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AN INVESTIGATION OF THE RELATIONSHIP OF CERTAIN VARIABLES ON THE PCS STATEMENTS OF MSU 1970-71 FRESHMEN WITH THE REJECTION OF VARIOUS TYPES OF FINANCIAL AID

By

Floyd Hower

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ABSTRACT

AN INVESTIGATION OF THE RELATIONSHIP OF CERTAIN VARIABLES ON THE PCS STATEMENTS OF MSU 1970-71 FRESHMEN WITH THE REJECTION OF VARIOUS TYPES OF FINANCIAL AID

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The purpose of this study was to attempt to identify, at one university, the population of those freshmen financial-aid recipients who rejected work or loans in spite of demonstrated need. A review of the literature revealed no related studies in this area. However, the research did reveal a need for judicious use of financial aid resources, as the demand for aid has increased to the point where applicants with real need must often be turned down.

Eight variables on the Parents' Confidential Statements, parental net income, residence equity, effective income, total assets, federal income tax, number of children, number of children in college, and financial need were investigated through multiple regression analysis for their prediction of the dependent measures of loans rejected, work rejected, and

total rejected. Two more variables, sex and parental occupational class, as well as the interaction effect between these two variables, were investigated through a two-way multivariate analysis of variance using the first two of the above dependent measures. Finally, interviews were conducted with a selected sub-sample of subjects to determine: (1) possible changes in circumstances relative to original assessment of needs, (2) opinions on the accuracy of the assessment of need, and (3) whether or not basic life styles were altered.

The study was begun through the identification of all 1970 fall quarter freshmen financial-aid recipients at Michigan State University who had turned down the work or loan portions of their financial-aid awards, yet made it through the freshmen year and returned in the fall of 1971 as sophomores. A one-hundred member random sample of this population was then studied.

The multiple regression, using a least squares stepwise delete routine, yielded a number of significant variables at the .05 level in the three equations for predicting loans rejected, work rejected, and total rejected. Federal income tax, it should be noted, appeared as significant in all three final equations. Thus there is some evidence that since federal income tax is a significant predictor of all three dependent variables, it is the most important predictor variable.

Further analysis of the federal income tax variable revealed that the higher the federal income tax paid, the greater the amount of loans accepted. Correspondingly, the higher the amount of federal income tax paid, the greater the amount of work rejected. Thus, the higher-income families tended to favor loans while the lower-income families tended to favor work.

The multivariate analysis of variance produced no significant differences in the multivariate tests for main effects, indicating that neither sex nor parental occupational class is related to the amount of loans or work rejected. Additionally, there was no interaction between sex and parental occupational class.

Generalized inferences were not made for the results of the interviews with the selected sub-sample.

While this study dealt solely with the population of those who rejected aid, future studies might test out whether the results would apply across the entire population of financial-aid recipients, including those who were satisfied with their aid and those who requested more aid. Such studies would be able to further distinguish those who tend to reject aid.

Finally, in view of the fact that the members of this population turned down, on the average, one-third of their aid package and yet made it through the year,

the formula for demonstrated need may be in need of revision. Thus, considerable flexibility should be utilized in the aid award by the financial-aid officer. Further studies in this area could provide the research for making such decisions.

ACKNOWLEDGMENTS

Appreciation is expressed to Dr. Van Johnson, Chairman, who encouraged and guided the conduct of this study, as well as my entire doctoral program. I would also like to thank Dr. Louis Stamatakos, Dr. Norman Bell, and Dr. Walker Hill for their willingness to serve on my guidance committee and for their helpful suggestions.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

THE PROBLEM

Statement of the Problem

The major challenges facing higher education financial-aid officers are noted by Miller, Ivey, and Goldstein as including increased student population, rising educational costs, and expanding programs of federal support.[1]

When dealing with these problems at a basic level, in determining the particular needs of each student, financial-aid officers utilize, in the main, two major need assessment techniques, the Parents Confidential Statement (PCS) of the College Scholarship Service (CSS), and the Family Financial Statement (FFS) of the American College Testing Program (ACT). Usually a package of three types of aid, including loans, grants, and employment is offered. West notes that the largest change in

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[1]C. Dean Miller, Allen E. Ivey, and Arnold D. Goldstein, "Student Patterns of Financing Education at a Land-Grant University," Personnel and Guidance Journal (March, 1967), 687.

recent years in financial aid to students is the widespread use of loans.[2]

A major problem becomes apparent, however, when a recipient rejects a portion of the aid offered, especially loans or work, yet arrives on campus and maintains himself for the entire year in spite of the lack of a portion of the aid offered.

Dyer notes that too many colleges are not following up the appropriateness of the decisions they made.[3] Related to this problem, Bowman and Weiss state that financial-aid officers themselves generally feel that the expectations for low income family contributions to student support is too high and the amount expected from high income families is too low.[4] Compounding this situation, Cliff and Ekstrom found that it is only when the student has entered college and the family must find the money that the pattern of the family economic response is crystallized.[5]

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[2]Elmer D. West, Financial Aid to the Undergraduate (Washington, D.C.: American Council on Education, 1963), p. 37.

[3]Henry S. Dyer, Student Financial Aid and Institutional Purpose (Princeton, N.J.: College Entrance Examination Board, 1963), p. 64.

[4]James L. Bowman and Gertrude S. Weiss, CSS Expected Contributions Toward Educational Costs: Suggested Revisions for 1969-70 (Princeton, N.J.: Educational Testing Service, 1969), p. 12.

[5]Cliff and Ekstrom, in Miller, et al., op. cit., p. 688.

Related to the findings of the latter study, Marple and Marple found that even among upper-middle income families only two of every five families have any savings plans for college.[6] Doerrmann suggests a re-examination of the CSS family contribution tables, to see whether it is possible to allocate the scholarship funds more broadly, while still being fair to individual students and their families.[7]

The research has demonstrated the need for judicious use of financial-aid resources. Pickering notes that demand for financial aid resources has increased to the point where qualified applicants are often necessarily turned down. Yet, a nationwide commitment has been made to increase the number of economically disadvantaged students.[8] Thus, in order to stretch the resources even further, there is a need to investigate the factors which determine the aid awarded to each student.

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[6]Betty Lou Marple and Wesley W. Marple, "How Affluent Families Plan to Pay for College," College Board Review, LXIII (Spring, 1967), 11.

[7]Humphrey Doermann, "Lack of Money: A Barrier to Higher Education," in Barriers to Higher Education (New York: College Entrance Examination Board, 1971), p. 146.

[8]James H. Pickering, "Admissions and Student Financial Assistance: Some Recommendations" (internal report), Michigan State University, East Lansing, Michigan, Summer, 1971.

The Purpose

Michigan State University utilizes the PCS statement to help assess the needs of incoming freshmen. The purpose of this study was to investigate a number of factors on the PCS statements of freshmen financial-aid recipients who rejected portions of their aid but still completed their freshman year. Through this analysis relationships between variables may show patterns in terms of characteristic backgrounds of those who reject specific types of aid.

One method of interpreting a set of data is through multiple regression analysis; by this method an estimation of the closeness of functional relationship between variables may be obtained in order to predict the values of one on the basis of others.

The multiple regression analysis dealt with continuous variables which are those variables which may take on any value within their range. These variables were: (1) parents net income, (2) residence equity, (3) effective income, (4) total assets, (5) federal income tax, (6) number of children, (7) number of children in college, and (8) financial need. Certain other non-continuous variables were also worthy of investigation. These included such discrete variables as sex and parent's occupation. These latter factors were categorized into classes and studied by means of multivariate analysis of variance.

As a supplement to the information gained through direct analysis of the data, a series of informal interviews were held with a subsample of the Ss's. These interviews were utilized to elicit three points: (1) Was the PCS statement accurate? (2) Was it accurate but with the family using it differently (e.g., had the family since submitting the statement sold any of their liquid assets)? (3) Had the subject or his family actually changed their life style. Findings based on these interviews were not statistically tested.

Supportive Research

Schlekat has shown that the financial needs analysis systems utilized in colleges have often failed to adjust for the differing needs of students from a variety of social backgrounds.[9] For example, Hansen and Weisbrod noted in their study that although student earnings are becoming a more important source of support across all family income levels, nonetheless, the pressures to work during the school year were far greater among the low-income students.[10]

Even so, Sherwood found that parents' and students' attitudes and not their economic status were most

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[9]George Schlekat, "Do Financial Aid Programs Have a Social Conscience?" College Board Review, LXIX (Fall, 1968), 18.

[10]W. Lee Hansen and Burton Weisbrod, Benefits, Costs, and Finance of Public Higher Education (Chicago: Markham Publishing Co., 1969), p. 32.

important in determining the types of contributions parents would make.[11] Berdie's study of 25,000 Minnesota high school seniors relates to Sherwood's findings in that parents' intellectual abilities had been responsible for determining whether or not students would attend college, regardless of the aid offered.[12]

The varying parental and student attitudes and differential socio-economic pressures upon applicants are complexities which financial aid officers must deal with daily. Ryan further noted that in many cases, parents failed to provide all significant details of their financial situation.[13] However, Dyer noted that too many colleges were accepting at face value such estimates as those reported in the financial need analysis reports of the CSS. He stated the need for studies concerned with the accuracy of the financial-aid officers' judgments as measured against the subsequent experience of students in paying their way.[14]

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[11]Paul M. Sherwood, "Student and Family Attitudes Toward Financing the College Experience," Dissertation Abstracts, XVII (1957), 66.

