

The Tuition Assistance Program (TAP) includes awards from both the Tuition Assistance Program (TAP) and its companion, the Supplemental Tuition Assistance Program (STAP), awards. The applicants must be New York state residents and enrolled full time in an approved program. Tuition Assistance Program awards are made on the basis of family New York state net taxable income adjusted by the number of dependents enrolled full time in post-secondary education in any state. The income eligibility ceiling for first time undergraduate dependent recipients was raised from $34,250 to $42,500 of state new taxable income (Board of Regents to the Governor and legislature, 1990, p. 10). The New York State Higher Education Corporation published annual data on the program expenditures, the program's recipients and the average of the awards both at the graduate and undergraduate level. The average TAP award in real value was computed by dividing the TAP average for each year by the consumer price index (CPI-U). There are a great variety of financial aids and fellowships available to students in New York. However, most of those assistances are meritocratic and are not distributed across the board like the Tuition Assistance Program.

Average Supplemental Educational Opportunity Grants (SEOG) in Real Value

The Supplemental Educational Opportunity Grants are need-based grants provided through Title IV of the Higher Education Acts as part of the federal campus-based programs. The bulk of the recipients who received SEOG had family income under $10,000 and under $27,000 for dependent applicants. The Supplemental Educational Opportunity Grants were chosen because they were the only federal aid for which data were available for the number of years under consideration. The Pell Grant which replaced the BEOG in 1975 was omitted in the analysis. This was due to the fact that data for 1976-1978 were not available for this type of aid.

Data Collection Techniques

The data pertaining to this study were collected in two different ways. The data related to enrollment, high school graduates, tuition and fees, unemployment rates, per capita disposable personal income, consumer price index and the different state and federal financial aid were gathered through telephone calls and a trip made to the New York State Education Department and the New York State Corporation Services in Albany. These data from 1975 to 1989 allowed to generate a time series analysis. Also, an eight-item questionnaire was mailed to a sample of 78 independent colleges and university presidents. A copy of the instrument is placed in the appendix. The questionnaire guaranteed confidentiality to the participants in a separate consent letter which appears in the appendix. The first mailing yielded 36 responses out of 78. The first follow-up provided 14 responses, the second follow-up resulted in 10 responses and the third yielded 6. Thus the total responses obtained from the questionnaire was brought to 66. Of this number, 10 wished not to

participate. That resulted in 56 responses or 70%. Those results allowed generation of a cross-sectional analysis of the trends in enrollment and financial situation of these private institutions for the year 1988. Prior to administering the eight-item questionnaire, a comprehensive instrument of 25 questions was prepared. Then the instrument was pilot-tested with Long Island University and Saint John University for vagueness, relevancy and appropriateness. It was discovered that most of the data needed to answer the questions in the former questionnaire were not available or were not kept by the colleges and universities.

Statistical Techniques

The statistical techniques put forth in the study were the multiple regression applied to a time series analysis and the cross-sectional techniques. The t-test, the analysis of variance, the Fisher test, for the significance of an individual regression coefficient, for the significance of the entire regression function and for the significance of changes were applied. The particular statistical model used in this research is the ordinary least-square multiple regression (O.L.S.). A stepwise and a global treatment were applied. The least-squares criterion implies that the coefficients are selected in such a way that the sum of squares residuals $\Sigma(y-y')$ is minimized, and that any other values for A and B_i would yield a larger $\Sigma(y-y')^2$. Selection of the optimum coefficients using the least-squares criterion also implies that the correlation between the actual y values and the y' estimated values is maximized, while the correlation between the independent variables and the residual values $(y-y')$ is reduced to zero. Two other least-squares solution requirements are also brought to view. First, "the least-square solution

requires only a set of bivariate correlation coefficients for solution of standardized regression coefficients, and sums of squares and cross-product for the solution of unstandardized regression coefficients." Second, "the normal equations lack a unique solution if the sample size is equal to or smaller than the number of variables involved, or if at least one of the independent variables is a perfect linear function of one or more others" (Kim & Kohout, 1984, SPSS-X, pp. 328-29).

"The stepwise inclusion allows one to determine the respective contribution of each variable to explained variance. The variable that explains the greatest amount of variance in the dependent variable is entered first and so on. Stepwise inclusion preestablishes hierarchy" (SPSS, pp. 344-47).

Multiple Regression Assumptions

The Prediction techniques introduced above call for the combining of two or more variables in such a way that scores resulting from the combination have maximum relationship with the variable to be predicted. The variables that are combined to do the predicting are often called predictors, and the variable to be predicted is called criterion (Thorndike, 1978, p. 140). The classical linear model of multiple regression can be written:

$$y_i = \alpha + \beta_1 x_{1_i} + \beta_2 x_{2_i} + \ldots + \beta_k x_{k_i} + e_i .$$

Tests of Significance

There are two tests of statistical significance that are important in multiple correlation analysis. First, one may wish to know whether a particular multiple correlation is significantly greater than zero. This

test assumes that the obtained R is a result of chance factors in sampling from a population in which the true ρ is zero.

The other test of significance is useful in multiple regression analysis tests whether a particular variable makes a worthwhile contribution to the accuracy of prediction. It is the t-test given by

$$t_{\alpha/2}(N-K-1) = \frac{b_j}{S_{b_j}}$$

where b_j is the jth coefficient and S_{b_j} standard error of b_j, and $t_{\alpha/2}$ $(N-K-1)$ two-tailed t-test.

Summary

The population for this study was 141 independent colleges and universities of the state of New York. Of that population only 78 institutions conferring bachelor's or higher degrees were selected, while independent institutions conferring associate or graduate degrees only, proprietary institutions, and theological seminaries were excluded. Information was provided relative to the gathering and the processing of data. The statistical treatment of the data by the multiple regression analysis was used to meet the technical objective of the study. One-way analysis of variance, the Fisher ratio and t-test of significance were used to test whether a certain computed overall result is statistically significant. The data was assumed to meet the requirement of the selected statistic. Whereas this chapter presented a discussion of the methods and statistical procedures set forth in the study, an analysis of the results is presented in Chapter IV.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE RESULTS

Introduction

The aim of this research was to investigate the factors which pertained to and impacted upon undergraduate enrollment of independent colleges and universities in New York from 1975 to 1989 in a time series treatment and in a cross sectional analysis for 1988. This chapter contains the reports of the results and the interpretation of the findings of the data analysis. As a matter of convenience, the hypothesis will be restated in the null form. The results on the main variables, the individual regression coefficients for hypotheses testing, the coefficients of determination, the Pearson Correlation Coefficients, the one-way analysis of variance, and the overall significance test or F-ratio are here reported. The chapter also includes some limited discussions on the rates of attrition, changes in tuitions and results related to quantitative measures deemed necessary to the research questions.

This chapter is divided into three components. The first section reports trends in attrition rates for the 1976-1987 period, tuition ratios in independent institutions of higher learning in New York state in relation to CUNY and SUNY, and changes in tuition and fees imposed on students with respect to the Consumer Price Index and the family disposable income in the northeastern region. The results of this data analysis are used as additional findings to highlight the discussion.

The second section presents the descriptive and statistical data which pertain to the main variables of the time series analysis. The frequency of distribution for each variable is reported in appropriate tables. The

hypotheses are restated and the Pearson Correlation and the Coefficients of Determination are reported. A brief description and explanation of the results of each tested hypothesis and appropriate tables are also included. The one-way analysis of variance (ANOVA) on main variable and descriptive data with accompanying tables are here displayed. And the *T*-tests are computed.

The third section includes the data collected in the survey. Items designed by the researcher as being helpful to the discussion, such as frequency distribution and other variables, are reported in simple counts and percentages. The important variables were dealt with in a cross-sectional treatment. Again, the frequency of distribution for each variable is reported. The hypotheses are tested. The coefficients of Correlation are computed. The one-way analysis of variance (ANOVA) on main variable, the *T*-test and the accompanying tables are also presented.

Results From Trends Study

Data for this section were collected by the researcher from the State Education Department of Post-Secondary Analysis, Albany, New York. These data were enrollment in student FTE (Full-Time Equivalent) and average tuition per student. Income data and consumer price index were collected from the New York State Department of Economic Development. These data were transformed and in support of the time series analysis.

Table 4.1 contains the attrition rates in percentages for freshmen, sophomores and juniors. It shows that the freshman group is more unstable in terms of college and university retention. From 1976 to 1987 the attrition rates changed from 18.0% to 31.0% for freshmen, -9.0% to -4.0% for sophomores, and -.01% to 6.0% for juniors.

Table 4.1 Attrition Rates in Undergraduate Independent Higher Institu-
tions in New York State From 1976-1987

Year	Freshman	Sophomore	Junior
1976	26.0	10.0	-0.01
1977	25.0	2.0	5.0
1978	18.0	-9.0	10.0
1979	24.0	1.0	5.0
1980	23.0	-4.0	12.0
1981	19.0	3.0	10.0
1982	25.0	2.0	7.0
1983	25.0	2.0	9.0
1984	28.0	2.0	6.0
1985	26.0	-1.0	8.0
1986	30.0	0.0	9.0
1987	31.0	-4.0	6.0

Table 4.2 shows that changes in tuition rates for independent colleges

and universities grew faster than the CPI-U and family median income.

Table 4.2 Percentage of Changes in CPI-U in Tuition and Fees, and in
Family Median Income for the Northwestern Region.

Years	CPI-U	Change in Tuition and Fees	Change in Income and Family Median
1976-77	5.0	7.2	9.0
1977-78	5.0	6.2	8.0
1978-79	8.0	8.4	5.0
1979-80	1.0	8.5	5.0
1980-81	9.0	10.0	8.0
1981-92	5.0	12.0	8.0
1982-83	4.0	13.0	5.0
1983-84	5.0	9.0	7.0
1984-85	3.0	9.3	6.0
1985-86	3.0	8.7	7.0
1986-87	5.0	8.9	5.0
1987-88	-3.0	10.6	7.0
1988-89	6.0	20.0	8.0

Note. CPI-U is the consumer price index for urban areas.

Table 4.3 Rate of Changes in Tuition for Public and Independent Colleges and Universities, and Tuition Ratio for Public and Independent Institutions From 1977 to 1989.

Year	SUNY (rate of change in tuition)	CUNY (rate of change in tuition)	Independent (change in tuition)	Independent/ SUNY (tuition ratio)	Independent/ CUNY (tuition ratio)
1977	4.0	-1.0	6.2	3.86:1	3.62:1
1978	4.0	2.0	8.4	4.01:1	3.85:1
1979	12.0	9.0	8.5	3.87:1	3.82:1
1980	4.0	2.0	10.0	4.08:1	4.11:1
1981	11.0	0.0	12.0	4.16:1	4.63:1
1982	4.1	16.0	13.0	4.53:1	4.55:1
1983	23.0	13.0	9.0	4.14:1	4.40:1
1984	4.0	2.0	9.3	4.34:1	4.70:1
1985	2.0	0.0	8.7	4.62:1	5.11:1
1986	3.0	0.0	8.9	4.87:1	5.56:1
1987	1.0	0.0	10.6	4.37:1	4.96:1
1988	-2.0	2.0	20.0	5.92:1	6.54:1
1989	1.0	1.0	9.1	6.40:1	7.09:1

In Table 4.3, the rates of change in tuition and fees in independent institutions of higher learning were compared to the tuition rates in SUNY and CUNY. And the ratios of tuition and fees for independent and SUNY, and for Independent and CUNY were computed. It was shown that the changes in independent institutions were higher than SUNY and CUNY except for three years (1979, 1981, 1983 in SUNY, and 1979, 1982 and 1983 in CUNY). It was also found a tuition ratio going from 3.86:1 to 6.4:1 for SUNY and 3.6:1 to 7.09:1 for CUNY.

Results From Time Series Analysis

Data for this section were parts of statistics gathered yearly by the State Education Department Office of Post-Secondary Analysis, Albany, New York, and from the New York State Department of Economic Development. The primary assumptions underlying this analysis were:

<u>Hypothesis 1</u>: There is no significant relationship between attendance at independent colleges and universities and per capita disposable personal income.

