ACT RESEARCH REPORT

No. 33

33

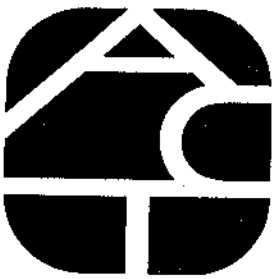
March, 1970

CAN FINANCIAL NEED ANALYSIS BE SIMPLIFIED?

M. D. Orwig
Paul K. Jones

PUBLISHED BY THE RESEARCH AND DEVELOPMENT DIVISION

THE AMERICAN COLLEGE TESTING PROGRAM



P. O. BOX 168, IOWA CITY, IOWA 52240

Abstract

The problem of collecting financial data on aid applicants is examined. A relatively small number of financial variables were found to effectively predict parents' expected contribution to college expenses. The most effective predictors among income variables are the Federal Income Tax paid by the parents and parents' nontaxable income; the best asset variables include parents' investments, the net value of a farm or business, the net value of real estate, home equity, and parents' savings. The computation of parents' expected contribution using combined variables is compared to the computation of financial need in the current ACT system. Finally, the relation between base year and estimated year income is analyzed. Individuals from families with low incomes tend to report higher estimated year incomes than base year incomes while the situation is reversed for families with high income levels.

CAN FINANCIAL NEED ANALYSIS BE SIMPLIFIED?

M. D. Orwig
Paul K. Jones

Student financial need analysis systems were developed to enable college aid officers to award student aid on the basis of financial need. Typically, these systems analyze the family financial characteristics of applicants, particularly income and asset information, compare financial resources available to the applicant with the costs of attending college, and finally for each applicant compute the amount of aid needed to attend a given college.

Until the late 1950's college aid, then usually called "scholarships," was often used to attract desirable students to the campus. Colleges would use scholarships to compete with each other for high ability men and women with unusual high school achievements. Recently, however, the federal government has initiated several student aid programs that have resulted in vast increases in available financial aid which for the most part, has been channeled to college students most in need. [U.S. Office of Education, 1968.(b)]. Thus, student financial need analysis for college applicants and students plays an important role in our society's commitment to equality of educational opportunity.

The desire for a simplified need analysis system has existed throughout the brief history of financial need analysis.[1] Financial aid officers want a system that is simple to use and understand and one that can be easily explained to parents and students. Parents, on the other hand, have resented long forms that require extensive past financial records to complete. This latter problem becomes increasingly important as expanding numbers of low-income students apply for financial aid. A complex need analysis form can be especially confusing to the parents of low-income students and, as a consequence, can impose an artificial barrier to the aid process for these students.

Despite the desire for simplicity, however, neither the financial aid officer nor the parents would knowingly sacrifice accuracy for simplicity.[2] The need analysis process is often an important component in the student's decision to attend and continue in college. Because it is used to allocate financial awards to students, it also defines the responsibility of the family in financing the college costs of its child. Thus, a need analysis system should be sufficiently flexible to accommodate the great variety of financial circumstances that obtain for individual families; it should evaluate all families on the basis of a common or standard budget; and it should use a data collection instrument that will not pose a barrier to youngsters from poor families.

[1] Crawford (1962) proposed the use of the Federal Income Tax System as a less complex procedure for need analysis. The U.S. Office of Education [1968 (a)] authorized the Income Tax Systems and the Alternate Income Methods for institutions that wanted a simpler need analysis procedure for use in federal student aid programs.

[2] An unpublished study done by Orwig (1968) revealed that although 80 percent of the financial aid officers participating in either the Educational Opportunity Grants, National Defense Student Loans, or College Work-Study programs during 1968-69 agreed that a need analysis system should be simple to explain to parents and students, approximately 75 percent of the aid officers felt that a need analysis system should be sufficiently sophisticated and flexible to accomodate the unusual circumstances of the families of aid applicants. Thus, the desire for simplicity is mitigated by the desire for a need analysis system that is complex enough to assess a variety of different family types and family financial circumstances.