[12]R. W. Berdie, After High School--What? (Minneapolis: University of Minnesota Press, 1954).

[13]Doris W. Ryan, "Let's Not Award Financial Aid by the Numbers," College Board Review, LXII (Winter, 1966-67), 18.

[14]Dyer, op. cit., p. 65.

The possession of assets by a family strengthens its economic position and a combination of assets and income provides more financial strength than income alone. This basic economic fact was incorporated by Bowman in noting that in measuring the ability of a family to contribute toward the costs of education of its children, the CSS regards financial strength to be determined by the interaction of income and the family asset holdings.

Thus, an investigation of certain income, asset, and related factors on the PCS statements of students who rejected portions of their aid could provide helpful indications on what factors are related to the granting of awards larger than what the student actually needs for the year.

Definition of Terms

Effective Income: In CSS procedures, from the net income reported by parents, adjustments are made to allow for federal and state income taxes and for unusual family expenses. After the adjustments, the amount that remains is considered "effective income."

Residence Equity: The residence equity entered represents the difference between the "present market value" and the "unpaid mortgage" of the family's home.

Parent's Occupational Class: The term "parent" is used rather than father because in a number of cases the mother was the sole support. The occupational classifications were adapted from Clifford M. Baumback, "A Study of the Financial Resources of Students at Public Institutions of Higher Education in Iowa" (multilithed; Iowa City: Bureau of Business and Economic Research, State University of Iowa, 1959).

Financial Need: The term "financial need" in this study refers to the final financial aid figure determined by Michigan State University for each of the recipients. Financial need is the estimated cost for the 1970-71 year minus student assets, summer earnings, and parents' contribution.

Limitations of the Study

There are two limitations to this study. The first is that this is an exploratory study of those who have rejected portions of their aid. It was not possible to collect data on those who had requested more aid. That is, just looking at the group which rejected aid is not as valuable as looking at the entire population of financial-aid recipients. Therefore, this study was intended solely to see if, within the group of recipients who rejected portions of their aid, there was any prediction effect based on the factors within the design.

The second limitation is that this study was done at Michigan State University, which has one of the largest financial-aid programs in the country, with more dollars available per student than average. Thus, the generalizations apply only to schools of similar size and with financial-aid programs approximating MSU's.

Organization of the Study

The statement of the problem, the purpose of the study along with supplementary exploratory questions, the supportive research, the specific meaning of selected terms, the limitations of the study, and the organization of the study have been presented in Chapter I. Chapter II will be a review of the literature on financial aids. Chapter III includes a report of the research design while Chapter IV consists of an analysis of the results. Finally, a summary of the study and the conclusions drawn along with the implications for future research are undertaken in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

History of Financial Aids

Student financial aid, due mainly to large federal programs, has increased greatly in recent years. Nash pointed out that in the late 1940's and 1950's, the GI Bill was the largest student financial-aid program.[1] The GI Bill also remains relatively unique in that payments are given directly to the students rather than to the institutions. Most of the present federal programs distribute funds to the colleges, with payments then distributed through an institutional office, such as the financial-aid office.

In 1958, Nash continued, with the passage of the National Defense Education Act, the federal government began what is now the National Defense Student Loan Program (NDSL), their first long-term program to aid undergraduates. In 1964, the College Work-Study Program was launched as part of the Economic Opportunity Act of that year.

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[1]George Nash, "The History and Growth of Student Financial Aid," National ACAC Journal, XIII, No. 3 (1968), 13.

The Higher Education Act of 1965 signalled the beginning of the Educational Opportunity Grants Program (EOG), which is aimed specifically at needy students. Finally, the Higher Education Act of 1965 also authorized the Guaranteed Loan Program, the last of the four major programs of federal aid to college students, in addition to the GI Bill.

Marshall emphasized, however, that the guaranteed loan program, for example, gets only seed money from the federal government, while the loans themselves are granted by private savings institutions, and guaranteed by either state agencies or the United Student Aid Fund, the latter being a private, non-profit organization.[2]

The states have also expanded their own aid programs. Giddens noted that the first scholarship programs were designed to help the institutions themselves.[3] Then, a number of states began using scholarships to recruit students for areas of critical need. New York State in 1913 heralded the entry of many of the present state competitive scholarship programs. Today, according to Kirkpatrick, the states continue to play a major role in

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[2]Allen D. Marshall, "Some Problems Facing the Guaranteed Loan Program," Educational Record, XLIX (Summer, 1968), 311.

[3]Thomas R. Giddens, "The Origins of State Scholarship Programs," College and University, XLVI, No. 1 (Fall, 1970), 37.

student aid, through, of course, tuition subsidization, tax appropriations, and support of private institutions, in addition to the direct student scholarship programs.[4]

Kirkpatrick concluded, however, that in particular, a trend toward increasing student loans will continue, both in state programs and in federal programs.

Paul Woodring indicated that since 1960 the total enrollment of American colleges has doubled.[5] This is due, in great measure, to avenues opening for large numbers of low-income students.

The student financial-aid system was not first designed, however, according to Schlekat, merely to bring large numbers of low-income students to campus.[6] The system actually was designed to bring those with high academic ability but low funds. However, many low-income students have not had the usual academic criteria and as a result their files often have not gotten past the admissions office to the financial aid officer's desk. For this reason, admissions criteria must be reconciled before financial-aid systems can become equitable.

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[4]John I. Kirkpatrick, "Financing Higher Education: The Role of the State," College Board Review, LXXVII (Spring, 1971), 23.

[5]Paul Woodring, "Higher Education for the 70's," Peabody Journal of Education (October, 1970), 4.

[6]George A. Schlekat, "Who Really Gets Financial Aid?" National ACAC Journal, XIV, No. 3 (September, 1969), 20.

During the past ten years, especially, Gordon explained, efforts have been devoted to expanding opportunities to minority groups.[7] However, in general, Schlekat found that during the 1960's financial need became the overriding criterion for determining student financial-aid recipients.[8] Nonetheless, Schlekat, in the same study, also found that although low-income students had a better chance of receiving aid, this aid was more likely to include loans and work while the upper-class recipients were more likely to receive grants.

Another difficulty financial-aid officers often have faced has been referred to by Ryan as the trait-and-factor approach.[9] This was in reference to the ease in which aid might be awarded based solely on statistical treatments such as the financial need analyses of outside agencies.

However, in attempting to solve financial need on a broader basis, California instituted free tuition. Spalding concluded though, that free tuition did not

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[7]Edmund W. Gordon, "Programs and Practices for Minority Group Youth in Higher Education," in Barriers to Higher Education (New York: College Entrance Examination Board, 1971), p. 109.

[8]George A. Schlekat, "Do Financial Aid Programs Have a Social Conscience?" College Board Review, LXIX (Fall, 1968), 15.

[9]Doris W. Ryan, "Let's Not Award Financial Aid by the Numbers!" College Board Review, LXII (Winter, 1966-67), 18.

provide complete accessibility of higher education.[10] Financial need still contributed to a lack of success in inducing many students to college. Further, although more entered, fewer finished than the average for the nation because of numerous extra fees, among other reasons.

Direct student financial aid has, however, on a nationwide basis, gone mainly to low-income students in recent years. For example, Cheryl Fields indicated that in the 1969-70 academic year, 75 per cent of the aid went to students whose families' income was six thousand dollars or less.[11] Strict federal guidelines insured this percentage, even though factors other than income, such as access to other aid, differences in costs of living, and individual institutional costs are crucially important.

Major Programs

The parent-student combination still provides the bulk of direct student support, while the greatest portion

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[10]William Spalding, An Evaluation of the Tuition Free Principle in California Public Higher Education (Sacramento: California State Coordinating Council for Higher Education, May, 1965), p. 33.

[11]Cheryl M. Fields, "U.S. Guidelines for Student Aid Put Colleges in A Guessing Game, Campus Official Say," Chronicle of Higher Education (December 7, 1970), 2.

of governmental support is noted by Hill as deriving from state financing.[12]

Federal student financial-aid programs, however, now provide, according to Nash, the major portion of direct student loans, grants, and work.[13]

A number of these programs were described by College Scholarship Service for the 1970-71 academic year.[14] The National Defense Student Loan Program (NDSL), in 1970-71, provided for loans of up to $1,000 per year to undergraduates enrolled on at least a half-time basis who showed need. These loans are made through the college financial aid offices. Interest at 3 per cent begins after the student leaves school.

The Guaranteed Student Loan Program, provided for loans of up to $1,500 per year, with the student obtaining the funds from commercial lending agencies. This is the first combined effort by educational and lending agencies, federal, and state governments to provide financial assistance to college students. Repayments begin nine

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[12]Watts Hill, Jr., "The Effects Which Federal and State Financial Aids Programs Have Upon Students in Higher Education," College and University, XLVI, No. 4 (Summer, 1971), 573.

[13]Nash, op. cit., p. 12.

[14]College Scholarship Service, Manual for Financial Aid Officers, 1970 (Princeton, N.J.: College Scholarship Service, 1970), p. 2.13.

months after cessation of studies at an interest rate of 7 per cent.[15]

The Educational Opportunity Grants Program (EOG) provided for grants of $200 to $1,000 per year to students of exceptional need. These grants required matching aid and were aimed directly at the low-income student.[16] Another program still aimed primarily at students from low-income families is the Work-Study Program. Under this program a student is able to obtain employment for up to fifteen hours per week, with the federal government paying 75 per cent of his salary.