<u>Hypothesis 2</u>: There is no significant relationship between attendance at independent colleges and universities and tuition and fees.

<u>Hypothesis 3</u>: There is no significant relationship between attendance at independent colleges and universities and federal aid (SEOG).

<u>Hypothesis 4</u>: There is no significant relationship between attendance at independent colleges and universities and state aid to independent colleges and universities.

<u>Hypothesis 5</u>: There is no significant relationship between attendance at independent colleges and universities and the unemployment rate.

<u>Hypothesis 6</u>: There is no significant relationship between enrollment at independent colleges and universities and the predictors (per capita disposable income, tuition, SEOG, TAP and unemployment rate).

Analysis of the data was carried out in three stages. First, the variables were defined. Second, regression analyses were computed along with a matrix of correlation coefficients for each pair of variables. These correlation coefficients of all the variables were reviewed to determine which variables had significant relationship to the outcome variable enrollment. Finally, overall F and analysis of variance were computed in an effort to determine overall significance of the outcome on the predictors. Time series analysis, in some cases, requires special treatment, mainly when the data is not stationary. That is to say that the data presents overlap changes over times. In this study, the total enrollment in independent colleges and universities are not stationary. Students come and leave the institution. There is an upward mobility from

freshmen to seniors, or to graduation. The overlap fostered by this mobility causes one to think of autocorrelation problems. It is stated that measurement errors, selection biases, and multicolinearity are all attributable to the data available to a researcher. One has to be aware of these problems. The first of these issues is termed auto correlation or serial correlation. It refers to the case in which the residual errors terms from different observations are correlated. Auto correlation can yield an inflated coefficient. That is, coefficients will be found to be significant different from zero when in fact they are not. The techniques to circumvent the problem are Durbin-Watson Coefficient and Generalized Least Squares GLS (Schroeder, et al., 1986, pp. 72-75). Due to the small number of data no such tests were applied.

Variables featured in this analysis were:

Enroll: enrollment in full-time equivalent (FTE) in four-year colleges and universities in New York is a discrete, or count, variable.

NY Grads: number of high school graduates in New York state is a discrete, or count, variable.

NY Income: per capita personal disposable income in real value is a continuous variable.

NY Tuit: Average tuition and fees in real value for four-year independent colleges and universities in New York is a continuous variable.

Unemploy: Unemployment rate in New York is a continuous variable.

TAP: Average Tuition Assistance Program per student in real value is a continuous variable.

SEOG: Supplemental Educational Opportunity Grants in real value is a continuous variable.

Means and standard deviation of the variables are illustrated in Table 4.4. All the variables showed some strength. However, there is a lack of homogeneity and consistency in their deviation around their means.

Using enrollment as outcome and SEOG as predictor, the fitted model was actually estimated with the following results, given in Table 4.5.

Table 4.5. Regression Results

Variable	Constant	Coefficient	t-test
SEOG	32668	-130.00	-2.916* (.0120)

* Significant, using $\alpha=.05$ in a two-tailed test. Significance level is in brackets.

The fitted model explains that when SEOG is equal to zero the predicted value of enrollment is equal to 32668 students. When SEOG increases by one dollar, the predicted value of enrollment decreases by 130 students. Since this type of grant is awarded to low income students with special needs, it appeared that the federal government is willing to spend more in SEOG when enrollment is down. The negative sign and the slope of SEOG is further discussed in Chapter V .

Table 4.6 illustrates that enrollment increased more in high cost institutions than in low cost institutions, except for one year. And the total aid per undergraduate FTE was higher in high cost institutions. These data might help explain the fact that an increase in federal aid SEOG in these highly selective institutions may not necessarily lead to an increase in enrollment statewide.

Table 4.4 Means and Standard of Deviation of the Variables

	Enroll (Number of students in FTE)	NY Grad (Number of high school graduates)	NY TUIT (in $)	NY Income (in $)	Unemploy (in %)	TAP (in $)	SEOG (in $)
Mean	224,608.93	92,6099	5,725.07	11,455.0	7.26	1,591.73	785.13
SD	11,632.19	77,303	919.44	953.86	1.76	145.71	56.26

Table 4.6 Enrollment, Average Total Cost and Total Financial Aid Per Undergraduate FTE in Independent Colleges and Universities in New York State.

Year	Enrollment in High Cost Institutions	% Change in Enrollment	Enrollment in Low Cost Institutions	% Change in Enrollment	Average Cost: High Cost Institutions	Average Cost: Low Cost Institutions	Total Aid: High Cost Institutions	Total Aid: Low Cost Institutions
1985	98,769	4.4	81,739	-2.8	$13,927	$8,874	$4,753	$3,661
1986	103,142	5.2	79,053	-4.3	$15,168	$9,775	$4,716	$3,929
1987	108,583	-0.6	75,575	3.2	$16,458	$10,322	$4,931	$4,363
1988	78,016	----	78,016	----	----	----	----	----

Note. Sources include New York State Department of Education, Office of Post-Secondary Policy Analysis Higher Education Data System; HEP Higher Education Directory, years 1985, 1986, 1987, and 1988.

Analysis of Hypothesis

Hypothesis 4: The result of R of .62880 from Table 4.7 suggested a fairly moderate positive relationship between enrollment and SEOG. The t-test -2.916 for n-2 degrees of freedon was significant at the .05 level. Therefore the null hypothesis was rejected. It can be concluded that there is a statistically significant relationship between enrollment and Supplemental Educational Opportunity Grants. Furthermore, the omnibus F (p<.012) of 8.5 confirmed that there was a statistically significant relationship between enrollment and SEOG.

A second regression model was constructed with enrollment as the outcome and all the other variables were added as predictors. The results of the fitted model are illustrated in Table 4.8.

Table 4.8 Results of the Second Regression

Variables	Coefficients	T-Test
SEOG	-159	-2.812* (.0228)
Unemploy	-2512	-.838 (.4257)
TAP	-10	-.449 (.6654)
NY Tuit	-.35	-1.639 (.1399)
NY Grads	-.04	-.358 (.7294)
NY Income	28	1.738 (.1205)
Constant	289862	1.824 (.1058)

* Significant using t=.05 in a two-tailed test. Significance levels are reported in brackets.

Table 4.7 Overall *F*-Test of Significance

		Analysis of Variance			
		Sources	DF	Sum of Squares	Mean Square	F-Ratio
Multiple R	.62880					
R Square	.39539	Regression	1	748984663.29	748984663.29	8.5
Standard Error	9386.26	Residual	13	1145324207.64	88101862.13	(.0120)

When the federal government increased SEOG by $1, enrollment decreased by 159 students with all the other dependent variables held constant. The enrollment decreased by 2,512 students when unemployment increased by 1% with all the other predictors held constant. When state aid (TAP) increased by $1, enrollment decreased by 10 students with all the other predictors held constant. And when per capita personal disposable income increased by $1, enrollment in independent colleges and universities increased by 28 students with all the other dependent variables held constant.

Hypothesis Analysis

The multiple R of .79556 in Table 4.9 suggested a fairly strong positive linear relationship between enrollment and the predictors.

Hypothesis 1: A two-tailed t-test with a t value of 1.73 at $\sigma=.05$ was applied. Based on the result the null hypothesis was not rejected. Therefore it cannot be concluded that a statistically significant relationship existed between per capita personal disposable income in New York and enrollment in independent colleges and universities in New York. However, the positive sign of per capita personal disposable income was predicted. It indicated that an increase in per capita personal income would translate into an increase in enrollment in independent colleges and universities.

Hypothesis 2: On the basis of the computed t of 1.64 in absolute value, the null hypothesis was not rejected. Therefore it can be concluded that there existed no statistically significant relationship between enrollment in independent colleges and universities and the average tuition and fees charged by these institutions. It was predicted

Table 4.9 Overall F-Test of Significance

		Analysis of Variance			
		Sources	DF	Sum of Squares	Mean Square	F-Ratio
Multiple R	.79556					
R Square	63292	Regression	6	1198950408.75	199825068.12	2.29
Standard Error	9323.08	Residual	8	695358462.18	86919807.77	(.1369)

that average annual tuition and fees would have a negative influence on enrollment demand. This negative relationship between tuition price and enrollment demand reflects economists' belief in a downward sloping of the demand curve. Therefore, the negative sign was predicted.

However, Siegel and Campbell (1967), in a time series analysis conducted for the entire higher education system, including public and private four-year or more from 1919 to 1964. The variables investigated were enrollment as dependent variable, and average tuition and fees, family median disposable income and number of high school graduates as predictors. They found an R^2 of .87 and a significant F-ratio of 19.701 for family income and tuition as they related to enrollment. They also found that family income was significant at the 5% level, and tuition was significant at 1%. This difference may be due to differences in the number of years analyzed and the different variables taken into consideration in these analyses. Also, the independent colleges and universities in New York could be different from colleges and universities taken country-wide.

Hypothesis 3: Based on the result of t =.449 the null hypothesis was not rejected. Hence, it can be concluded that there existed no statistically significant relationship between change in independent college and university attendance and change in state aid TAP. The negative sign for the coefficient of correlation was not expected. It appeared that the State Tuition Assistance Program followed the negative sign of federal aid SEOG. That is, the state would spend more money on independent colleges and universities when enrollment was down in these institutions.

Hypothesis 5: It was found here a t of .839 in absolute value and a correlation coefficient R of -.2039. In the light of these results, the

null hypothesis was not rejected. It was concluded that there existed no statistically significant relationship between enrollment in independent colleges and universities in New York and the rate of unemployment.

However Lehr and Newton (1978), in a time series analysis, found that unemployment had a positive sign and was significant at the 5% level. It was also explained that "a direct positive relationship suggests that as unemployment increases and work alternatives become more limited, the opportunity cost of college attendance decreases. College enrollment becomes the best option available for more individuals" (pp. 415-16).

Hypothesis 6: The result of the omnibus F showed there was not statistically significant relationship between enrollment outcome and all the independent variables taken together. On the basis of the result the hypothesis was retained. Overall, an omnibus F (p<.1368) was computed for the variables. The F (3.8) failed to confirm that there existed a statistically significant relationship between enrollment outcome and SEOG, TAP, unemployment, tuition and fees, and so forth. Therefore the hypothesis was retained.

However, Lehr and Newton (1978) found R^2 = .9948 and an F-ratio of 19.095. But their dependent variable was freshman enrollment in two-year public, four-year public and four-year private universities in the state of Oregon, and their predictors were average real tuition, mean real per capita income in the state, annual rate of unemployment in the state, the number of 18- to 21-year-olds in the armed forces and the total number of Oregon high school graduates.

Furthermore, Hoenack et al. (1973) conducted a time series study for the University of Minnesota. Included in their model were: ratio of enrollment to eligible high school graduates, tuition and fees, room and

board, and per capita Minnesota real income. These variables were found to be significant at the 1% level. And their research yielded an R^2 of .665 for liberal arts colleges, .477 for technology, .256 for agriculture, and .656 for colleges in general. The R of .79556 found in this research shows greater strength. It appeared that the differences were not in the methodology but in the different variables entered in these equations and the systems investigated.

Section III: Results of the Cross-Sectional Analysis

Data for this section were collected through survey techniques. However, data for tuition and fees, and fall enrollment for 1988 for each institution were collected from the New York State Department of Education. A small questionnaire was developed and mailed to the 78 presidents of four-year independent colleges and universities offering bachelor's degrees or higher in New York. The primary assumptions underlying this analysis were that financial aid, tuition and family income have no significant relationship to enrollment in independent colleges and universities. The analysis sought to confirm or disprove the assumptions in a cross-sectional treatment of data for the year 1988.

First, the researcher examined in simple counts and percentages parts of the data collected in the survey. Items such as frequency distribution and other variables which were helpful to the discussion are here reported.