The development of the ACT need analysis system and its underlying economic base has been discussed elsewhere.[3] We examine here the financial information presently collected on the Family Financial Statement (FFS), the blank currently used in the ACT need analysis system to collect data from aid applicants, to determine what items, if any, can be eliminated without sacrificing accuracy. Since the length of the form often indicates complexity and difficulty to all but the most motivated students, we sought items we could omit without appreciably altering the need figure as computed by the present system. Finally, we investigated why estimated 1969 income, collected during the 1968-69 academic year, declined for ACT aid applicants when 1969 family income generally increased. The estimated year income is held by many to be the most important year in the need analysis process since it deals with income in the same year in which college expenses are incurred. An inspection of the national norms for students who completed FFS's from September 1, 1968 to August 31,1969, however, revealed that families estimated 1969 income to be lower than income for the two previous years.[4] Since the trend in the economy was exactly the opposite—i.e., that personal income during 1968 and 1969 increased at a higher rate than during 1967[5]—this apparent anomaly for ACT aid applicants was investigated in an attempt to identify with greater precision the source of declining income during 1969.

Sample

We drew a ten percent sample of student records from the 1968-1969 alphabetic (by student name) history file for the ACT Student Need Analysis Service. The sample was created by including every tenth unduplicated student record and resulted in a sample of 12,383 records. Thus, the sample can be considered representative of colleges and universities that use the ACT system. While the sample is not representative of aid applicants nationally, it is likely relationships among variables found here would generalize beyond the population of ACT applicants.

A random sub-sample of the original sample file was used for purposes of economy in certain phases of the study. For example, a 1,000 student sample was used in the derivation of the intercorrelation matrix shown in Appendix A. This sample was selected by taking every tenth record on the sample file until 1,000 records were obtained. The 1,378 student sample used in the analysis summarized in Table 6 was selected by taking every fifth student record with 1968 base year income.

Method

Each student record contained information from the FFS and the Comprehensive Financial Aid Report, (the report to the college of the student's financial need). It was possible, therefore, to use this sample to

[3]See "1969 Revision in Expected Family Contribution for the ACT Student Need Analysis Service," Research and Development Division, American College Testing Program, November, 1969, and Chapter III of the *Handbook for Financial Aid Officers,* American College Testing Program, 1969.

[4]M. D. Orwig, *Your Financial Aid Applicants,* American College Testing Program, 1969, p. 48.

[5]*Survey of Current Business,* U.S. Department of Commerce, *49* (12), December, 1969, pp. 4, 9.

compare data that was input to the need analysis system with the expected contribution that was computed. The criterion of validity used for FFS items was the expected parents' contribution as computed by the system for each student. Intermediate criteria were expected parents' contribution from (1) income and (2) assets, to determine if item elimination might be differently related to the two sources of family contribution to college, and thus be a source of bias in a shortened form. That is, would the system favor the student from a family where most discretionary income would come from income as opposed to assets or vice versa? The investigation of simplifying the FFS form proceeded within the constraints established by the general need analysis procedure.

Results and Discussion

In order to obtain a preliminary indication of the relationships among financial variables on the FFS, all the variables were intercorrelated (see Appendix A for the intercorrelation matrix). For purposes of economy in data processing this sample was limited to 1,000 randomly drawn records from the original sample of 12,383. Table 1 summarizes income and asset variables most highly correlated with expected contribution from parents' income, parents' assets, and total parents' contribution. Means, standard deviations, and percent reporting are given for these same variables in Table 2.

From these initial results, it was possible to identify a preliminary list of variables to be included in a multiple regression analysis. Several criteria were used to determine inclusion or exclusion. First, did the response rate on the FFS indicate that this information was provided often enough for this variable to be a good predictor? Second, what was the correlation of this particular variable with the criteria variables of expected contribution? Third, were we excluding any FFS variable with apparent high face validity? Home value, and father's and/or mother's nontaxable income, fell into this category.

Stepwise multiple regression procedures were used to select sequentially a set of variables giving the best linear prediction at each step. Sequentially, the nonincluded variable having the highest partial correlation with the criterion variable was slated for inclusion in the next step.