Although government NDSL loans, Guaranteed Loans, Economic Opportunity Grants, and Work-Study programs provide a great deal of student aid, state and institutional aid may also be considerable. For example, Holstein pointed out that in Michigan, Student Aid Grants (SAG's) are available to in-state students who demonstrate need. The students are eligible for grants of up to half of their tuition.[17]

Direct state scholarship programs are also available in twenty states, according to Kirkpatrick, including

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[15] Ibid., p. 2.13.

[16] Ibid., p. 4.28.

[17] Bill Holstein, "Heavy Demand Depletes 'U' Funds for Financial Aid," Michigan State News, October 4, 1971, p. 11.

Michigan.[18] For example, Michigan provides scholarships to students who, after first demonstrating need, then become eligible for grants, based on examination scores and grades.

Need Analysis and the Financial-Aid Office

Dyer reports that the expected contributions of students or their parents can only be roughly determined, primarily because of variances in their willingness to sacrifice.[19]

Married students, which have included an increasing percentage of students in recent years, according to Sauber, present problems in determining expected contributions.[20] Both their expenses and resources are usually higher than those of single students and they are likely to live off campus. Although more likely to be employed, the great majority are also more likely to be under constant financial stress. However, because of more variance in their costs, plus the fact that the spouse may or may

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[18]Kirkpatrick, op. cit., p. 23.

[19]James S. Dyer, "Assessing the Effects of Changes in the Cost of Higher Education to the Student," Report (Santa Monica, Calif.: Rand Corporation, June, 1970), p. 6.

[20]S. Richard Sauber, "Money and Marriage in College," College and University, XLVI, No. 3 (Spring, 1971), 245.

not be working, a uniform system of estimation is difficult to develop.

Standardized need analysis systems have, to some degree, aided in resolving these economic considerations. Students still, however, often choose their college according to the type of financial aid package, in terms of the relative proportioning of loans, work, and grants offered. Bingham points out that standardized need analysis systems have not achieved nationwide standardized awards because, first, in addition to the College Scholarship Service and American College Testing Program systems, many schools have their own systems.[21] Also, most schools have special scholarships for prized potential enrollees, who are not expected to supply self-help. Thus, Bingham concludes, competition in dollars for students still continues. Bingham summarizes by proposing adoption of a national needs analysis system, so that financial aid could be determined through a single, clear administrative process, which would be subject to on-going evaluation and refinement.

In addition to a uniform method of selecting aid recipients, the role of the financial-aid office must also be clarified. Van Dusen has pointed out that the philosophy by which the financial-aid officer operates is

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[21]R. Gordon Bingham, "Financial Aid Packaging, Student Serving or Institution Serving?" National ACAC Journal, XV, No. 2 (1970), 24.

effected constantly by circumstances beyond his control.[22] For example, rather than aid being determined in sole accordance with institutional purpose, federal and state programs have had strict guidelines which impose, in actuality, outside controls on whom the aid recipients will include. Further, even within the institution, administrative hierarchies, procedures, and controls often determine, to a great extent, the policies which the financial-aid office must follow.

Van Dusen went on to urge, nonetheless, a student centered rather than an institutional point of view in the awarding of financial aid.[23] This student personnel approach takes into account the potential effect of the type of aid offered on the development and future of the student.

Gross countered, however, that the student-centered viewpoint, though noble, is not yet based sufficiently on empirical research.[24] Gross called first,

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[22]William D. Van Dusen, "Toward a Philosophy of Financial Aid Programs," Journal of the National Association of Student Personnel Administrators, IV, No. 1 (July, 1966), 3.

[23]Ibid., p. 5.

[24]Stanley J. Gross, "A Critique of Practice in the Administration of Financial Aid," The Journal of College Student Personnel, VII, No. 2 (March, 1966), 83.

for example, for the establishment of standards for training programs for financial-aid officers to establish more closely uniform levels of competency.

Stamatakos and Bekkering point however, that no matter how competent the individual financial-aid officer might be, because of the environmental pressures he encounters, his overall effectiveness in meeting the student's needs is more importantly determined by both the location of his office and the person to whom he is administratively responsible.[25]

Stamatakos and Bekkering then concluded that if the present trend continues for the financial-aid office to be located in the student personnel area, with the director reporting to the dean of students, aid is more likely to be effectively determined according to student needs, rather than institutional needs.

Impact of Financial Aid

The type and amount of financial aid often influences, of course, whether a student will attend any college. Further, should the decision be made to attend, the same two factors can effect his college experience.

Initial demonstration of this fact is shown by the influence of financial aid on the choice a student

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[25]Louis C. Stamatakos and James R. Bekkering, "Financial Aid: Whom Should It Serve?" The Journal of College Student Personnel, XIII, No. 1 (January, 1972), 61.

makes on whether to attend a public or a private college. For example, Fenske and Boyd found that the present large state program of aid in Illinois markedly increases the number of students in attendance at private schools.[26] This holds true because the awards, while requiring financial need, allow the costs of the particular college applied for to figure heavily in the determination of that need. Thus, a student applying for a private, higher cost college often can demonstrate more need than a student from a lower-income background who applies for a community college.

In another vein, present federal guidelines effect heavily the type of aid students from different income brackets receive. The Work-Study and Economic Opportunity Grant guidelines, for example, are geared to students with low family income. Fields, though, points out the importance of other factors which also influence financial need, such as access to other aid, different costs of living, particular institutional costs, and whether the student lives at home or school.[27] Middle-income students thus often must turn to loans, especially when a poor general economy lessens their chances of obtaining outside employment.

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[26]Robert H. Fenske and Joseph D. Boyd, "The Impact of State Financial Aid to Students on Choice of Public or Private College," College and University (Winter, 1971), 98.

[27]Fields, op. cit., p. 2.

However, the 1970 Manual for Financial Aid Officers points out that no specific, concrete studies on the effects of different loan parameters have been conducted with regard to research on attitudes, repayment patterns, long-range earning expectations, or undergraduate choice of fields of study.[28]

A study by Kelly at the University of Illinois does attempt to ascertain the effect that different kinds and combinations of financial aid have on academic achievement.[29] Kelly found no significant difference between the level of ability, which was determined by the ACT Battery, and the type of financial-aid award. He did find, however, that those students who received gift aid did achieve slightly better grades. Nevertheless, Kelly found no significant differences between the grades of those students who received packaged aid and those who did not. Also, there were no significant differences between the academic performance of those whose packaged aid included part-time work versus those whose package included no part-time work.

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[28]College Scholarship Service, op. cit., p. 2.12.

[29]Bruce Kelly, "An Anaysis of Various Types of Financial Aid and Academic Achievement at the University of Illinois," Dissertation Abstracts, XXXI (1970), 4550A.

Merritt specifically investigated the academic performance of work-study students.[30] The work-study students were compared on grade-point averages with social fraternity and sorority students. Also, for the purposes of this study, the fraternity and sorority members surveyed earned less than $50 during the semester. The author found that work-study students achieved grades equal to the social organization group members. Merritt concluded that fifteen hours per week of part-time employment does not lower the grade-point average.

The findings of Kelly and Merritt agree with the results of a general review of financial-aid research studies which was conducted by Nash.[31] Nash concluded, however, that in spite of the individual institutional studies, the general pervasive effect of the present major federal, state, and institutional financial-aid programs on both low- and middle-income recipients has not yet been conclusively or completely measured.

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[30]Ray Merritt, "Academic Performance of Work-Study Students," Journal of College Student Personnel (May, 1970), 173.

[31]George Nash, "A Review of Financial Aid Research," National ACAC Journal, XIV, No. 1 (1969), 27.

Descriptive Studies

The 1970 College Scholarship Manual indicates the need, in order to assess their college financial-aid programs, for the financial-aid officers to concern themselves with institutional studies of the characteristics of their students, their expense patterns, and how these expenses are accounted for.[32] Further, by combining socio-economic characteristics of recipients with the types of aid offered and either accepted or rejected, the CSS manual notes that officers can determine, each year, the effects of their institutional financial-aid policies.

Nash found, for example, that the federal work-study program has caused a generalized across-the-board increase in student pay scales by requiring that salaries paid to students working under this program must at least match the legal minimum per hour wage rates.[33] Also, Nash concluded that the low (3 per cent) interest rate of the NDSL program has contributed, at least in part, toward a more favorable general attitude by parents and students toward the concept of loans as a means of financing a college education.

In addition, in terms of immediate effects on life styles, Hall and Craigie found, in a nationwide study of

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[32]College Scholarship Service, op. cit., p. 3.8.

[33]Nash, "Review of Financial Aid Research," p. 24.

student borrowers, that loans, in the case of about half of the recipients, enabled them to reduce their part-time employment.[34] In the same study, in terms of need for loans, 30 per cent of the borrowers were reported as financing their entire costs from sources outside the family (loans, scholarships, jobs), 59 per cent financed over 75 per cent of their own education, and 85 per cent, one-half or more.[35] Finally, 85 per cent of the borrowers had savings of less than $250.

In a nationwide study of entering students, Baird found that most low-income freshmen had chosen their college on the basis of low cost, closeness to home, and the offer of financial aid.[36] Also, although likely to have had fewer experiences, more low-income students view college solely in vocational terms.

In another study of freshmen, Bayer reported the results of a nationwide survey which indicated that 10 per cent of the freshmen drew most of their aid from

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[34]U.S., Department of Health, Education, and Welfare, Office of Education, Student Borrowers, Their Needs and Resources, by Robert C. Hall and Stanton Craigie (Washington, D.C.: Government Printing Office, 1962), p. 13.