Table 4.10 showed that only 18% of the administrators surveyed viewed tuition as the most important factor contributing to enrollment decline. On the other hand 39% percent chose less financial aid to be the most important, and 42% chose other or demographic changes. No one viewed less

social activities and distance from the school as the most important contributors to enrollment decline.

Table 4.10 Factors Contributing to Enrollment Decline-Frequency

Names	Frequency	Percent
Tuition	9.0	18.4
Less Financial Aid	19.0	38.8
Less Social Activities	0.0	0.0
Distance from School	0.0	0.0
Other	21.0	42.9
Total Responses	49.0	100.0

Table 4.11 Long-range Plan to Raise Additional Income Frequency

Name	Count	Percent of Responses
Tuition Increase	36	36.7
More Federal Aid	12	12.2
More State Aid	14	14.3
More Private Contributions	28	28.6
Other	8	8.2
Total Responses	98	100.0

Note. Rev 1 = tuition increase; Rev 2 = more federal aid; Rev 3 = more state aid; Rev 4 = more private contributions; Rev 5 = other.

For raising additional revenues, 37% of the administrators surveyed considered an increase in tuition rate to be the most important,   12% ascertained that obtaining more federal aid was the most important, 14% chose more state aid, and 28% chose private contributions. Only 8% stated that other such as increase in enrollment, fundraising campaigns, research funding, and so forth. The above table showed that most administrators were dependent upon tuition increase and private contributions to raise additional income.

Table 4.12   Enrollment Projection Frequency

Value	Frequency	Valid Percent
Decrease enrollment	3	6.1
Maintain enrollment	25	51.0
Increase enrollment	21	42.0
Total	49	100.0

Only 6.1% of the administrators reported that they expected a decline in their enrollment, 51% expected that the current level of enrollment would be maintained, and 42.0% anticipated an increase in their enrollment. Among the programs, strategies they intended to put forth were: aggressive marketing and recruiting programs, maintain the institution's reputation, clarify the mission statement, establishment of new programs, campus extension, growth in research graduates, foreign students, improved retention, increased marketing among the non-traditional students, and so forth.

Results of Cross-Sectional Analysis

Data for this section were collected through survey techniques. A small questionnaire was developed and mailed to the presidents of four-year independent colleges and universities in New York state. The primary assumptions underlying this analysis were that financial aid, tuition and family income have no significant relationship to enrollment in independent colleges and universities. The analysis sought to confirm or disprove that assumption in a cross sectional treatment of data for the year 1988.

The analysis of the data was examined in three steps. First, the variables were defined. Second, correlation coefficients of all pairs of

variables were reviewed, and regression analyses were computed to determine which variables indicated significant relationships to the outcome variable enrollment. Finally, analyses of variances were computed to isolate specific effects on enrollment outcomes. Variables featured in the analysis were as follows:

Enroll: Enrollment in four-year independent colleges and universities in New York state for 1988 is a discrete variable

Tuition: Average tuition and fees in independent colleges and universities in New York in 1988 is a continuous variable

Tuit 1990: Tuition and fees in four-year independent colleges and universities in New York in 1990 is a continuous variable

TuitNext: Average rate of tuition increase for the next five years is a continuous variable

Finaid 1: The amount of institutional grants received is a continuous variable

Finaid 2: The amount of federal aid is a continuous variable

Finaid 3: The amount of state aid is a continuous variable

Finaid 4: The amount of local aid is a continuous variable

Finaid 5: The amount of other financial aid

Finaid: The amount of total financial aid

Faminc: Average family income is a continuous variable

Faminc 1: Average family income is a continuous variable

Faminc 2: Average family income of $25,000-$35,000 is a continuous variable

Faminc 3: Average family income of $35,000-$45,000 is a continuous variable

Faminc 4: Average family income of $45,000-$55,000 is a continuous variable

Faminc 5: Average family income above $55,000 is a continuous variable

As shown in Table 4.13, all the variables but tuition and financial aid showed some homogeneity and strength.

Hypothesis Analysis

Using enrollment as outcome and total financial aid as predictor, the fitted model for the stepwise regression actually yielded the results illustrated in Table 4.14.

Table 4.14 Regression Results

Variables	Coefficients	T-Tests
Finaid	.1505	3.645* (.0007)
Constant	1223	2.766* (.008)

* Significant at α=.05. Significance levels are reported in brackets.

The fitted model explains that: when Finaid is equal to zero, the predicted value of y enrollment is equal to 1223. When Finaid increases by 1 unit, the predicted value of enrollment increases by 15% of a unit. This is to say that if financial aid per student was increased by $100, the enrollment would be increased by 15 students. The positive sign of

Table 4.13 Means and Standard Deviation of the Variables

Variables	Enroll	Tuit 88	Tuit 90	TuitNext	Finaid 1	Finaid 2	Finaid 3	Finaid 4	Finaid 5	Finaid
Means	2119.0	7300	7.99	6.53	2631.7	2774.5	17,639	1.6	471.8	7,642
SD	2686	2259.39	1.6	2.2	3452.3	4782.1	3572.1	8.8	1358.1	10,462

financial aid was predicted by the research. When financial aid is increased the enrollment is also increased.

Hypothesis 3 & 4: There is no significant relationship between attendance at independent colleges and universities and financial aid.

The multiple R of .46942 in Table 4.15 showed that there existed a very weak positive relationship between enrollment and financial aid. The result of the t-test at $\alpha=.05$ revealed that the computed value t of 3.647 is significant. And a significant overall F (p<.001) of 13.28 was found. On the basis of these results, it can be concluded that there existed a statistically significant relationship between enrollment and financial aid. Thus the null hypothesis was rejected.

Hypothesis Analysis

A second stepwise regression model was constructed using enrollment as outcome, and financial aid and family income 5 as predictors. The fitted model gave the results illustrated in Table 4.16.

Table 4.16   Regression Results

Variables	Coefficients	T-Tests
Finaid	.15	3.909* (.0003)
Faminc5	2,001	1.96* (.0558)
Constant	932	2.053*

* Significant using $t=.05$ in a two-tailed test. Significance levels are reported in brackets.

Table 4.15 The Overall *F* Significance

Analysis of Variance

Sources	DF	Sum of Squares	Mean Square	F-Ratio
Regression	1	76648780.28	76648780.28	13.28
Residual	47	271187275.11	5769942.02	(.0007)

Multiple R	.46942
R Square	.22036
Standard Error	2402.07

It was shown that enrollment is increased by 15 students when financial aid increases by $100 and family income is held constant. Enrollment is increased by 2,001 students when high family income is increased by $1 and financial aid is held constant. All the variables are significant at the .05 level of confidence. This indicated that there was a statistically significant relationship between financial aid and enrollment, and between high family income and enrollment. The result is different from that found for SEOG because the latter is a special type of aid awarded to students who demonstrate extra financial need.

Hypothesis 1: There is no significant relationship between attendance at independent colleges and universities and family income.

The multiple R of .52968 in Table 4.17 indicated a fairly moderate relationship between enrollment and the predictors financial aid and family income 5. The computed t of 1.96 is statistically significant at $\alpha=.05$. It can be concluded that there existed a statistically significant relationship between enrollment and high family income. And a significant overall F (p<.001) of 8.9 confirmed that there is a relationship between enrollment in independent colleges and universities and high family income. Therefore the null hypothesis was rejected.

A third stepwise regression model was formed with enrollment as outcome and financial aid, family income 5 and tuition as predictors. The results of the fitted model are illustrated in Table 4.18.

Table 4.17 Overall *F* Significance

Analysis of Variance

		Sources	DF	Sum of Squares	Mean Square	F-Ratio
Multiple R	.520527					
R Square	.28056	Regression	2	97588795.85	48794397.93	8.97
Standard Error	2332.41	Residual	46	250247259.53	5440157.82	(.0005)

Table 4.18 Results of Regression

Variables	Coefficients	T-Tests
Finaid	.17	4292* (.001)
Faminc5	2935	2.598* (.0126)
Tuition	-.29	-1.762 (.0849)
Constant	2837.5	2.427*

* Significant using $t=.05$ in a two-tailed test. Levels of significance are reported in brackets.

Hypothesis 2: There is no significant relationship between private college and university attendance and tuition.

The signs of the equation indicated that more financial aid and high family income increased enrollment. But tuition has a negative influence on enrollment. That is to say that high tuition decreased enrollment. However, tuition has no statistically significant relationship with enrollment. Tuition in this case was not a good predictor of enrollment.

On the basis of the results the null hypothesis was not rejected. Therefore it can be concluded that there is no statistically significant relationship between enrollment and tuition. Accordingly, Strickland et al. (1984) found that tuition was not significant also at $\alpha=.05$ in their cross-sectional study.

However, Knudsen and Servelle (1978) found in a cross-sectional study that tuition was statistically significant at the .05 level in private institutions with moderate selectivity, was also significant at the .01 level in private institutions of moderate selectivity with public

Table 4.19 Overall *F*-Ratio

Multiple R	.57181
R Square	.32697
Standard Error	2280.86

Analysis of Variance

Sources	DF	Sum of Squares	Mean Square	F-Ratio
Regression	3	113731956.65	37910652.22	7.29
Residual	45	234104098.74	5202313.31	(.0005)

competitors of the same selectivity within 50 miles, and was not statistically significant in private institutions of moderate selectivity with private competitors of the same selectivity within 50 miles. Included in their equation were first-time enrollment, tuition and fees at private institutions, tuition and fees minus aid per student, state personal income per capita, average tuition and fees of competing public institutions located within 50 miles of private schools' campuses, average tuition and fees minus aid per student of competing public institutions, average tuition and fees of competing private institutions located within 50 miles of private schools' campuses, and average tuition and fees minus aid per student of competing private institutions. Their R^2 or coefficient of determination were .1568 and .1332 for private institutions of moderate selectivity, .4811 and .3838 for private institutions of moderate selectivity with public competitors of the same selectivity, and .2475 and .2341 for private institutions of moderate selectivity with private competitors of the same selectivity within 50 miles. The results are different here because different variables were used and the institutions were clustered in different categories.

A fourth regression model was presented with enrollment as outcome and family income 5, financial aid, family income 2, family income 4, tuition, and family income 3 as predictors. The results of the fitted model are illustrated in Table 4.20.

Table 4.20 Results of Regression

Variable	Coefficient	T-Test
Faminc5	3008	2.097* (.0420)
Finaid	.17	4.254* (.0001)
Faminc2	-40.7	-.033 (-.9739)
Faminc4	-584.99	-.498 (.6211)
Tuition	-.306	-1.725 (.0919)
Faminc3	538.77	.479 (.6347)
Constant	2888.5	1.869

Only Faminc5 and Finaid are significant at the .05 level. Faminc2 and Faminc4 showed negative coefficients which denoted a negative relationship between Faminc2, Faminc4, and tuition and enrollment. However, Faminc3 presented a positive coefficient. It appeared that a rise in personal income between $25,000-$35,000 and $45,000-$55,000 would decrease the amount of financial aid for which students are eligible. Thus this would lead students in these income brackets to choose public institutions over private institutions. However, the Faminc3 coefficient was positive. This indicated that students in the bracket of $35,000-$45,000 would choose private institutions when the personal disposable per capita income increased.

Hypothesis 6: The predictors (financial aid, high family income, low family income and tuition), taken together, are significant variables in determining enrollment.

The multiple R of .59246 in Table 4.21 showed a fairly moderate positive relationship between the enrollment outcome and high family income, low family income, financial aid and tuition. The computed F is very significant at the .05 level. Therefore, the hypothesis was rejected. It can be concluded that there is a statistically significant relationship between attendance at independent colleges and universities and family income, tuition and financial aid, taken together. Even when the different types of financial aids were added, the omnibus F was still significant. That is to say that in the presence of state and federal aid packages and local aids, tuition and fees are reduced and even low income students will find it cheap to attend independent colleges and universities.