[35]Ibid., p. 16.

[36]Leonard L. Baird, Family Income and the Characteristics of College Bound Youth, Report No. 17 (Iowa City: American College Testing Program, 1967), p. 23.

scholarships or grants.[37] Also, although relatively few students worked a significant number of hours during their first year of college, at least 10 per cent did manage to earn over $800.

In a study of urban university financial-aid recipients, Zaccardelli accumulated data describing selected characteristics.[38] Based on his findings, Zaccardelli rejected the assumption that financial-aid recipients may need additional personnel services not already commonly available at a university. He did conclude, though, that federal financial-aid programs were not sufficient to completely alleviate many of the recipients' financial problems. However, in comparing the recipients with non-recipients, both groups achieved roughly equal grades. Finally, the recipients were not found to have had a significantly larger number of problems in adjusting to college than non-recipients, except in the already mentioned area of finances.

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[37]Alan E. Bayer, et al., "The First Year of College: A Follow-Up Normative Report," ACE Research Reports, V, No. 1 (February, 1970), 70.

[38]E. Joseph Zaccardelli, "A Study of Selected Characteristics of Students Attending an Urban University While Receiving Financial Aid Under Certain Federal Acts as Contrasted to Students Not Receiving Financial Assistance," Dissertation Abstracts, XXIX (1969), 3433A.

Present Context

College students, according to Mitchell, vary widely in the type and amount of expenditures they make.[39] For example, Mitchell found that single students spend less than married ones, females spend more than males, and except for the sophomore year, expenses increase each year.

Nevertheless, all full-time students share in common the concept of foregone income. Hansen and Weisbrod explain foregone income in that as long as the student is on campus, one form of cost is the income which he could have earned were he to work full time rather than to attend school.[40] The authors infer that this factor is especially important in the case of students from low-income families, which might badly need the extra funds.

Doermann concluded that low-income students with average or below average measured aptitudes for college comprise the greatest unsolved educational and social problem in higher education.[41] This problem is further aggravated each year by inflation.

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[39]Glen H. Mitchell, Some Selected Expenditure Characteristics of Non-Resident Students, New Mexico State University, 1967-68 Academic Year (Las Cruces: New Mexico State University, 1969), p. 3.

[40]W. Lee Hansen and Burton A. Weisbrod, Benefits, Costs, and Finance of Public Higher Education (Chicago: Markham Publishing Co., 1969), p. 56.

[41]Humphrey Doermann, "Lack of Money: A Barrier to Higher Education," in Barriers to Higher Education (New York: CEEB, 1971), p. 136.

Loans may not be a panacea for these students. Gordon notes that while many of these students have to be sold on the idea of going to college in the first place, they especially may not be able to go into debt for an education.[42]

Kirkpatrick indicates that, to meet this problem, states, in addition to increasing their role in the guaranteed loan program, are setting up increasing numbers of scholarship and grant programs based on financial need.[43] The federal government also continues to increase their need-based programs each year.

Presently, the major independent need analysis systems are operated by the College Scholarship Service (CSS) and the American College Testing Program (ACT).[44] These two programs are utilized by 65 per cent of the colleges and universities in the United States, with the other 35 per cent utilizing their own need analysis systems.

Because many of the low-income families have had difficulty with the need assessment forms, both ACT and CSS have been attempting to simplify their systems. For

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[42]Gordon, op. cit., p. 120.

[43]Kirkpatrick, op. cit., p. 25.

[44]Beckie Hanes, "U-M Study Will Influence 'U' Financial Aids System," Michigan State News [East Lansing], February 23, 1972, p. 2.

example, Orwig and Jones examined certain variables to determine the best predictors of expected parents' contributions.[45] The best predictors identified were federal income tax, parents' investments, net value of farm or business, net value of real estate, home equity, and parents' savings.

Finally, over the past decade, CSS has also attempted to make changes in their system. For example, Bowman reports the replacement of the borrowing potential concept by a net worth formula.[46] That is, generally, the more stable a business or farm is, the greater the proportion of assets they can borrow on. Thus, under the borrowing potential system, as larger loans were taken out, it was possible for smaller proportions of assets to be considered in determining the amount of money that could be contributed to college expenses. However, this system was unfair in that larger and more successful businesses or farms were able to avoid proportionally large contributions.

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[45]M. D. Orwig and P. K. Jones, "Can Financial Need Analysis be Simplified?" ACT Research Report, No. 32 (Iowa City, March, 1970), p. 1.

[46]James L. Bowman, Measuring the Financial Strength of Farm and Business Assets (Princeton, N.J.: College Scholarship Service, Educational Testing Service, December, 1969), p. 4.

Net worth is total assets minus total liabilities.[47] Presently, CSS is utilizing an arbitrary percentage of net worth contribution formula in place of the borrowing potential concept. Thus, under this system, as net worth increases, a greater contribution toward educational expenses is expected.

Finally, another, more gradual change, a decrease, has taken place in the amount of expected contributions from parents in response to rises in the costs of living.[48]

Summary

In recent years there has been a strong increase in the amount of need-based student financial aid, which has opened college enrollments to students from the full range of economic backgrounds. The federal programs of grants, work-study, and loans have provided the greatest proportion of these funds.

Orwig emphasizes that because of the differing need analysis systems, a uniform method of determining need has not yet been established.[49]

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[47] Ibid., p. 7.

[48] James L. Bowman and Gertrude S. Weiss, Expected Contribution Toward Educational Costs: Suggested Revisions for 1969-70 (Princeton, N.J.: College Scholarship Service, Educational Testing Service, September, 1969), p. 1.

[49] M. D. Orwig, "A Survey of Financial Need Analysis Methods Used in Institutions of Higher Education" (unpublished doctoral dissertation, Indiana University, 1970), p. 82.

However, regardless of the specific procedures utilized by the college financial-aid office, Stamatakos and Bekkering point out that it remains imperative for the financial-aid office to be as free as possible from institutional pressures in determining student-centered policies for awards.[50]

Nash has shown that most aid is awarded in the form of packages, which consist of combinations of loans, work, and grants.[51] Although the long-term effect of loans are not yet demonstrated, parents' attitudes toward loans have become more favorable, although this is not as true for low-income families.

Finally, in order to accurately assess the effectiveness and relationships of the different variables utilized in determining financial need, a uniform method of need analysis is called for.

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[50]Stamatakos and Bekkering, op. cit., p. 61.

[51]Nash, op. cit., p. 27.

CHAPTER III

DESIGN OF THE STUDY

The design of this study is described under six main headings: (1) Sample Selection, (2) Nature of the Data, (3) Testable Hypotheses, (4) Analysis Procedures, (5) Exploratory Questions, and (6) Summary.

Sample Selection

The sample was selected from the 1970-71 Michigan State University freshmen financial-aid recipients who rejected portions of their award, but showed on campus, completed their freshman year, and showed again on campus in the fall of 1971 as sophomores. There were 201 such students, as shown by records maintained at the Michigan State University offices of Admissions and Scholarships, and Financial Aids. The sample of 100 was randomly chosen in alphabetical order.

Nature of the Data

The following data was gathered on each student:

a. Parent's net income

b. Residence Equity

c. Effective Income

d. Total Assets

e. Federal Income Tax

f. Number of children

g. Number of children in college

h. Financial need

Also:

a. Sex

b. Parents' Occupational Class

The factors listed so far have constituted the independent variables. The following were the dependent variables:

a. $ Amount of loans rejected

b. $ Amount of work rejected

c. $ Total Rejected

The data was gathered from the analysis of the Parents' Confidential Statement by College Scholarship Service and from the Michigan State University offices of Admissions and Scholarships, and Financial Aids.

Testable Hypotheses

Rather than list all possible hypotheses, instead, only the general ones will be included. However, Chapter IV will have explanations of them in detail in terms of specific analyses resulting from the data. The first major hypothesis, to be tested through multiple regression analysis, is:

H1: There is no relationship between a set of eight predictor variables or any subset of these variables and the amount of aid rejected by freshmen college students.

The eight predictor variables associated with H1 are: (1) parents' net income, (2) residence equity, (3) effective income, (4) total assets, (5) federal income tax, (6) number of children, (7) number of children in college, (8) financial need.

The next three hypotheses, to be tested through two-way multivariate analysis of variance of variance, are self-explanatory in regard to the variables involved. These three hypotheses are:

H2: There are no significant differences between the amount of aid rejected by males and females.

H3: There are no significant differences between the amount of aid rejected among several different classes of parents' occupations.

H4: There is no significant interaction effect between the variables of sex and parents' occupational class on the dependent measure of aid rejected.

Analysis Procedures

The methods of analyses utilized included multiple regression analysis and two-way multivariate analysis of variance. The Michigan State University CDC 3600 computer was employed in the statistical computations. The specific programs used were the MSU Agricultural Experiment

Station's Least Squares Delete Routine[1] and the Finn Fortran Program for Univariate and Multivariate Analysis of Variance and Covariance.[2]

The first step in the procedure regarding the multiple regression will be to report the amount of relationship between the whole set of predictor variables and the criterion variables. There will be a separate multiple regression on each criterion variable. The general form of the equation to be determined in each of the three cases will be presented here. This equation, then, represents the relationship between the criterion variables and all of the independent variables.

Specifically, it will be determined, for each individual, the amount of aid rejected (Y_i), where:

i = dependent variables 1-3

so that:

Y_1 = $ work rejected

Y_2 = $ loans rejected

Y_3 = $ total rejected

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[1]Michigan State University, Stepwise Deletion of Variables from a Least Squares Equation, Agricultural Experiment Station STAT Series Description No. 8 (East Lansing, Mich.: Michigan State University, November, 1969), p. 1.

[2]Jeremy D. Finn, Multivariance: Fortran Program for Univariate and Multivariate Analysis of Variance and Covariance (Buffalo, N.Y.: The State University of New York at Buffalo, 1967).

Then, other quantitative measures (x) will be taken, where:

x_1 = parents' net income

x_2 = residence equity

x_3 = effective income

x_4 = total assets

x_5 = federal income tax

x_6 = number of children in college

x_7 = financial need

x_8 = number of children

The above eight possible predictors, then, are the independent variables.

In utilizing the measures described, the general regression equation formed to determine if there is a relationship between any or some of the eight predictors and the criteria variables is:

$$Y_i = \beta_{i_0} + \beta_{ix_1} + \beta_{ix_2} + \ldots \beta_{ix_8}$$

where

$\beta_{i_0} \ldots \beta_{i_8}$ = Beta weights

Now, through application of the equation, the amount of aid to be rejected could be predicted for the individual, who, for some reason it is known will reject

aid. The prediction would be based upon that student's measures (scores) on the independent variables.

Utilizing the least squares delete routine, the independent variables will be deleted one at a time, as determined by their failure to contribute at the .05 level of significance to the prediction of the criterion variance. This continues until the last variable is reached whose removal would not significantly effect the prediction at the .05 level. The remaining independent variables are then the significant contributors. Then, the final weights of those remaining after all the deletions have occurred will be reported.

In the case of the discrete variables, which include sex and parents' occupation, a two-way multivariate analysis of variance will be utilized. The Finn Program[3] will be employed on the Michigan State University CDC 3600 computer to perform multivariate linear estimates and tests of the hypotheses.

Sex and father's occupation will be the independent variables used to determine if there are differences in the amount of aid rejected by members of those groups. Thus the analyses of Hypotheses H2, H3, and H4 involve a multivariate analysis of variance with loans rejected and work rejected as the two dependent variables involved.

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[3] Ibid.

Finally, F Tests for the main effects and interaction will be computed. The significance level at which these tests will be conducted has been set at α(alpha) = .05.

Exploratory Questions

After the major analysis procedures related to the main hypotheses were completed, there were a number of supplemental exploratory questions that were answered through informal interviewing with a selected sub-sample of the subjects. An attempt was made to determine three points: (1) What happened to the student's circumstances relative to the PCS accuracy after enrollment? (2) How accurate was the assessment of need viewed prior to enrollment? and (3) Did the student or his family have to alter their basic life style?

Eleven questions were asked of each member of the selected sub-sample of thirty students. These questions were:

1. Was the assessment of need accurate?
2. Did the family financial situation change between the time the parents confidential statement was submitted and the time the award was received?
3. How concerned are you about your ability to finance your education for the remaining years?

4. Did your family have to sacrifice?
5. How much, in terms of percentage did you pay for yourself last year?
6. Has your financial situation affected your extra-curricular activities or social life?
7. What was the main influence on attending college?
   a. Improve ability to think
   b. Discover your interests
   c. Develop skill for a job
   d. Learn to work and live with others
8. Reasons for attending MSU?
   a. Atmosphere and reputation
   b. Physical facilities
   c. Personal friends or family influence
   d. Other factors (e.g., location or cost)
9. How many hours per week did you work while attending college last year?
10. How much, if any, was on work-study?
11. Prior to arrival on campus, had you planned on working?

Because the sub-sample was not random, conclusions to be drawn could be applied only to the sub-sample and generalized inferences will not be possible. Also, the

statistical treatment consisted of frequency counts, with no test of significance conducted.

Summary

A 100 Ss random sample of the 1970-71 Michigan State University freshmen financial-aid recipients who rejected part of their aid package, yet made it through their freshman year and achieved sophomore status by the following autumn was drawn. Through multiple regression analysis, the relationships of eight independent continuous variables with three dependent variables were explored for predictive purposes.

Through two-way multivariate analysis of variance, the relationships of two discrete independent variables with two dependent variables were also investigated.

In attempting to determine additional descriptive characteristics, informal interviews were conducted with a selected sub-sample.

CHAPTER IV

ANALYSIS OF THE RESULTS

This chapter will include the statistical findings of the study along with the analyses and discussions of these findings. Results are presented in the same order in which the hypotheses were presented in Chapter I. Thus, the multiple regression results are presented first. The two-way multivariate analysis of variance results are presented next. Finally, the findings from the personal interviews with members of the selected subsample are presented.

Grand Means and Standard Deviations

Table 4.1 presents in dollars the mean scores and standard deviations on each variable processed through the multiple regression analysis. The first three variables constitute the dependent variables of loans rejected, work rejected, and total rejected. The rest of the variables, net income, residence equity, effective income, total assets, federal income tax, number of dependents in college, financial need, and number of children are all independent.

TABLE 4.1. Descriptive Statistics on All Variables.

Variable	Mean	Standard Deviations
Loans rejected	140.4	138.56
Work rejected	178.1	256.23
Total rejected	330.8	215.56
Net income	9703.7	3691.18
Residence equity	10234.7	7507.49
Effective income	8371.2	3089.83
Total assets	16276.1	12301.25
Federal income tax	879.9	617.38
Number of children in college	1.5	0.61
Financial need	1180.1	440.07
Number of children	3.75	1.83

Table 4.1 shows that there was an average of about $140 rejected per subject in loans and about $178 in work. This constitutes an actual total rejected of $318, whereas the table indicates an average total rejected of about $331. The difference between the $318 and the $331 shown represents the amount rejected per subject in grants. This amount was considered to be negligible as most students turned down only work or loans.

In referring now to the independent variables, the figures show, for example, that the categories of net income and residence equity reveal an average net income of $9703, and an average residence equity of about $10,234.

Table 4.2 contains the simple Pearson Product-Moment correlations among the variables. The most important correlation which should be noted is the high negative (-0.602) correlation between work rejected and

TABLE 4.2. Simple Correlations.

	Ln. Rej.	Wk. Rej.	Tl. Rej.	Net Inc.	Res. Eq.	Eff. Inc.	Tl. Asts.	Fd. Tax	Num. Col.	Fin. Need	Num. Dep.
Loans Rejected	1.000										
Work Rejected	-0.602	1.000									
Total Rejected	-0.065	0.762	1.000								
Net Income	-0.251	0.138	-0.086	1.000							
Residence Equity	-0.020	-0.124	-0.223	0.044	1.000						
Effective Income	-0.278	0.136	-0.117	0.974	0.040	1.000					
Total Assets	0.027	-0.008	0.060	-0.252	0.610	-0.279	1.000				
Federal Income Tax	-0.289	0.203	0.012	0.823	-0.014	0.730	-0.211	1.000			
Number of Dependents in College	-0.003	-0.136	-0.127	0.082	0.164	0.081	0.187	0.024	1.000		
Financial Need	-0.200	0.102	0.292	-0.584	-0.212	-0.552	-0.150	-0.570	-0.106	1.000	
Number of Dependents	0.223	0.070	0.057	0.283	0.048	0.365	-0.081	-0.078	0.142	0.227	1.000

loans rejected. This implies that the subjects may have rejected work or loans but tended not to reject both. Apparently, the subjects needed some aid, for if they had had no need for financial assistance they most likely would have rejected both work and loans. The negative correlation implies that as the amount of work rejected increased, the amount of loans rejected goes down and vice versa.

The next correlation of interest is the high positive (0.761) correlation between the total amount of aid rejected and the work rejected. The reason for a positive correlation here when there was a negative correlation between work rejected and loans rejected is that the work rejected was summed in to get the total amount of aid rejected. Thus, total amount of aid rejected is being correlated against itself by one-half (since total aid rejected = work rejected + loans rejected). That is, then, as the total amount of aid rejected goes up, the amount of work rejected also goes up. This indicates that if a person is likely to reject aid, he most likely includes work as part of the aid which he rejects.

There are also a number of other high correlations in the matrix. Residence equity and net income correlated strongly (0.973). Federal income tax and net income also correlated positively (0.822). However, financial need and net income correlated, as expected, negatively (-0.584).

Total assets and residence equity correlated positively (0.609). However, financial need and effective income correlated, again as expected, negatively (-0.551). Financial need and federal income tax also correlated negatively (-0.570).

In summing up correlational results, it must be remembered that these correlations merely show relationships and are not necessarily causal.

Regression Equation Determination: Introductory Statement

Tables and discussions provide the statistical results pertaining to final least squares estimates for each of the three dependent variables of loans rejected, work rejected, and total rejected.

In analyzing the regression results in terms of the eight predictor variables, standardized regression weights (beta weights) were used in order to reduce the amount of predictive fluctuation due to large standard deviations in the raw data. That is, standardized regression weights are based on standard scores and therefore reduce the amount of fluctuation in the raw regression weights.

In addition, these beta weights do not change when an independent variable is multiplied by a constant, and they give some suggestion as to the relative

contribution of each independent variable as a predictor for the variation of the dependent variables.