A fifth regression model was computed with enrollment as outcome and Family income 5, Family income 6, total financial aid and tuition as predictors. The results are illustrated in Table 4.22. When family income was divided into three groups the results of the regression were slightly different. High family income (Faminc5) was statistically significant and positively related to enrollment. But the middle family income (Faminc6) was not statistically significant but was positively related to enrollment. The total financial aid was statistically significant and positively related to enrollment. And tuition was not statistically significant and was negatively related to enrollment. The multiple R of .57183 showed a fairly moderate positive relationship between the enrollment outcome and high family income, middle family income, financial aid and tuition. The computed F ($p<.0013$) of 5.34 was very significant at the .05 level. It can be concluded that there exists a statistically significant relationship between attendance at independent

Table 4.21 Overall *F*-Ratio

Multiple R	.59246
R Square	.35101
Standard Error	2318.37

Analysis of Variance

Sources	DF	Sum of Squares	Mean Square	F-Ratio
Regression	6	122092876.56	20348812.76	3.79
Residual	42	225743178.83	5374837.59	(.0042)

colleges and universities and family income, financial aid and tuition, taken together. Here again the null hypothesis 6 was not retained.

Table 4.22 Results of Regression in Combining Faminc2, Faminc3 and Faminc4 into Faminc6

Variable	Coefficient	T-test
Faminc6	40.37	.039 (.9688)
Finaid	.17	4.186* (.0001)
Tuition	-.29	11.736 (.0895)
Faminc5	2968.90	2.094* (.0421)
Constant	2801.85	1.879 (.0669)

* Significant using α=.05. Significance levels are reported in brackets. Faminc1: low family income from $0 to $25,000; Faminc6: middle family income from $25,000 to $55,000 (Faminc2, Faminc3, and Faminc4 combined); Faminc5: high family income above $55,000.

A series of stepwise regression analyses were constructed at this point to verify the effects of different financial aids, different family income brackets, and tuition on enrollment. The results are presented in Table 4.23.

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Table 4.23 Results of Regression Analyses

Equation	Variables	Coeffi-cients	T-Tests	R^2	F-Ratio
Step 1 Regression Analysis	Finaid2	.367046	4.126* (.0006)	26588	*17.0 (1,47)
	Constant	1374.77	3.495*		(.0001)
Step 2 Regression Analysis	Finaid2	.395994	4.613* (.0000)	.34469	*12.09 (2,46)
	Faminc5	2305.54	2.352* (.0230)		(.0001)
	Constant	1024.33	2.535*		
Step 3 Regression Analysis	Finaid2	.221809	1.826	.39674	*9.86 (3,45)
	Faminc5	2504.2	2.619*		
	Finaid3	.451275	1.970*		(.0001)
	Constant	803.158	1.970*		
Step 4 Regression Analysis	Finaid2	.208734	1.72	.42015	*7.97 (4,44)
	Faminc5	3158.65	2.958*		
	Finaid3	.495170	2.158*		(.0001)
	Tuition	-.203943	-1.333		
	Constant	2183.18	1.964*		
Blockwise Regression Analysis	Faminc5	2755.80	1.92 (.0619)	.45235	*3.13875 (10)
	Finaid5	-.175314	-.671 (.5061)		
	Finaid4	-25.40	-.670 (.5067)		
	Finaid1	-.09	-.580 (.5655)		
	Faminc2	-965.67	-.739 (.4642)		
	Faminc4	-701.09	-.892 (.3779)		
	Tuition	-.17	1.858 (.0710)		
	Finaid3	.47	-.033 (.9737)		
	Finaid2	-39.48	1.998* (.0529)		
	Constant	.30	1.490		

* Significant using t=.05 in a two-tailed test. Significance levels are reported in brackets. Finaid1 = institutional grants, continuous variable; Finaid2 = federal financial aid, continuous variable; Finaid3 = state aid, continuous variable; Finaid4 = local aid, continuous variable; Finaid5 = other aid, continuous variable.

On the one hand, federal aid (Finaid2) was significant in the equations I, II and V, and was not significant in the equations III and IV. It appeared that federal aid was a good predictor of enrollment when it was considered without tuition and state aid. On the other hand, state aid was significant in the equations III and IV. This might be due to the fact that state aid is mostly given as indirect aid to bring down tuition and to increase students' ability to finance higher education. Therefore, when taken along with tuition and high family income, this type of aid had a greater impact on enrollment than the federal aid. However, when all the variables and the various types of aids were taken into consideration, the federal aid as equalizer had a greater impact on enrollment. And the F-ratio showed that there existed an overall significant relationship between these variables and enrollment. Furthermore, the negative signs for institutional grants, local aid, and others indicated that these types of aids increased when enrollment went down. That is to say that these aids were awarded when state enrollment in independent institutions decreased.

Summary

The purpose of this chapter was to analyze and report the data collected. The methodology of the research and the characteristics of the sample were discussed.

The discussion concerning attrition rates, enrollment, and the results related to quantitative measures revealed that attrition rates and enrollment were greater among freshmen. The tuition and fees grew faster than CPI-U and family income. And the tuition ratio of these independent colleges and universities to SUNY and CUNY were very large.

Multiple regression analyses were constructed to investigate the relationship between the variables in a time series treatment. The Pearson Correlations revealed positive linear relationships between enrollment and the federal aid SEOG. However, the sign of the slope for SEOG is negative. This is not what was predicted. The sign and the slope for SEOG is discussed in Chapter V. A one-way factor ANOVA was used to determine the level of significance of SEOG in determining enrollment. The one-way ANOVA provided data necessary to reject the null hypothesis that there was no relationship. The probability value for relationship did show statistical significance. However, adding the other variables showed no statistically significant relationship between enrollment and the other predictors. And the ANOVA failed to provide the data necessary to reject the null hypothesis.

In the cross-sectional analysis the descriptive data yielded the important information that demographic factors were responsible for 44.7% of enrollment decline, and less financial aid for 40.4. The decision to raise additional revenues among the administrators of those independent colleges and universities rested heavily on tuition followed by private contributions. The results of the enrollment projection inquiry showed that 51.0% of the administrators expected to maintain their enrollment. And 42.0% intended to increase their enrollment mostly through aggressive marketing and recruiting programs and the establishment of new academic programs. The Pearson Correlations supported the hypothetical notion that there is a significant relationship between financial aid and enrollment. But no relationship was shown between enrollment, tuition and low family income. However, the t-tests were significant for Financial aid and Family income 5. The probability values did show statistical significant

for these two variables. The ANOVA confirmed that there was statistical significance in overall effect of Financial Aid and Faminc5 on enrollment outcome. The addition of the other variables, tuition and low family income series, it has shown that the effect of Family income 2, Family income 3 and Family income 4 were not statistically significant. The probability value, however, was significant. The negative signs for tuition and the low family incomes were predicted. This is to say higher tuition led to a decline in enrollment, and low family income also translated into a decrease in enrollment in private colleges and universities.

When the five components of total aid were taken separately, it was shown that state and federal aids were statistically significant and positively related to the enrollment variable. Whereas institutional grants, local aids and other forms of aids were not significant and were negatively related to enrollment.

The following chapter contains a summary of the study. Conclusions based on major findings, implications and suggestions for further study are also presented.

CHAPTER V

SUMMARY, CONCLUSIONS, REFLECTIONS AND RECOMMENDATIONS

Introduction

The primary purpose of this study was to investigate the factors which impacted on enrollment at independent institutions of higher learning in New York. This chapter includes a summary of the study and the results of the findings. Conclusions, reflections and recommendations for future research are made, based on these findings as they apply to the research questions and hypotheses.

Summary

An introduction to and overview of the study was presented in Chapter I. Included in the first chapter were a statement of the problem, the purpose of the study, definitions of terms, and supporting comments about the need for the study. The design of the study was outlined, research questions were presented, hypotheses were stated, and limitations and assumptions of the study were defined.

The second chapter contained a review of the literature relevant to the purpose of the study. In preparation for the study, an extensive literature search was undertaken. The search was narrowed to focus on the impact of tuition, financial aid, family income and unemployment rate in New York state.

The review of literature has given scant attention to the market and non-market forces which play major roles in determining undergraduate enrollment in New York state. Included in this literature search were: demand for higher education, measure of demand and empirical formulation, college enrollment, tuition and pricing in higher education, financial

aids and family disposable income and unemployment. Another segment of the literature review dealt with private higher education in New York. The items surveyed in this section included enrollment patterns in New York, the schemes of independent institutions' finances, and the state student aid programs.

A description of the research methodology and the design of the study were presented in Chapter III. Included in the chapter was collection of data collection through the data base of the New York State Department of Education, and through the administration of a written questionnaire. The population consisted of 141 private colleges and universities in New York. The convenient sample included 78 independent colleges and universities in New York offering four-year degrees or higher. The respondents were presidents or those administrators who held positions at the executive level, and those who assisted those presidents. Of the 78 questionnaires mailed, 66 responses were received (84.2% of the population). Fifty completed and usable instruments were returned (64.1% of the population). However, 49 usable questionnaires were used because the enrollment range was too low in one institution.

Chapter IV presented the data collected from the New York State Department of Education, and the tabulated data collected from the questionnaires. Included in this chapter was an analysis of data for the purpose of hypothesis testing.

The multiple regression techniques were used. And the particular statistical model was the ordinary least-square multiple regression. This technique is tantamount in determining the relationship which exists between the dependent variable, or criterion, and the independent variables or predictors.

The hypotheses were tested by using *t*-tests and overall *F*-ratio. The computer program used to tabulate the scores was the Statistical Package for Social Sciences (SPSS-X) on the Michigan State University IBM mainframe computer.

Major Findings and Discussions

The findings of the data analysis that were presented in Chapter IV are discussed here in two parts. Part One is a discussion of the *t*-tests and the omnibus *F* that were applied to the research hypotheses as they relate to the time series analysis. Part Two focuses on the discussion of the *t*-tests and the *F*-ratio as they apply to the cross-sectional treatment. Furthermore, the research questions are restated, and the findings from the data pertinent to the questions are discussed for each part.

Discussion of the Findings for the Time Series Analysis

Specific results are here reported under headings of each research question explored. The significant level for every test was set at the .05 level.

Question 1: Is per capita personal disposable income a significant variable in determining attendance in independent colleges and universities?

A *t*-test and overall *F*-ratio indicated that in independent colleges and universities there was no statistically significant relationship between enrollment and per capita disposable income at the .05 level. The test data failed to reject the null hypothesis. On the basis of the results, per capita personal disposable income appeared not to be a significant variable in determining enrollment in independent colleges and universities. When examining these results, it is important to remember

that the analysis was done on a 15-year span. The per capita personal income was an average income. No difference was made for families with low, middle or high income. Family income was the primary determinant of resources available to finance an education. The positive relationship found in the study between enrollment and per capita disposable income indicated that enrollment increased as per capita income increased.

Here, per capita personal disposable income appeared not to be a significant variable in determining enrollment in independent colleges and universities. The null hypothesis was retained. The positive relationship found between enrollment and per capita income in the study is consistent with the results of the research conducted by Siegel and Campbell (1967). However, it is asserted in the literature that family income was the primary determinant of resources available to finance an education. Moreover, the results are refuted by Siegel and Campbell (1967), Lehr and Newton (1979) and Hoenack et al. (1973) who found that per capita disposable income and median family income were significant at the .05 level. This difference may be due to the different variables entered in those equations and the limitation of this study with regard to the number of years under investigation.

<u>Question 2</u>: Are tuition and fees significant variables in the determination of enrollment in independent colleges and universities in New York?