R^2 deletes were also signified since they are helpful in approximating the portion of additional variation which each of the independent variables account for in the dependent variables. Since R^2 (the squared regression correlation coefficient) indicates the extent to which the variance of the dependent variable is explained by the set of independent variables, examination of R^2 deletes (meaning the resultant R^2 if a given independent variable is deleted) gives the researcher some relative indication as to the contribution of each independent variable. For example, if R^2 delete shows a very large drop from the overall R^2, it would be a clear indication that the particular independent variable in question would be contributing a good deal to the prediction.

Regression Equation Determination: Dependent Variable I: Loans Rejected

Three of the eight independent variables met the .05 significance criterion for inclusion in the final multiple regression equation for loans rejected. These remaining variables, net income, effective income, and federal income tax, would be the best predictors of loans rejected for the type of population included in this study. The final relationship, as indicated in Table 4.3, was significant at the F Test significance level of .001.

TABLE 4.3. Analysis of Variance to Test Significance of the Relationship Between Independent Variables (After All Deletions) and the Dependent Variable: Loans Rejected.

	Sum of Squares	Degree of Freedom	Mean Square	F	Sig.
Regression (about mean)	299569.407	3	99856.409	5.9876	0.001
Error	1601014.592	96	16677.235		
Total (about mean)	1900583.999	99			

Multiple Correlation Coefficients		Standard Error of Estimate
R^2	R	
0.158	0.397	129.14

Of those variables originally entered into the regression, five were dropped as not having contributed significantly (at alpha = .05) to the overall prediction. The five variables deleted (in order of deletion) were: (1) number of children in college, (2) residence equity, (3) financial need, (4) number of children, and (5) total assets.

For the three remaining independent variables: (1) net income, (2) effective income, and (3) federal income tax, Table 4.3 indicates that the multiple correlation coefficient (R) was .397, and the square of the multiple correlation coefficient (R^2) was .158. The latter indicates that roughly 16 per cent of the amount of the variance of loans rejected was accounted for by these selected independent variables. The standard error of estimate was 129.14.

Table 4.4 shows that net income had the highest beta weight (1.599), indicating considerable usefulness as a predictor of the amount of loans rejected. The last two remaining independent variables, effective income and federal income tax, carried negative beta weights respectively of -1.422 and -0.567, even though they both are positively correlated with the amount of loans rejected.

These negative weights indicate that a suppressor effect has taken place. That is, some of the irrelevant

TABLE 4.4. Final Regression Coefficients, Beta Weights, Standard Errors, Levels of Significance, and R^2 Deletes from a Stepwise Deletion of Eight Independent Variables in a Least Squares Regression Equation for the Dependent Variable: $ Loans Rejected.

	Regression Coefficients	Standard Error	Beta Weights	Standard Error of Betas	F Critical Value	F Significance	R^2 Deletes
Constant	203.413	40.197			25.608	<0.0005	
Net Income	0.060	0.022	1.599	0.590	7.353	0.008	0.093
Effective Income	-0.064	0.022	-1.422	0.490	8.400	0.005	0.084
Federal Income Tax	-0.127	0.044	-0.567	0.197	8.278	0.005	0.085

Note: Variables in Order Deleted: Number of Children in College, Residence Equity, Financial Need, Number of Children, and Total Assets.

variance of the net income can, in effect, be partialled out through the employment of the two additional variables, thus allowing that which is left to contribute more significantly to the multiple regression equation.

Thus, we have three highly related measures acting in conjunction to produce a prediction that would not have been possible with any one of them alone. Therefore, there is a component of the variable in each one of the three which is related to the loans rejected, and that, apparently, by adding all three makes that component much clearer in terms of its relationship with the dependent variable.

At this point, the resulting multiple regression equation (in standard score form) for predicting loans rejected may be written:

Loans Rejected = (1.599) net income
+ (-1.422) effective income
+ (-0.567) federal income tax

where the numerical scores refer to the corresponding standardized scores of the independent variables.

Regression Equation Determination: Dependent Variable II: Work Rejected

Table 4.5 gives the analysis of variance for the overall regression regarding the dependent variable of work rejected, indicating that the set of independent variables remaining as predictors after deletion of

TABLE 4.5. Analysis of Variance to Test Significance of the Relationship Between Independent Variables (After All Deletions) and the Dependent Variable: Work Rejected.

	Sum of Squares	Degree of Freedom	Mean Square	F	Sig.
Regression (about mean)	720729.680	2	360364.839	6.049	0.003
Error	5778809.320	97	59575.354		
Total (about mean)	6499538.999	99			

Multiple Correlation Coefficients		Standard Error of Estimate
R^2	R	
0.111	0.333	244.08

non-significant variables were significantly related to the variable work rejected at the F test significance level of 0.003.

Of those variables originally entered into the regression equation, six were dropped as not having contributed significantly (at alpha = .05) to the overall prediction. The variables deleted (in order of deletion) were: (1) number of children, (2) net income, (3) number of children in college, (4) effective income, (5) residence equity, and (6) total assets.

The two variables that met the .05 significance criterion, federal income tax and financial need, reported a multiple correlation coefficient (R) of .333, and a squared correlation coefficient (R^2) of .111. The latter indicated that the two independent variables accounted for roughly 11 per cent of the variation in the dependent variable of work rejected. The standard error of estimate was 244.08.

The two variables which indicated usefulness as predictors of work rejected: (1) federal income tax, and (2) financial need, had beta weights of .386 and .322, respectively, as revealed in Table 4.6. It may be noted here that federal income tax reversed the function it had for predicting loans rejected. That is, here, with the dependent variable of work rejected, the beta weight for federal income tax was positive instead of negative. Also,

TABLE 4.6. Final Regression Coefficients, Beta Weights, Standard Errors, Levels of Significance, and R^2 Deletes for a Stepwise Deletion of Eight Independent Variables in a Least Squares Regression for the Dependent Variable: $ Amount of Work Rejected.

Independent Variables	Regression Coefficients	Standard Errors	Beta Weights	Standard Error of Betas	F Critical Values	F Significance	R^2 Deletes
Constant	-183.867	112.720			2.660	0.106	
Federal Income Tax	0.160	0.048	0.386	0.116	10.974	0.001	0.010
Financial Need	0.187	0.068	0.322	0.116	7.615	0.007	0.041

Note: Variables in Order Deleted: Number of Dependents, Net Income, Number of Dependents in College, Effective Income, Residence Equity, and Total Assets.

financial need appears here as a significant predictor for the first time, while net income did not appear.

In standard score written form, the regression equation for dependent variable II, Work Rejected, is:

Work Rejected = (.386) federal income tax
+ (.322) financial need

where the score for work rejected is a normal score and the numbers in parentheses are standardized regression weights (beta weights).

Regression Equation Determination:
Dependent Variable III: Total Rejected

Table 4.7 gives the analysis of variance table for the overall regression predicting total rejected. It is clear from this table that the set of variables remaining after deletion of non-significant variables was significantly related to the variable total rejected at an F test significance level of less than .0005.

Of those variables originally entered into the regression equation, four were dropped as not having contributed significantly (at alpha = .05) to the overall prediction. The four variables deleted (in order of deletion) were: (1) effective income, (2) net income, (3) number of children, and (4) number of children in college.

TABLE 4.7. Analysis of Variance to Test Significance of the Relationship Between Independent Variables (After All Deletions) and the Dependent Variable: Total Rejected.

	Sum of Squares	Degree of Freedom	Mean Square	F	Sig.
Regression (about mean)	1210501.3245	4	302625.331	8.4817	<0.0005
Error	3389592.6754	95	35679.922		
Total (about mean)	4600093.9998	99			

Multiple Correlation Coefficients		Standard Error of Estimate
R^2	R	
0.263	0.513	188.89

The four variables that met the .05 significance criterion: (1) total assets, (2) residence equity, (3) federal income tax, and (4) financial need, reported a multiple correlation coefficient (R) of .513, and a squared correlation coefficient (R^2) of .263. The latter indicated that the four independent variables accounted for roughly 26 per cent of the variation in the dependent variable of total rejected. The standard error of estimate was 188.89.

It is interesting to note from the sample correlations (Table 4.2) that residence equity and financial need correlated directly with total rejected (one positively and the other negatively), and that the corresponding beta weights after the regression, as shown in Table 4.8, fell in the same direction. However, the other two variables, total assets and federal income tax, respectively, as shown in Table 4.2, are <u>not</u> strongly correlated with total rejected (.06) and (.01). Considering these latter simple correlations, it is clear that the variables total assets and federal income tax, which have strong beta weights (as shown in Table 4.8) are acting as suppressor variables for the other two independent variables. For example, some of the irrelevant variance in residence equity is taken out by the effect of total assets. That is, some of the irrelevant variance of residence equity can be explained by the relationship

TABLE 4.8. Final Regression Coefficients, Beta Weights, Standard Errors, Levels of Significance, and R^2 Deletes from a Stepwise Deletion of Eight Independent Variables in a Least Squares Regression Equation for the Dependent Variable: Total Rejected.

Independent Variables	Regression Coefficients	Standard Error	Beta Weights	Standard Error of Betas	F Critical Value	F Significance	R^2 Deletes
Constant	-90.277	108.517			0.692	0.408	
Residence Equity	- 0.011	0.003	-0.387	0.112	11.824	0.001	0.171
Total Assets	0.008	0.002	0.452	0.118	14.695	<0.0005	0.149
Federal Income Tax	0.135	0.040	0.386	0.115	11.167	0.001	0.177
Financial Need	0.244	0.056	0.497	0.114	18.947	<0.0005	0.116

Note: Variables in Order Deleted: Effective Income, Net Income, Number of Children, Number of Children in College

between residence equity and total assets. This, then, allows a better prediction, based on a smaller remaining error variance in the residence equity variable.

In sum, the dependent variable total rejected will best be predicted (based on Table 4.8) by the following regression equation (in standard score form):

Total Rejected = (-0.387) residence equity
+ (0.452) total assets
+ (0.386) federal income tax
+ (0.497) financial need

where the decimal numbers in parentheses are standardized regression weights (beta weights).

Discussion of the Least Related to the Most Related Variables

Multiple regression beta weights fluctuate, depending on how many variables there are in the equation, which ones they are, and how they correlate with each other. Therefore, theoretically, it must always be taken into consideration how the beta weights effect each other even though the equation might be the best one. For example, beta weights are relative to each other, therefore a strong high correlation between two predictor variables might lead to a negative beta for one or the other of the two variables. Thus, in order to gain maximal interpretation, an independent rerun, theoretically, would be needed to see if a particular beta changed its sign or size.

This close relationship between beta weights appeared a number of times in this study. One specific example may be pointed out in the loans rejected equation. Here, net income, effective income, and federal income tax were all weighted about the same (Table 4.4) but since they are all highly related, when the first variable (net income) is placed in the equation, its beta weight tends to be positive. However, the second variable, effective income, rather than contributing from its own direct correlation with loans rejected, instead increases the prediction of the equation by partialing out some of the irrelevant variance of the net income.

Given these characteristics of beta weights, Table 4.9 lists the retained and deleted independent variables for each of the three dependent variables.

Examination of Table 4.9 reveals that the number of children, and the number of children in college were the only two variables deleted in all cases. Residence equity was dropped, however, in both loans rejected and work rejected, but not in total rejected.

Of those variables retained, federal income tax was retained as significant for all three dependent variables. Financial need was retained in the prediction of work rejected and total rejected, but not for the first dependent variable, loans rejected.

TABLE 4.9. Deleted and Retained Independent Variables for Loans Rejected, Work Rejected, and Total Rejected.

	Loans Rejected	Work Rejected	Total Rejected
Deleted (in order)	1. Number of Children in College 2. Residence Equity 3. Financial Need 4. Number of Children 5. Total Assets	1. Number of Children 2. Net Income 3. Number of Children in College 4. Effective Income 5. Residence Equity 6. Total Assets	1. Effective Income 2. Net Income 3. Number of Children 4. Number of Childrer in College
Retained	1. Net Income 2. Effective Income 3. Federal Income Tax	1. Federal Income Tax 2. Financial Need	1. Residence Equity 2. Total Assets 3. Federal Income Tax 4. Financial Need

Effective income and net income proved to be significant predictor variables for loans rejected. Residence equity and total assets were retained for total rejected.

Two-Way Multivariate Analysis of Variance Results

The two-way multivariate analysis of variance (MANOVA) was the statistical procedure used to test for significant differences, on loans rejected and work rejected, between the sexes and between levels of parents' occupations. In addition, the MANOVA provides a statistical test for interactions between the two independent variables of sex and parents' occupation. The seven levels of occupations are presented in Table 4.10.

TABLE 4.10. Parents' Occupational Classes.

Level	
1	Unskilled, e.g., day laborers, miners, janitors
2	Semi Skilled, e.g., painter, trucker, welder
3	Skilled, e.g., printer, craftsman, farm manager
4	Subprofessional, e.g., technical writer, police, clerks
5	Minor Officials, e.g., military officer, merchants, small business owner
6	Professionals, e.g., engineer, teacher, minister
7	Retired or Disabled

Note: There were 14 members in Class 1, 15 in Class 2, 11 in Class 3, 28 in Class 4, 16 in Class 5, 10 in Class 6, 6 in Class 7.

The MANOVA, using the computer program developed by Finn, yields two types of F ratios.[1] One type of F ratio constitutes a multivariate R ratio and the other is a univariate F. The multivariate F ratio indicates whether or not the set of dependent variables is significantly (in this study at the .05 level) different across levels of the independent variables. The univariate F ratios for each dependent variable associated with the hypothesis being tested indicate whether or not a given particular dependent variable is statistically significant, in this study again at the .05 level.

As can be seen in Table 4.11, no significant differences were found in the multivariate tests for main effects for sex, occupation, or for the interaction between sex and occupation. Since the multivariate F test results were not significant, the univeriate tests were not examined. Since these main multivariate tests indicated no significance, a furthur investigation of univariate effects would have been meaningless. Thus, the null hypotheses were accepted.

Also, it should be noted that in calculating the MANOVA, the three dependent variables are dependent upon each other. That is, only two of the three values for

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[1]Jeremy D. Finn, Multivariate: Fortran Program for Univariate and Multivariate Analysis of Variance and Covariance (Buffalo, N.Y.: Department of Educational Psychology, State University of New York at Buffalo, May, 1967).

loans rejected, work rejected, and total rejected are needed to obtain the third value. Thus, calculating the total is unnecessary and redundant.

TABLE 4.11. Multivariate Tests of Equality of Mean Vectors [Variables = Loans Rejected, Work Rejected].

Source	Multivariate DF	Multivariate F Value	P Less Than
Sex	21,85	.9749	.3815
Occupation	12,170	.3933	.9646
Interaction between occupation and sex	12,170	.6751	.7738

Since there were no significant findings on the MANOVA, rather than report individual cell means, only the grand means are pointed out. This is because in calculating the MANOVA, a failure to obtain significant findings refers specifically to the fact that there were no significant differences between the cell means. However, for information on the grand means, the reader may refer to the results already presented in Table 4.1.

Interview Results

A selected sub-sample of thirty of the one hundred members of the sample was taken in order to ask specific questions which were analyzed in terms of

frequencies of responses regarding life styles after enrollment. The subjects were selected on the basis of convenience.

The interviews attempted to gather information on how accurate the students considered the original analyses of their financial need, how they managed to pay for college, and if they had to lower their style of living. The conclusions made apply only to the selected sub-sample and cannot be inferred back to the entire group. However, the findings may be of some interest for expansion in a future study since a post-check of backgrounds on three key variables revealed a close approximation of the original sample. The average parents' net income was roughly $9,000, which is less than two standard deviations from the grand mean of the main sample, which was $9,700. The average residence equity was $10,000 compared with the grand mean figure of $10,234. Finally, the average financial need was $1,200, compared with the grand mean figure of $1,180. Table 4.12 presents the tabular results of the interviews.

Discussion of Interview Results

The picture of the interview respondents was that of a group which, although they had rejected portions of their aid, was generally satisfied with the amount of aid they did receive. This was in spite of the fact, that, on the average, the amount of loans or work they

TABLE 4.12. Tabular Results from Interviews with Selected Sub-sample of Thirty Ss's.

Question	Response	
	Yes	No
1. Was the assessment of need accurate?	25	5
2. Did the family financial situation change between the time the PCS statement was submitted and the time the awards were received?	8	22
3. Are you concerned about your ability to finance your education for the remaining years?	8	22
4. Did your family have to sacrifice?	14	16
5. How much percentagewise did you pay for yourself last year?	median 25%	
6. Has your financial situation effected your extra-curricular or social life?	9	21
7. What was the main influence on attending college?		
a. improve ability to think	4	
b. discover your interests	4	
c. develop skills for a job	18	
d. learn to work and live with others	4	

TABLE 4.12. Continued.

Question	Response	
	Yes	No
8. Reasons for attending MSU?		
a. atmosphere and reputation	11	
b. physical facilities	2	
c. friends or family influence	6	
d. other (e.g., location and cost)	11	
9. How many hours per week did you work while attending college during freshman year?	19 none	11 averaged 10 hrs/week
10. How much work was on work-study?	25 none	5 averaged 8 hrs.
11. Prior to arrival on campus, had you planned on working?	11	19

had turned down had totaled about one-third of their aid package.

Although there was roughly an even split on the question of whether the family sacrificed, only about one-third indicated that their extracurricular activities had been restricted.

Those students interviewed were all dorm residents, as is in keeping with Michigan State University policy for all except local freshmen.

As a group, they were quite vocationally oriented, with a heavy majority in college primarily to develop a job skill. However, most did not work during their freshman year, and, in fact, had not planned on working. Thus, most evidently obtained additional aid from private sources, or were able to get along without it.

Based on the finding, those students interviewed did not utilize traditional ways of keeping expenses down, such as by living at home and attending a local institution, by going to evening college, by locating inexpensive housing, by part-time work, or by reducing or eliminating social activities.

Summary

Results of this study were analyzed and discussed as to what predictors are functioning in respect to freshman financial-aid recipients at Michigan State University

who rejected portions of their aid. The researcher hypothesized that certain variables would prove descriptive of this population for predictive purposes.

The predictors used for this study, in the case of the multiple regression, were net income, residence equity, effective income, total assets, federal income tax, financial need, number of children, and number of children in college. The independent variables used in the case of the two-way multivariate analysis of variance were sex, and parents' occupational level. Finally, informal interviews were conducted with a selected subsample of students.

Further discussion of the measurements used, summary, conclusions based on the results stated, and implications for further research are included in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS, DISCUSSION, AND IMPLICATIONS FOR FURTHER RESEARCH

Summary

Student financial aid, through large infusions of federal aid, has increased greatly at colleges and universities across the country in the last several years. Demands for that aid, however, have also increased. Awards have become, therefore, especially in the case of federal aid, almost exclusively based on financial need.