The tests results indicated that there was no statistically significant relationship (at the .05 level) between enrollment at independent colleges and universities and average tuition and fees. On the basis of the results, the null hypothesis was retained. Thus, tuition and fees were viewed here as not being significant variables in the determination

of enrollment. The review of literature in this respect suggested that reduced tuition and board costs are considered as minor levels in terms of increasing the enrollment. And this is due to the fact that the principal costs of college attendance are not tuition and fees but the income lost from possible employment, or foregone income (Carnevale, 1983, p. 14). There is also strong evidence and clear indication in the literature that, in the eighties and nineties, a combination of substantial cost reduction with aggressive student marketing will attract some students especially in a recession, during periods of labor surplus. A good rule of thumb showing the trade-off between tuition and enrollment was that a 10% cut in tuition would increase enrollment by 1% (Carnevale, 1983). The negative relationship between tuition and attendance was confirmed by all the research surveyed in this study. On the increase side of tuition the argument is presented differently. Because tuition rates grew faster than inflation rates over the past decade, it is said that there is a perception by many families that education costs are rising faster than their ability to meet those costs. And as the public versus private college tuition gap widens, there is indication in the literature that high income students are attracted to public institutions as evidenced by a distinct drop-off in terms of percentage of representation of upper middle-income students in private higher education (McPherson, 1979, p. 265). It was found in the data of this research that changes from year to year in tuition were higher in independent colleges and universities than the changes in CUNY and SUNY. From 1976 to 1989, the tuition rates went from 3.8:1 to 6.4:1 for SUNY and 3.6:1 to 7.9:1 for CUNY. In that setting Bishop and VanDyk (1977) argued that the divergence in growth between public and private colleges and universities has been contributed by the

large disparity in tuition charged by private and public colleges and universities. In other words, this disparity in tuition, as viewed in the review of related literature, has given institutions in the public sector an overwhelming competitive edge in attracting and retaining students. This is an indication that private colleges and universities can lose students to public institutions if those private institutions fix their tuition levels too high. This is consistent with the substitution effect and the new discouragement effect purported by Hopkins (1974). That is, when tuition is increased at one type of college, some students may choose simply to enroll in a different type of college (substitution effect), while others may decide against enrollment altogether (net discouragement effect). However, the results of this study were different from the findings of Siegel and Campbell (1967) who found that tuition was significant at the 1% level for the entire United States system of higher education. Lehr and Newton (1978) found that tuition was statistically significant at the 5% level in the state of Oregon for fall enrollment of all freshmen in the state. The test data rejected the null hypotheses.

Question 3: Does federal aid SEOG make an significant impact on attendance in independent colleges and universities in New York?

The results of this study showed that there was a statistically significant relationship between enrollment in independent colleges and universities and federal aid SEOG. The test data rejected the null hypotheses. The results indicated that SEOG makes a significant impact in determining enrollment in independent colleges and universities.

It is documented in the literature that college matriculants attending public and private four-year colleges and universities typically rely on a mixed financial aid package. It is suggested in the literature that the

federal government for the past 20 years has been by far the largest source of direct aid to help students meet their costs of attendance. However, the negative sign of the relationship between federal aid SEOG and enrollment was not expected. At this point it is deemed necessary to mention that the largest mission of federal aid is to equalize college opportunities regardless of individual economic or social origin (Gladieux, 1986). The Supplemental Educational Opportunity Grant (SEOG) is awarded to undergraduate students with exceptional need. However, there is no guarantee that every eligible student will be able to receive an SEOG (U. S. Department of Education, 1991, p. 25). The Panel on Student Financial Need Analysis, formed by the U. S. Department of Education, conducted its own survey of student aid at a sizeable sample of colleges and universities, and found that the amount of aid provided did not tend to vary with family need. In part, this finding reflected the fact that larger total amounts of student aid funds were available at institutions that were characterized by high selectivity and high tuition rates. Family income of students attending these institutions tended to be higher than that of students attending low cost public institutions, and yet the amount of student aid awarded in these institutions tended to be high. In addition, it was discovered that in about half the institutions, large financial need significantly reduced the probability of admission by the institution even when quantifiable indicators of ability were used as controls. It was further found that although packaging practice varied considerably, high ability was often associated with a high grant component. Moreover, it was revealed that high financial need was weakly associated with increases in grant-share of the aid package and sometimes negatively correlated with the grant-share. Similar criticisms

were made by the Panel on Financing Low-Income and Minority Students in Higher Education. The recommendation was made that the SEOG program should be restructured to cover only instructional costs and to meet the needs of low- and middle-income students attending moderately and high priced institutions. It was also recommended that funds available for the program should gradually be reduced from $240 million to about $100 million (_Federal Role in Post-Secondary Education_, pp. 30-31). One should remember that the grant is distributed on the individual basis and the analysis was done statewide. Due to the fact that the larger amount of this grant is awarded to low- and middle-income students attending high selectivity and high tuition institutions, the needy students attending certain private colleges and universities where funds were not available might find low cost public colleges and universities more attractive. Therefore, an increase in the amount of SEOG in these selective private institutions might not prevent a decrease in enrollment statewide in the private colleges and universities. Therefore an increase in the amount of SEOG in the selective private institutions might be translated into a decrease in enrollment statewide in private colleges and universities. The null hypothesis was not retained.

Question 4: Does state aid (TAP) constitute a significant variable in determining attendance in independent colleges and universities?

The results of the tests showed that there was no statistically significant relationship between enrollment in independent colleges and universities and state aid TAP. On the basis of these results the null hypothesis was not rejected. Therefore, it can be concluded that state aid does not constitute a significant variable in determining attendance in independent colleges and universities. The negative sign of TAP

suggested a negative correlation between TAP and enrollment. That is to say that the government would distribute more grant money to private colleges and universities when enrollment decreased. The review of literature indicated that the state government in the American system probably always will be the largest source of indirect aid to students in the form of subsidized low tuition. This is viewed as an irony that New York, the nation's second most popular state, is ranked fifth in proportion of the population enrolled within the state and has one of the highest net export rates to other states. This is due to the fact that the government abandonment of social programs is putting an unprecedented burden on private gifts that would support institutions of higher learning (Wharton, 1983). The hypothesis was retained.

Question 5: Is unemployment rate a significant variable in determining attendance in independent colleges and universities?

There was no statistically significant relationship between attendance at independent colleges and universities and the rate of unemployment (at the .05 level). The test data failed to reject the null hypotheses. The results indicated that unemployment is not a statistically significant variable in determining enrollment in independent colleges and universities. The negative sign of the relationship indicated a negative correlation between enrollment and unemployment. It explicated that when unemployment increased, enrollment in private colleges and universities decreased. However, Newton and Lehr (1978) found that unemployment was positively related to enrollment when public higher institutions were taken into consideration. The hypothesis was retained.

<u>Question 6</u>: Are the predictors (SEOG, unemployment, TAP, tuition, and New York income) significant variables in determining enrollment at independent colleges and universities when taken together?

There was no statistically significant relationship between enrollment and all the other predictors taken together. The test data failed to reject the hypothesis. Therefore it follows that these dependent variables taken together are not significant in determining enrollment in independent colleges and universities. However, Siegel and Campbell (1967) found a significant F for tuition and median family income. But the analysis was applied on data for 46 years. And their research included data for the total United States higher education system. Therefore, independent colleges and universities in New York may yield different results.

Discussion of the Findings from the Cross-Sectional Analysis

The cross-sectional analysis showed improvement over the time series analysis. The Pearson correlation, t-tests and omnibus F-tests are fairly consistent with other studies surveyed in the review of literature. Again, the significance level for every test was set at the .05 level.

<u>Question 1</u>: The results of the tests showed that there was at the .05 level a statistically significant relationship between enrollment at independent colleges and universities and high family income (Faminc5, above $55,000). The null hypothesis was rejected. High family income is viewed as a significant variable in determining enrollment in private colleges and universities. The positive correlation was predicted. However, low family income was not significant. But family income between $25,000-$35,000 and $45,000-$55,000 are negatively related to enrollment,

while family income between \$35,000-\$55,000 are positively related. The higher the family income, the more enrollment in independent colleges and universities increases. And the lower the family income, the more enrollment in independent colleges and universities decreases. However, when family income between \$35,000-\$45,000 increases, enrollment in private colleges and universities increases also. This rejects the theoretical notion that there is a drop-off in percentage terms in representation of upper middle-income students in private higher education due to the tuition gap between private and public institutions. It can be argued here that low- to middle-income students may find private institutions cheaper than public institutions because of the differences in financial aid. But the lower the family income, the less likely students would choose private colleges and universities (Knudsen & Servelle, 1978).

Question 2: The omnibus F showed an overall significant relationship between the enrollment outcome and the predictors family income 5, financial aid and tuition. But the individual t-test indicated that there was no statistically significant relationship between attendance at independent colleges and universities and tuition. Therefore the null hypothesis cannot be rejected. It can be concluded that tuition was not a significant variable in determining enrollment in private colleges and universities.

However, when taken alone, tuition was statistically significant in determining enrollment in private colleges and universities. This explicates in the absence of financial aid to reduce the educational costs tuition constitutes a significant factor in the determination of enroll-ment. But the per dollar effect of tuition is larger than any other cost

for low- to middle-income students (Bishop, 1977). Tuition, in fact, does not stand out here as an effective tool to attract students. This is consistent with the statement that a combination of substantial cost reduction with aggressive marketing is required to attract students (Knudsen & Servelle, 1978). Among the administrators surveyed in this study, 37% affirmed that a tuition increase is the most important factor in the long term to raise additional income, 12% ascertained more federal aid, 14% more state aid, and 28% chose more private contributions. This means that the administrators in these independent colleges and universities will continue to view tuition as the main source of income. The findings of this study seem to indicate that tuition will continue to increase to keep pace with the inflation rate. However, Yanikoski and Wilson (1984) ascertain that "if a university raises its general undergraduate tuition rates either above its current rates or significantly above the rate of its competitors, it risks inducing an unevenly distributed depression of enrollment."

Question 3: The result of the data showed that there existed a statistically significant relationship between enrollment and total financial aid. And there was a statistically significant relationship between federal aid and enrollment in independent colleges and universities. Thus the null hypothesis was rejected. When all federal aids are considered as a package without including state aid , the former is a significant variable in determining enrollment in private colleges and universities. However, when state aid was entered in the equation, federal aid was no longer significant.

Question 4: The tests of the data indicated that state aid was significant at the .05 level in determining enrollment in private colleges

and universities. The null hypothesis was rejected. It can be concluded that state aid constitutes a significant variable in determining enrollment in independent colleges and universities. When used as a package, state and federal aids had a greater impact on enrollment. The argument is put forth that institutions which provide student aid are more likely to attract students than their counterparts equally expensive providing no such aids (Bishop & VanDyk, 1977). It appeared on the basis of the result that financial aids stand out as a more effective tool than tuition to attract students.

Question 6: Are the predictors (tuition, family income, financial aid), taken together, significant variables in determining enrollment?

The test results showed that there existed a statistically significant relationship between attendance at independent colleges and universities and the dependent variables. On the basis of the results the hypotheses were not retained. Therefore it can be concluded that tuition, family income and financial aid, taken together, are significant variables in determining attendance at independent colleges and universities.

When all the variables were added, the multiple R became .59246. And when considering the results, it would be well to remember that these data were collected at the institutional levels, not on an individual basis. The results of this study are supported by the research conducted by Knudsen and Servelle (1978) that showed a significant relationship between tuition and enrollment is the only predictor. The Pearson correlation of this study is consistent with the Pearson correlation of R^2 of .1568, .4811 and .2475 discovered by Knudsen and Serville. The nature of the cross-sectional data provided significant differences to the longitudinal data. And this is in keeping with the research of Strickland et al.

(1984) stating that cross-sectional studies are generally preferred over longitudinal and time series studies because the latter tend to result in · a confounding of supply and demand determinants. The enrollment capacity of institutions changes over time, producing multiple supply curves and underidentification of model equations" (p. 36). This causes one to view the findings of the time series with reservation. The amount of data print in this study is believed to be a severe limitation in evaluating the variables.

Additional Findings

The additional findings are based on some transformation applied on the time series data, and on 49 completed and usable responses (62.8% of the population) from presidents at independent colleges and universities in New York.

The rate of attrition was higher among the freshmen. This is in keeping with the review of relevant literature because it was said that freshman enrollment is more sensitive to change in relative cost-benefits than was total enrollment.