Further, the three major types of aid: grants, loans, and work, are offered to students in various proportional packages. However, although most colleges make their awards on the basis of prior assessment, few follow up the appropriateness of the individual decisions they have made. For example, many students with demonstrated need turn down the work or loan portions of their aid package, yet make it through the year with the remaining aid.

In particular, this fact applied to approximately 13 per cent of the freshmen financial-aid recipients at

Michigan State University for the 1970-71 year. These students enrolled for enough course work to achieve sophomore status by the following fall. Yet, the aid they turned down had amounted, on the average, to approximately one-third of the total aid offered each of them.

A review of the financial-aid literature revealed no related studies in this area. The research did reveal, however, a need for judicious use of financial-aid resources, as the demand for aid has increased in most colleges and universities across the nation to the point where applicants with real need are often turned down. Finally, because of the increasing national commitment by colleges to ensure places in their programs for economically disadvantaged students, resources continue to be stretched even further.

The purpose of this study, then, was to attempt to identify for predictive purposes, the population of those who rejected portions of their aid (usually work or loans) in spite of demonstrated need. Through statistical procedures, it was possible to predict the amount of aid to be rejected for the individual, who, for some reason rejected self help. The predictions were made through equations based upon the students' scores on the dependent variables of work rejected, loans rejected, and total rejected.

The study was initiated by identifying a random sample of 100 freshman financial-aid recipients from the fall of 1970 who had rejected self help in the form of loans or work. The data was gathered through records at the Michigan State University Office of Admissions and Scholarships, and the Michigan State University Financial Aids Office.

Eight independent variables were analyzed through the use of multiple regression analysis. These eight variables were net income, residence equity, effective income, total assets, federal income tax, number of children in college, financial need, and number of children. Two more independent variables, sex and parents' occupational level, underwent two-way multivariate analysis of variance. In order to get in-depth information, interviews were conducted with a selected sub-sample of thirty students from the original sample of one hundred.

The multiple regression, using a least squares stepwise delete routine, yielded a number of significant variables in three equations for predicting loans rejected, work rejected, and total rejected. The two-way multivariate analysis of sex and parental occupational levels produced no significant differences. The results of the interviews, because they were not based on a random sample, were merely discussed rather than tested for significance.

Conclusions

1. The stepwise deletion procedure for dependent variable I, loans rejected, deleted five of the independent variables. The three remaining variables were net income, effective income, and federal income tax. These had a multiple regression correlation coefficient (R) of .397, and a squared multiple correlation coefficient (R^2) of .158, as well as beta weights which were all significantly different from zero at the .05 alpha level. The standard error of estimate was 129.14.

The resulting multiple regression equation, in standard score form, for predicting loans rejected may be written:

$$\text{Loans Rejected} = (1.599)\ \text{net income} + (-1.422)\ \text{effective income} + (-0.567)\ \text{federal income tax}$$

where the numbers in parentheses are standardized regression weights (beta weights).

Thus the research hypothesis that there is a relationship between a set of eight predictor variables or a subset of these variables and the amount of loans rejected by freshmen college students has not been rejected.

2. Six variables were deleted from dependent variable II, work rejected. The two remaining, federal income tax and financial need, had a final multiple

correlation coefficient of .333, and a squared correlation coefficient (R^2) of .111, as well as beta weights which were all significantly different from zero at the .05 alpha level. The standard error of estimate was 244.08.

In standard score written form, the regression equation for work rejected is:

$$\text{Work Rejected} = (.386)\ \text{federal income tax} + (.322)\ \text{financial need}$$

where the score for work rejected is a normal score and the numbers in parentheses are standardized regression weights (beta weights).

Thus, the research hypothesis that there is a relationship between a set of eight predictor variables or a subset of these variables and the amount of work rejected by freshmen college students has not been rejected.

3. Dependent variable III, <u>total rejected</u>, had four of the eight predictor variables remain with a final multiple correlation coefficient (R) of .513, and a squared correlation coefficient (R^2) of .263, as well as beta weights which were all significantly different from zero at the .05 alpha levels. The standard error of estimate was 188.89.

In standard score written form, the regression equation for total rejected is:

Total Rejected = (-0.387) residence equity
+ (0.452) total assets
+ (0.386) federal income tax
+ (0.497) financial need

where the decimal numbers in parentheses are standardized regression weights (beta weights).

Thus, the research hypothesis that there is a relationship between a set of eight predictor variables or a subset of these variables and the total amount rejected by college freshmen students has not been rejected.

4. The research hypothesis that there are significant differences between the amount of aid turned down by males and females has been rejected.

5. The research hypothesis that there are significant differences between the amount of aid turned down among several different classes of parents' occupations has been rejected.

6. The research hypothesis that there are significant interaction effects between the variables of sex and parents' occupational class on the dependent measure of aid turned down has been rejected.

7. In response to exploratory questions presented during informal interviews to a selected sub-sample, 83 per cent of the students felt their original need assessment had been accurate. Only 27 per cent indicated

any change in circumstances effecting their original assessment of need. Although 45 per cent indicated that their parents had to sacrifice, only 30 per cent of the students indicated any personal sacrifice. Because the sub-sample was not random, generalized inferences were not made.

Discussion

The review of the literature indicated a preponderance of gross global studies in the area of student financial aids as opposed to studies of specific individual background factors. One strength of this study was that it was aimed at the latter. The population consisted of students who had successfully completed their freshman year and had re-enrolled in the fall of 1971 as sophomores. Thus there was no question about the fact that they had been able to proceed with their studies in spite of having turned down, on the average, one-third of their aid package.

On the other hand, one major limitation to this study, in regard to the effectiveness of the predictors, was the restricted range of the population. That is, this study was limited to those students who rejected aid. The ideal, for a multiple regression, would have been to take a sample of those financial-aid recipients who rejected aid, those who were satisfied with the amount of their aid, and finally, those who received aid

but wanted more. Then, the entire population of financial-aid recipients could have been studied. However, information on which students requested more aid was not available.

In terms of the actual results obtained in this study, it was evident that the overall prediction of work rejected on the entire equation is not as great as the prediction in loans rejected. That is, the amount of work rejected cannot be predicted as well as loans rejected. Specifically, for example, the loans rejected equation can predict 16 per cent of the variance of loans rejected with a standard error of estimate of 129.14, whereas the work rejected equation accounts for 11 per cent of the variation with a standard error of estimate of 244.08.

However, the prediction on total rejected is better than for either loans rejected or work rejected. The equation for total rejected accounts for 26 per cent of the variation with a standard error of estimate of 188.89.

The relationships expressed by the three regression analyses may tend to underestimate the true relationship between the independent and dependent variables involved. This fact is a result of the restricted nature of the sample employed in the study. Since only those rejecting aid were included, the range of the amount of "perceived

financial need" has been restricted to only those who "perceived" that they needed less aid. By including those who wanted more aid or those who were satisfied with the aid offered, one would be extending the range and would be allowing for a better prediction to occur in the sample. In analogous terms, it is easier to tell an apple from an orange than it is to discriminate between a nectarine and an orange.

In terms of specific variables in the multiple regression, federal income tax appeared in all three final equations. It was negatively correlated with loans rejected, meaning that the tendency is that the lower the amount of loans rejected, the higher the federal income tax paid. However, federal income tax was positively correlated with work rejected, meaning that the greater the amount of work rejected, the higher the federal income tax paid. Thus, when the equation for total rejected was determined, the two previous correlations cancelled themselves to the point where in the total rejected equation, federal income tax was significant, but only slightly. Nonetheless, it may be concluded that there is some evidence that since federal income tax is significantly present in all three dependent variables, it is the most important independent variable.

In answer to the original question of whether any of the variables investigated in the multiple regression

are related to the amount of aid a student will reject, the answer is yes, although it is not clear where the relationships are coming from. Therefore, the investigation revealed that there is a new variable which takes pieces of the others, but cannot be easily explained.

In regard to the results of the two-way multivariate analysis of variance, the researcher predicted differences in loans rejected and work rejected on the main effects for sex, parents' occupational level, and the interaction between sex and parents' occupational level. There were no significant differences indicating that males and females do not reject loans or work differently. Also, parental occupational level evidently has no influence on the amount of loans or work rejected, nor does any interaction between sex and parental occupational level.

In terms of the results of the informal interviews with the selected sub-sample, it may just be noted that even though the population is restricted, many officers at schools with similar populations may be interested in the results.

Implications for Further Research

1. A further study is needed to see how well the factors investigated in this study could be used to predict from the total population of applicants which ones will reject aid.

2. This study should be validated across other universities in different geographical areas and the research extended to schools with varied enrollments and types of financial-aid programs.

3. This study should be repeated each year for cumulative data on those who reject aid.

4. Direct structured interviews should be conducted with a random sample of those who reject aid along with validation of the results.

5. In this study, net income and federal income tax correlated highly with each other. Yet, the net income-work rejected relationship was lower than the federal income tax-work rejected relationship. Thus, people with the same income may still tend to reject work differentially depending on the amount of federal income tax they pay. Thus, it would be worthy of further investigation to find how federal income tax and net income differentially behave in relation to work rejected.

6. A questionnaire study on those who have been offered aid, at the time of the offer, should be conducted to determine how they feel about their aid offer and why, in order to obtain subjective opinions on what is needed.

7. In view of the fact that the members of this population turned down, on the average, one-third of their aid package and yet made it through the year, the formula for demonstrated need may be in need of revision. Thus, considerable flexibility should be utilized in the aid award by the financial-aid officer. Further research studies in this area could provide the research basis for making such decisions.

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