The changes in tuition rates for independent colleges and universities increased faster than the consumer price index and family median income. And from 1977 to 1989 the tuition ratio grew from 3.86:1 to 6.4:1 for SUNY, and 3.6:1 to 7.09:1 for CUNY.

From the usable questionnaires, nine presidents (18.4%) indicated that tuition was the most important factor contributing to enrollment decline, 19 presidents (38.8%) believed that less financial aid was the most important factor contributing to enrollment decline. Twenty-one presidents (42.9%) indicated that demographic factors were the most

important factors contributing to enrollment decline. Three presidents (6.1%) indicated that they expected a decrease in their enrollment. Twenty-five presidents (51.0%) indicated that they expected to maintain their enrollment. Twenty-one presidents (42.0%) indicated that they expected to increase their enrollment.

Eighteen presidents (36.7%) indicated that tuition increase will be the main source of raising additional revenue. Six presidents (12.2%) indicated that receiving more federal aid will be the main source of additional income. Seven presidents (14.2%) indicated that more state aid will be the main source of additional income. Fourteen presidents (28.6%) indicated that more private contributions will be the main source for additional revenue. Four presidents (8.2%) indicated that increase in enrollment, fundraising campaigns, research funding, and so forth.

Conclusion

In correspondence with the variables which have impacted on enrollment in independent colleges and universities, the following conclusions can be drawn.

1. The findings of the study indicated that family income was positively related to enrollment at independent colleges and universities. At the highest level of income family income was statistically significant.

2. The findings of this study concerning the impact of financial aid on enrollment indicated that if the total aid is combined in a package, it makes a significant and positive impact on enrollment at independent colleges and universities. And financial aid is viewed as more significant than tuition in determining enrollment in independent colleges and universities.

3. When taken in conjunction with other variables such as financial aid and family income, tuition is not statistically significant in determining enrollment at independent colleges and universities. However, when taken alone, tuition is statistically significant. That is to say that independent colleges and universities which provide financial aid are more likely able to attract students than their counterparts which do not provide such aids. This is due to the fact that financial aid reduces the costs of higher education to the student.

4. Overall, it can be concluded that high attrition rates among freshmen and juniors were viewed as contributing factors to enrollment decline in independent colleges and universities. The factors responsible for attrition in independent colleges and universities in New York were identified as being: less financial aid, tuition increases, lack of academic programs for traditional and non-traditional students, and lack of facilities and dormitories. The decline in the traditional student cohort is perceived as being largely responsible for the decline in enrollment in independent colleges and universities. Family income is viewed as the primary factor in determining enrollment in private colleges and universities, not in public colleges and universities. It appeared that high income and low- to middle-income students respond more positively to enrollment in independent institutions. The tuition in these institutions should remain at the competitive level to their public counterparts. However, those private colleges and universities can utilize differential pricing in using different tuition levels for different colleges and programs. More state aid is needed to help those private institutions reduce their tuition and more federal aid is needed in these institutions to equalize education and to attract more minority

and low-income students. Unemployment has a negative impact on private colleges and universities. The results of the cross-sectional study appeared to be more reliable.

Implications and Recommendations

Arbeiter (1985) found that a disproportional share of the decline in enrollment was attributed to public and private institutions. A projection made for high school graduates from 1979-1995 indicated that the United States would witness an 18% decline by 1991 and a 22% decline by 1995. However, the Northeast region will absorb a 40% decline in public high school graduates by 1994, Rhode Island 49%, the District of Columbia 60% and New York 43% (Arbeiter, 1985). Considering Arbeiter's observation, one could easily explain the rapport of this statement with the additional findings of this study indicating that 21 out of 49 college presidents (42.9%) believe that demographic factors or a decline in the 18- to 24-year-old age group are responsible for that decline. Therefore, it follows that the response of independent colleges and universities to this decrease will result in an increase of non-traditional and part-time students.

If the argument that the birth rate decline and the market of the 18- to 24-year-old age group continue to decrease, the independent colleges and universities which depend on tuition to cover three-fifths of the full cost (Knudsen & Servelle, 1978) need to expand their market potential by some aggressive student marketing and discover new means of income such as fundraising, research funding, alumni giving, and so forth to maintain the status quo. New York, the nation's second most populous state, is ranked fifth in proportion of the population enrollment within the state and has

one of the highest net export rates of students to other states. This is due to the fact that the government abandonment of social programs is putting an unprecedented burden on private giving by diverting to other purposes some portion of gifts that would support institutions of higher education (Wharton, 1983). If one takes into consideration the accuracy of the preceding statement, one can explain why additional findings of this study indicated that 36.7% of the presidents surveyed believed that an increase in tuition will be the main source of additional revenue in independent colleges and universities, 28.6% believed that more private contributions will be the main source of additional revenue, and only 8.2% indicated that an increase in enrollment, fundraising and so forth will be the main source of additional revenue at independent colleges and universities in New York. Therefore, an implication of this research for administrators is to study the decline in enrollment and the export ratio, and to act accordingly.

The substance of the recommendations for this research can be clearly stated into the following statements.

1. Some of the presidents of the independent colleges and universities responding to the questionnaires believed that enrollment in these institutions will continue to decline. Thus this investigator recommends that serious efforts be made to retain students and to increase enrollment of part-time and non-traditional students by adding more programs and off-campus courses to a certain proximity for these students.

2. Some of the presidents of the independent colleges and universities in New York indicated that private donations are a major source of their additional income. And the abandonment of certain social programs by the government causes some portion of private gifts that would be used to

support institutions of higher learning be diverted to other purposes. Therefore, this investigator recommends that administrators and public legislators should work together to reduce the export rate of students from New York by providing more aid to students and more social programs to the state which would free those private gifts to be used for institutions of higher learning.

Suggestions for Future Research

In this study the research analyzed the impact of tuition on family income and financial aid on enrollment in a longitudinal and cross-sectional treatment. The study was intended to serve as preliminary research in unraveling the relationship existing between enrollment and those variables. The following recommendations are offered as areas in which further research should be conducted.

1. This research should be replicated in other states with some other socioeconomic variables to determine the generality of the findings.

2. Because these variables change whether they were used in longitudinal system-wise or cross-sectional at the institutional level, an analysis at the institutional level could provide a more detailed account in that respect.

3. A replication of the study at the individual student level in specific institutions might provide different but comparable conclusions.

4. A study might be conducted to show the impact of opportunity grants awarded to needy students and the impact of different student loans on enrollment at the individual level.

5. Studies that explore the different strategies of recruiting and retaining students in different academic levels should be encouraged

to increase enrollment of students selected from different socioeco-
nomic levels, different age groups and sexes.

6. More research is needed to examine how the development department
    might proceed to obtain more revenues of funds to help finance higher
    education.

Reflections

This research constituted a source of satisfaction, pride and humility
to the researcher. It has resulted in the discovery of a body of
knowledge that was not anticipated at the outset. It also afforded him an
opportunity to appreciate and respect the effort and contributions of
those who have trodden that path before him.

This researcher firmly believes that enrollment will continue to
decline because the impact of the baby boom generation of the fifties and
sixties is over. To maintain or increase their enrollment, those
independent colleges and universities should attract non-traditional
students and keep tuition and fees at the competitive level with regard to
the price of their public counterparts. Because the study has used both
time series and cross-sectional analyses, it should provide meaningful
insights into the role of tuition, financial aid and family income in
independent colleges and universities. The answer to the financial crunch
is not raising tuition but increasing private gifts and part-time and
non-traditional student numbers. It is the researcher's hope that those
who study this research will be better equipped to increase or maintain
enrollment, not simply by reducing tuition but in retaining students,
providing more financial aids, offering more programs and recruiting more
non-traditional students.

APPENDICES

APPENDIX A

SURVEY INSTRUMENT

APPENDIX A

SURVEY INSTRUMENT

1. What is the average family income of the students attending your institution?
    (Please check one)

    a. ___ Under 25,000
    b. ___ 25,000-35,000
    c. ___ 35,000-45,000
    d. ___ 45,000-55,000
    e. ___ Above 55,000

2. In your estimation, rank the factors which contribute to enrollment decline
    in higher education (1 being most important, 5 being least important).

    a. ___ Tuition Increase
    b. ___ Less Financial Aid
    c. ___ Less Social Activities
    d. ___ Distance from the School
    e. ___ Other (Explain) _____

3. What rate of increase in tuition did your institution experience in the
    academic year 1989-1990?
    ____%

4. What do you expect the rate of tuition to be in the next five years?
    ____%

5. What long range plan do you have for raising additional revenues for your
    institution? (Please check all appropriate boxes and circle the one which is
    most significant to your institution.)

    a. ___ Raise Tuition
    b. ___ Obtain More Federal Aid
    c. ___ Obtain More State Aid
    d. ___ More Private Contributions
    e. ___ Other (Explain) _____

6. What is the projection for the future enrollment of your institution.

    a. ___ Maintain Current Enrollment Level
    b. ___ Decrease in Enrollment
    c. ___ Increase in Enrollment

7. If your response to question six was "c", briefly explain how this increase
    would be accomplished. _____
    _____
    _____

8. What is the amount of student financial aid your institution has received in
    the academic year 1988-1989 from the following sources? (Please give the
    total amount.)

    _____ Institutional Grants
    _____ Federal
    _____ State
    _____ Local Government
    _____ Other

APPENDIX B

COVER LETTER

APPENDIX B

COVER LETTER

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION
DEPARTMENT OF EDUCATIONAL ADMINISTRATION
ERICKSON HALL

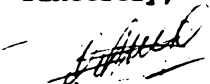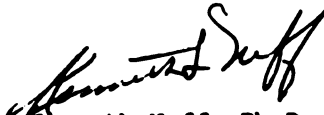EAST LANSING • MICHIGAN • 48824-1034

September 26, 1990

Dear

    I am writing to request your assistance in a research project as part of my doctoral dissertation for the Department of Educational Administration at Michigan State University. The inquiry is to assess/evaluate the demand for Private Higher education in New York State and Compare the perceptions of their presidents to those presidents of Seventh-day Adventist colleges and universities in the United States. A review of the relevant literature indicates from 1980 to the 1990's colleges and universities must reassess their pricing policies and respond to the external environment and adapt accordingly in order to survive.

    Your level of responsibility, and experience in higher education make your contribution to this endeavor very valuable. I am aware of the fact that you are very busy and may not have the necessary time or readily access to the information needed to respond to this questionnaire. However, I would appreciate it very much if you would either take this time to complete this questionnaire or pass it along to the person(s) who would respond. Please complete the enclosed consent form and questionnaire and return them in the self-addressed stamped envelop by _____. All responses will be held in strict confidence.

    And a copy of the abstract will be made available to you after the completion of the study. Thank you in advance for time and cooperation in helping me complete this research and accept my gratitude for your contributions.

Sincerely,

Louis B. Metellus, Research Director
2903 Bayswater Ave.
Far Rockaway, NY 11691

Kenneth Neff, Ph.D
Professor

APPENDIX C

CONSENT FORM

APPENDIX C

CONSENT FORM

October 13, 1989

CONSENT FORM FOR ACCESS TO UNIVERSITY/COLLEGE RECORDS

I consent to participate or to allow the person(s) in position to respond voluntarily in this research project by completing and returning the questionnaire.

I understand that information will be treated in strict confidence with respect to the data on myself and any individual in my institution taking part in this research. In keeping with this it is understood that the researcher will record this information in such a way that will not allow particular scores to be identified as belonging to my institution. I understand that participation is strictly voluntary and that I can withdraw from this research at any time. I also understand that a copy of the finding will be sent to me on request. I also understand that I have a right to contact the researcher should I have any questions or problems at: 2903 Bayswater Avenue, Far Rockaway, NY 11691, 718/327-3408.

Signed: _____
Date: _____
Name: _____

APPENDIX D

FOLLOW-UP LETTER

APPENDIX D

FOLLOW-UP LETTER

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION
DEPARTMENT OF EDUCATIONAL ADMINISTRATION
ERICKSON HALL

EAST LANSING • MICHIGAN • 48824-1034
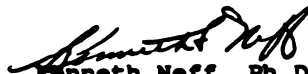
Follow-up Letter

Dear

    Several weeks ago, we requested your assistance by asking you to complete and return a questionnaire. This questionnaire was an integral part of a research endeavor to investigate and evaluate the demand for Private Higher Education in New York State and compare the perceptions of their presidents to their Seventh-day Adventist counterparts.

    As of today, we have not received a response from you. We realize you are very busy and may not have time to complete that questionnaire. For your convenience, we have enclosed an additional questionnaire. We would appreciate it, however, if you would either take the time to respond to the questionnaire or pass it along to the person(s) who is in position to respond. Please complete the enclosed consent form and the questionnaire and return them in the self addressed stamped envelope by _____. All responses will be held in strict confidence.

    And a copy of the abstract will be made available to you at the completion of the study. Thank you, in advance, for your cooperation in helping us complete this research.

Sincerely,

Rev. Louis B. Metellus
2903 Bayswater Avenue
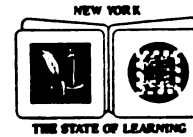Far Rockaway, NY 11691
(718) 327-33408

Kenneth Neff, Ph.D
Professor
Michigan State University
College of Education
Department of Educational Administration

APPENDIX E

CORRESPONDENCES

APPENDIX E

CORRESPONDENCES

Mr. Louis Metellus   December 21, 1989
2903 Bayswater
Far Rockaway, New York 11691

Dear Mr. Metellus:

As a result of our telephone conversation, I am enclosing the following:

(1) High School Graduates and College Going Rate publications for years fall
     1968 through fall 1976

(2) College and University Admissions and Enrollment publications for years fall
     1966 through fall 1976

(3) A report on Student Financial Aid at Degree-Granting Postsecondary
     Institutions for years 1984-85 to 1986-87 and 1985-86 to 1987-88

(4) Report on College Costs and Student Financial Aid

For additional information concerning student financial aid, you might consider
contacting the Washington office of the College Board or the New York State Higher
Education Services Corporation (518: 474-5642).

I trust the enclosed information will be of use to you.

Sincerely,

Carole Hammond

Carole Hammond
Associate Statistician
Bureau of Postsecondary
 Statistical Services

CH:clh
Enclosure

January 6, 1992

U.S. Department of Education
Office of Student Financial Assistance
Washington, D.C. 20202

Dear Sir/Madam:

        I write this letter to inform you that I need two sets of data from your office. I am a PHD Candidate at Michigan State University and I am conducting a research study to estimate the demand for Independent Colleges and Universities in New York State.

        The completion of this study requires data on the averages of Pell Grants or its equivalents and the averages of Supplemental Educational Opportunities Grants allocated to Independent Institutions of Higher Education in New York State for the Periods of 1975 to 1990. If such averages are not readily available I will be willing to accept the amount of expenditures in Pell Grants and in Supplemental Education Opportunity Grants, and the number of recipients for each of those two federal aids for the same period, in the setting of Independent Institutions of Higher Education in New York State for the same Period 1975 to 1990.

        I would appreciate very much you forwarding this material to me. I hope to hear from you soon, so that I may meet my research committee at the beginning of January.

I remain sincerely,

Louis B. Metellus
212 Boundary Ave.
Massapequa, N.Y. 11758

Louis R. Metellus
29-03 Bayswater Ave
Far Rockaway, NY 11691

January 19,1990

Mr. Paul Teufer
NYSHESC
99 Washington Ave.
Albany, NY 12255

Dear Mr. Teufer:

As a result of our telephone conversation, I am writing you
to kindly request some data from your department.

I am presently writing my doctoral dissertation for Michigan
State University. Enclosed you will find a copy of my approved proposal.
In order to complete this research project I need to obtain the
following data:

1. The list of tuition and required fees, by institution, for
   1966-1975, and 1977-1981.

2. A list of State and Federal aid, by institution for 1966 -
   1987.

3. Per capita disposable income in New York State for 1966-1987.

4. US Consumer Price Index for 1966-1987.

For data not available in your department, please give references
as to where this data may be obtained.

Thank you in advance for your help and understanding.

Sincerely,

Louis R. Metellus
Ph.D Candidate

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HIGHER EDUCATION SERVICES CORPORATION

NEW YORK STATE

Cornelius J. Foley
President

February 14, 1990

Mr. Louis B. Metellus
29-03 Bayswater Avenue
Far Rockaway, NY 11691

Dear Mr. Metellus:

Sorry for the delay in responding to your request for detailed institutional information relating to institutions in New York State.

Unfortunately, we do not collect these data, with the partial exception of No. 3 (per capita disposable income in NYS).

I suggest you refer to such publications as:

-   New York State Statistical Yearbooks published by The Nelson A. Rockefeller Institute of Government.

-   Student Financial Aid at Degree-Granting Postsecondary Institutions in NYS published by The State Education Department.

-   College Cost Book published by The College board.

These publications along with other such publications can be found in most libraries located in NYS.

I have enclosed for your information a copy of our corporation's latest Annual Report 1988-89 along with an old Guaranteed Student Loan Program Statistical Summary dated March 31, 1980.

If I can be of any further assistance to you, please feel free to contact me at your earliest convenience at 518-473-4562.

Sincerely,

Paul E. Teufer
Research & Management
   Information Systems

Enclosures
/wsh

Albany, New York 12255

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MICHIGAN STATE UNIVERSITY

October 2, 1990

IRB# 89-432

Louis B. Metellus
2903 Bayswater Avenue
Far Rockaway, NY 11691

Dear Mr. Metellus:

RE: AN ESTIMATE OF THE DEMAND FOR PRIVATE HIGHER EDUCATION IN THE STATE OF
NEW YORK FROM 1960 TO 1986. A CORRELATION STUDY OF PRIVATE ENROLLMENT
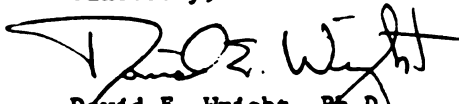FORECAST AND ECONOMIC IMPACTS, IRB# 89-432

UCRIHS' review of the above referenced project has now been completed. I am
pleased to advise that the rights and welfare of the human subjects appear to
be adequately protected and the Committee, therefore, approved this project at
its meeting on October 1, 1990.

You are reminded that UCRIHS approval is valid for one calendar year. If you
plan to continue this project beyond one year, please make provisions for
obtaining appropriate UCRIHS approval one month prior to October 1, 1991.

Any changes in procedures involving human subjects must be reviewed by the
UCRIHS prior to initiation of the change. UCRIHS must also be notified
promptly of any problems (unexpected side effects, complaints, etc.) involving
human subjects during the course of the work.

Thank you for bringing this project to our attention. If we can be of any
future help, please do not hesitate to let us know.

Sincerely,

David E. Wright, Ph.D.
Chair, UCRIHS

DEW/deo

cc: Kenneth Neff

APPENDIX F

AN ASSESSMENT OF THE LINEAR AND LOG TRANSFORMATION MODELS

AN ASSESSMENT OF THE LINEAR AND LOG TRANSFORMATION MODELS

Moreover, the investigator looked at and reflected upon different methodologies used in estimating enrollment in higher education. It became evident that some researchers utilized the linear model of regression, while others preferred to use non-linear models, particularly the log transformation. Therefore, it deems necessary to assess the linear model and the log transformation model. Kim and Kohout (1984) stated that regression analysis assumes that the underlying relationships among variables are linear and additive, which implies not only that each bivariate relationship between y and k_i is linear but also that combined effects of independent variables are additive (p. 386).

They bring to view some occasions for which the linear models are inadequate. These are: 1) the bivariate relationship is expected, on the basis of the theory, to take a specific non-linear form, 2) the bivariate relationship is simply unknown, and there is clear suggestion of deviation from linearity in the scatterplots, or 3) the combined effects of the independent variables are not additive. Some of the ways presented by these authors to handle these types of non-linear situations are 1) to transform the original variable in such a way that the resultant relationships among the transformed variables become linear,   2) to find a simple non-linear form the use of polynomial regression, and 3) to introduce interaction terms as new variables.

The most often used transformation is log transformation. The general formulation can be approximated by $\phi_k = I(1 + g)t$ where ϕ is the economic

output for year t, I is the output of the beginning year and g is the unknown rate of growth. Suppose further that the rate of is constant. The objective is therefore to estimate g. A more explicit formulation should error term e as in $\phi = I(1 = g)t_{et}$. By using log transformation the multiplicative and exponential functions of the type represented above can be made linear. The unknown value can be found by using antilog.

In the review of literature, it was discovered that the researchers using a ratio of enrollment to eligible high school graduates as dependent variable utilized log transformation. And those investigators using enrollment as dependent variable preferred the linear model. When the bivariate relationship is unknown or deviates from linearity, log transformation is the best model to estimate the relationships. However, when the bivariate relationship is linear or known the linear model is a direct and adequate tool.

BIBLIOGRAPHY

BIBLIOGRAPHY

Allemand, L. E. (1983). Sharpening the focus on planning at DePaul. Change, 15, 22-24.

Arbeiter, S. (1986). Guns, butter or sheepskins. The College Board Review, 137, 18.

Arnold, C. K. (1982). A historical perspective: The federal role in funding education. Change, 14(3), 39-42.

Bailey, S. K. (1982). Coping with the crises of funding. Standards and purpose. An expanded role for trustees. Change, 14(2), 24-28.

Beck, N. E. (1986, Fall). Financial aid today: An economic perspective. College Board Review, 137, 2-5.

Berg, I. (1971). Education and job: The great training robbery. Boston: Beacon Press.

Berg, I. (1981). Sociological perspectives on labor market. New York: Academic Press.

Bishop, J. (1977). The effect of public policies on the demand for higher education. The Journal of Human Resources, 12(3), 387-407.

Bishop, J., & VanDyk, J. (1977). Can adults be hooked on college: Some determinants of adult college attendance. Journal of Higher Education, 48(1), 38-59.

Bowen, H. R. (1980). The costs of higher education. How much do colleges spend per student and how much should they spend. San Francisco: Jossey-Bass, Inc.

Bowen, H. R., & Minter, J. M. (1975). Private higher education. Washington, DC: Association of American Colleges.

Boyd, J. (1978). Trends in meeting college costs over the past ten years. Journal of Student Financial Aid, 8, 5-17.

Boyd, J., & Fenke, R. (1976). Financing a college education: Theory vs. reality. Journal of Student Financial Aid, 6, 11-21.

Braun, T. G. (1983). An analysis of the effects of geographic-demographic factors on college attendance. Research in Higher Education, 19(2), 131-151.

Breneman, D. W. (1983). The coming enrollment crisis -- focusing on the figures. Change, 15(2), 14-19.

Burk, M. (1968). Consumption economics: A multidisciplinary approach. New York: John Wiley and Sons, Inc.

Cameron, K. (1983). Strategic responses to conditions of decline: Higher education and the private sector. Journal of Higher Education, 54(4), 359-380.

Campbell, R., & Siegel, B. N. (1967). The demand for higher education in the U. S. 1919-1964. American Economic Review, 57, 482-494.

Carnegie Foundation on Policy Studies in Higher Education. (1974). The federal role in post-secondary education: Student aid and related programs. San Francisco: Jossey-Bass, Inc.

Carnevale, A. P. (1983). Higher education's role in the American economy. Educational Record, 64(4), 6-11.

Christi, S. (1984). International demand for American higher education. Research in Higher Education, 20(3), 329-339.

Clarkson, G. P. E. (1963). The theory of consumer demand: a critical appraisal. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Cook, R. W. and Zalluccio, R. L. (1983). Predicting university preference and attendance: Applied marketing in higher education administration. Research in Higher Education, 19(2), 197-203.

Corman, H. (1983). Post-secondary education enrollment responses by recent high school graduates and older adults. Journal of Human Resources, 17(2), 249-267.

Corrazzini, A. J., Dugan, D. J & Grabowski, H. G. (1972). Determinants and distributional aspects of enrollment in U.S. higher education. Journal of Human Resources, 7, 39-59.

Deitch, K. M. (1981, April). A price war for higher education. Change, 13, 24-26.

Deutsch, J. M. (1983). Retrenchment or challenge? Educational Record, 64(1), 41-44.

Dickmeyer, N., Wessels, J., & Goldren, S. L. (1981). Institutionally funded student financial aid. Washington, DC: American Council on Education.

Diran, K. M. (1978). The management information systems: The human factor. <u>Journal of Higher Education</u>, <u>49</u>(3), 273-281.

Discenza, R., Jeffrey, M. F., & Ronald, W. (1985). Marketing higher education: Using a situation analysis to identify prospective student need in today's competitive environment. <u>NASPA Journal</u>, <u>23</u>(2), 19-25.

Edgerton, W. (1982). Number of foreign students continues to increase but at a slower rate. <u>Change</u>, <u>14</u>(8), 49-51.

Edwards, A. L. (1960). <u>Experimental design in psychological research</u>. New York: Holt, Rinehart and Winston.

Edwards, L. N. (1975). The economics of schooling decisions: Teenage enrollment rates. <u>Journal of Human Resources</u>, <u>10</u>(2), 155-187.

Elliott, W. F. (1980). Financial aid decisions and implications of market management. In J. B. Henry (Ed.), <u>New directions for institutional research: The impact of student financial aid on institutions</u>. San Francisco: Jossey-Bass, Inc.

Feldman, P., & Hoenack, S. (1969). <u>Private demand for higher education in the United States: The economics and financing of higher education in the United States</u>. The Joint Economic Committee on Financing of Higher Education in the United States. Washington DC: U.S. Government Printing Office.

Folsey, B., & Heyns, B. (1984). The college channel: Private and public schools reconsidered. <u>Sociology of Education</u>, <u>57</u>, 111-122.

Frances, C. (1980). <u>College enrollment trends? Testing conventional wisdom against facts</u>. Washington, DC: American Council on Education.

Galper, H., & Dunn, R. N., Jr. (1969). A short-run demand function for higher education in the U. S. <u>Journal of Political Economy</u>, <u>15</u>, 765-777.

Gladieux, L. E. (1986, November). Student financial assistance: Past commitments, future uncertainties. <u>Academe</u>, <u>72</u>, 9-15.

Gleaser, E. J. (1982). A case study: Private two-year college tries a new approach. <u>Change</u>, <u>14</u>(3), 30-35.

Havighurst, R. J. (1975, Spring). <u>The college and youth</u>. New Directions for Higher Education, no. 9. San Francisco: Jossey-Bass, Inc.

Hays, W. L. (1963). <u>Statistics for psychologists</u>. New York: Holt, Rinehart and Winston, Inc.

Hearn, J. (1980). Effects on enrollment of changes in student aid policies and programs. In J. B. Henry (Ed.), <u>New Directions for Institutional Research: The Impact of Student Financial Aid on Institutions</u> San Francisco: Jossey-Bass, Inc.

Hearn, J. C., & Longanecker, D. (1985). Enrollment effects of alternative post-secondary pricing policies. <u>Journal of Higher Education</u>, <u>56</u>(3), 485-504.

Henderson, A. D., & Henderson, H. G. (1974). <u>Higher education in America</u>. San Francisco: Jossey-Bass, Inc.

Hoenack, S. A. (1982). Pricing and efficiency in higher education. <u>Journal of Higher Education</u>, <u>53</u>(4), 402-418.

Hoenack, S. A. & Weiler, W. C. (1977). Personnel and enrollment policies on size and composition of a university's faculty. <u>Journal of Higher Education</u>, <u>48</u>(4), 631.

Hopkins, T. D. (1974). Higher education enrollment demand. <u>Economic Inquiry</u>, <u>11</u>(1), 52-62.

Hossler, D. (1982). College enrollment: The impact of perceived economic benefits. <u>College and University</u>, <u>58</u>, 85-96.

Hossler, D. (1984). <u>Enrollment management: An integrated approach</u>. New York: College Entrance Examination Board.

Hossler, D. (1985). Enrollment management: A paradigm for student affairs professionals. <u>NASPA Journal</u>, <u>23</u>(3), 3-7.

Hoy, J. D. (1980). To market to market....<u>Connection</u>, <u>2</u>, 2-4.

Hyde, W., Jr. (1977). <u>The effect of tuition and financial aid on student choice in post-secondary education</u>. Paper presented at the Post-Secondary Educational Finance Conference, Washington, DC.

Jackson, A. G. (1978). Financial aid and student enrollment. <u>Journal of Higher Education</u>, <u>49</u>, 548-574.

Jackson, A. G., & Weathersby, G. Individual demand for higher education. <u>Journal of Higher Education</u>, <u>46</u>, 623-652.

Johnson, J. L. (1979). An analysis of the relationship between instructional costs and differential tuition levels. <u>Journal of Higher Education</u>, <u>50</u>(3), 281-287.

Jones, L. V., Tanja, B., & Ernest, C. D., Jr. (1985). College-bound high school graduates of 1972 and 1980 compared by college major. <u>Research in Higher Education</u>, <u>23</u>(3), 318-330.

Kendall, M. G., & Buckland, W. R. (1971). <u>A dictionary of statistical terms (1973)</u>. 3rd ed. New York: Hafner and Co.

Kerlinger, F. N. Multiple regression in behavioral research. New York: Holt, Rinehart and Winston.

Kim, J., & Kohout, J. (1984). Multiple regression analysis: Subprogram regression. In N. H. Nie, C. H. Hull, J. G. Jenkins, K. Steinbrenner & D. H. Bent (Eds.), Statistical packages for the social sciences (2nd ed.). New York: McGraw-Hill Book Co.

Kim, J., & Kohout, J. (1984). Special topics in general linear models. In N. H. Nie, C. H. Hull, J. G. Jenkins, K. Steinbrenner & D. H. Bent (Eds.), Statistical package for the social sciences (2nd ed.). New York: McGraw-Hill Book Co.

Knudsen, O. K., & Servelle, P. J. (1978). The demand for higher education at private institutions of moderate selectivity. The American Economist, 22(2), 30-33.

Lehr, D. K,. & Newton, J. M. (1978). Time series and cross-sectional investigations of the demand for higher education. Economic Inquiry, 16, 412.

Lindquist, E. F. (1983). Design and analysis of experiments. Boston: Houghton Mifflin, Co.

Manski, C. F., & Wise, D. A. (1983). College choice in America. Cambridge, MA: Harvard University Press.

Minter, J. W., & Bowen, H. R. (1980). Independent higher education. Washington, DC: National Institute of Independent Colleges and Universities.

Morgan, J. N. (1983). Tuition policy and interstate migration of college students. Research in Higher Education, 19(2), 183-195.

Muston, R. A. (1985). Role ambiguity in institutional marketing and enrollment management. Research in Higher Education, 22(4), 371-375.

New York State Education Department. (1977 to 1990). A report by the Board of Regents to the governor and legislature on state student financial aid programs NYS. Albany: The University of the State of New York.

New York State Education Department. (1988, 1991). A report on student financial aid at degree-granting post-secondary institutions in New York state. Albany: Office of Post-Secondary Policy Analysis.

New York State Education Department. (1975, 1980, 1983-85, 1988-89). Average undergraduate tuition and required annual fees weighted by full-time undergraduate enrollment NYS. Albany: Bureau of Post-Secondary Education Policy and Analysis.

New York State Education Department. (1975-76 to 1990-91). <u>Basic student charges for undergraduate and graduate programs for full-time study</u>. Albany: New York Bureau of Post-Secondary Research and Information Systems.

New York State Education Department. (1966 to 1990). <u>College and university admissions and enrollment NYS</u>. Albany: Information Center on Education

New York State Education Department. (1968 to 1988). <u>College and university revenues and expenditures NYS fiscal years 1968-1988</u>. Albany: Information Center on Education.

New York State Education Department. (1966 to 1990). <u>Distribution of high school graduates and college-going rate, New York state, fall 1966-fall 1990</u>. Albany: Information Center on Education

New York State Education Department. (1983-84 to 1987-88). <u>Fiscal indicators for post-secondary education in New York state</u>. Albany: The University of the State of New York.

New York State Education Department. (1989). <u>Report on college costs and student financial aid in New York</u>. Albany: Bureau of Post-Secondary Research and Information Systems.

New York State Education Department. (1987). <u>Undergraduate college financing in New York state: A report of the New York State Augmentation of the 1987 National Post-Secondary Student Aid survey</u>. Albany: Bureau of Post-Secondary Research and Information Systems.

New York State Higher Education Services Corporation. (1975-76 to 1989-90). <u>Annual Report</u>. Albany, NY: Higher Education Services Corporation.

New York State. (1991). <u>Per capita disposable personal income for states and regions</u>. Albany, NY: Department of Economic Development.

Olivas, M. A. (1983, November-December). Student financial assistance: Past commitments, future uncertainties. <u>Academe</u>, <u>72</u>, 16-18.

Perry, R. F., & Ramp, D. L. (1984). Predicting the likelihood of matriculation for college applicants. <u>Research in Higher Education</u>, <u>21</u>(3), 317-326.

Pocock, J. W. (1983). A demographic debacle? Wiser for the experience. <u>Change</u>, <u>15</u>, 31, 33.

Rath, G. J. (1968). Management science in university operation. <u>Management Science</u>, <u>14</u>(6), 374-376.

Scheffe, H. (1953, June). A method for judging all contrasts in the analysis of variance. Biometrics, 40, 87-104.

Schroeder, L. D. 1986. Understanding regression analysis: Quantitative applications in the social sciences. London: Sage Publications.

Smith, P. F. (1986, November-December). Need-based meritocratic admission: The selective private college. Academe, 72(6), 22-24.

Stampen, J. (1980). The financing of higher education. (Report No. 9). Washington, DC: American Association for Higher Education.

Strickland, D. C., Vittorio, A. B., Gerald, W., James, R. M., & Beatrice, T. M. (1984). Effects of social and economic factors on four-year higher education enrollments in Virginia. Research in Higher Education, 20(1), 36-51.

Suttle, J. L. (1983). The rising cost of private higher education. Research in Higher Education, 18(3), 253-269.

Tierney, M. L. (1983). Student college choice sets: Toward an empirical characterization. Research in Higher Education, 18(3), 271-283.

Torregrosa, C. H. (Ed.). (1989). The HEP higher education directory. Falls Church, VA: Higher Education Publications, Inc.

Troutt, M. D. (1983). Deciding tuition structure with linear programming. Research in Higher Education, 18(3), 359-370.

U. S. Department of Commerce. (1990). Statistical abstract of the United Sates 1990. Washington, DC: Bureau of Census.

U. S. Department of Education. (1991). The student guide -- financial aid from the U. S. Department of Education: grants, loans, and work-study. U. S. Department of Education: Washington, DC.

U. S. Department of Labor. (1991). Consumer price index all urban consumers. Washington, DC: Bureau of Labor Statistics.

Wasylenko, M. J. (1984). Black student demand for higher education at large state universities. Research in Higher Education, 21(1), 3-8.

Wharton, C. R., Jr. (1983). Enrollment: Higher education's window of vulnerability. Change, 15(2), 20.

Winer, B. J. (1962). Statistical principles in experimental design. New York: McGraw-Hill Book Company, Inc.

Whiteman, R. E. (1985). <u>Enrollment and economic impact on Michigan private liberal arts colleges</u>. Unpublished doctoral dissertation, Michigan State University, East Lansing.

Yanikoski, R. A., & Wilson, R. F. (1984). Differential pricing of undergraduate education. <u>Journal of Higher Education</u>, <u>55</u>(6), 735-748.