Table 1

Correlations between Selected Financial Variables and Expected Parents' Contribution*

		Expected Contribution			
	Financial Variable	*From Income*	*From Assets*	*Total*	*N*
1.	Father's Taxable Income	.56	.02	.26	669
2.	Father's Federal Income Tax	.75	.02	.35	626
3.	Father's Nontaxable Income	.25	-.08	.15	99
4.	Mother's Taxable Income	.08	-.01	.04	284
5.	Mother's Federal Income Tax	.26	-.11	-.03	150
6.	Mother's Nontaxable Income	.25	.05	.13	74
7.	Value of Farm or Business	.10	.15	.17	196
8.	Parents' Savings	.06	.36	.36	313
9.	Parents' Investments	-.07	.63	.57	171
10.	Home Value	.27	.24	.33	587

Table 2

Means, Standard Deviations, and Percent Reporting Key Financial Variables*

	Variable	*Mean*	*S.D.*	*Percent Reporting*
1.	Father's Taxable Income	7,804	4,039	82
2.	Father's Federal Income Tax	778	741	77
3.	Father's Nontaxable Income	1,902	1,650	13
4.	Mother's Taxable Income	3,224	2,176	35
5.	Mother's Federal Income Tax	290	307	18
6.	Mother's Nontaxable Income	1,800	1,501	10
7.	Value of Farm or Business	38,656	65,647	24
8.	Parents' Savings	2,456	6,721	38
9.	Parents' Investments	5,574	18,155	21
10.	Home Value	13,185	7,888	72

*Analyses are performed on all valid responses for dependent students only. A correction was made for independent students in computing the percent reporting; the estimated number of dependent students was 820. Income figures are for 1968. "Dependent" and "independent" students refer to the students' dependency on their parents for financial support. If a student is not receiving financial support from his parents and was not declared as a dependent on the parents' Federal Income Tax Form, he is defined as an independent student.

Initial multiple regression results were encouraging although not fully satisfactory. Table 3 presents the effectiveness of successive steps in predicting total parents' contribution. The Federal Income Tax paid by the father correlates .42 with the criterion variable. Addition of parents' savings to the prediction equation results in a multiple R of .51. When ten variables have been included in the model, the multiple R is .63. Since the last five variables added little to predictive effectiveness, we conclude that .63 is the asymptotic level of prediction under these circumstances.

Table 3

Stepwise Regression Results in Predicting Total Parents' Contribution before Forming Combinations of Variables

	Variables Added	*Multiple R*
1.	Father's Federal Income Tax	.42
2.	Parents' Savings	.51
3.	Parents' Investments	.57
4.	Value of Farm or Business	.61
5.	Father's Nontaxable Income	.62
6.	Home Value	.63
7.	Applicant's Federal Income Tax	.63
8.	Father's Taxable Income	.63
9.	Spouse's Taxable Income	.63
10.	Mother's Federal Income Tax	.63

To attempt to improve the ceiling level of the various predictions, it was decided to form linear combinations of certain key variables. For example, home equity was defined as the difference between home value and home mortgage, father's and mother's incomes were combined as parents' income, etc. These new combinations predicted more effectively than any simple aggregate of the components did.

Table 4 presents results of the successive steps in predicting each of three criterion variables. The first criterion variable is the contribution from income that parents are expected to make toward their child (or children) in college. In the ACT system this quantity is then divided by the number of children in college to determine the portion that will aid the applicant. We see, in Table 4, that two items of financial information, the parents' Federal Income Tax and parents' nontaxable income, predict parents' contribution from income with a multiple R of .91.[6] Since the asymptotic level is .92, we conclude not only that these two variables are effective predictors but that addition of other variables does not appreciably raise predictive effectiveness.

The second criterion variable studied was the amount that the parents might be expected to contribute from their assets toward the children's college education. (The dollar amount is then divided by the number of college years remaining to determine the portion that the applicant will receive next year.) The data in Table 4 shows that a greater number of asset variables, six in fact, do not provide predictive power equivalent to that attained with two income variables for the first criterion variable. Parents' investments, the net value of a farm or business, and the net value of real estate appear to be the most important predictors. Here the asymptotic level is about .88.

The third criterion variable was total expected parents' contribution for the applicant. It is important to note that this variable is not the sum of the first and second criterion variables but is rather the sum of criterion variable one, divided by the number of children in college[7] and criterion variable two, divided by the number of college years remaining in the family.[8] Thus, the prediction of total parents' contribution (criterion variable three) is affected by two random nonfinancial variables (the number of children in college and the number of college years remaining) that are not incorporated in the multiple regression analysis. The prediction of criterion variables one and two, on the other hand, was not affected by these two nonfinancial variables because the criterion variables were not divided by the nonfinancial quantities. Consequently, the asymptotic ceiling on prediction is lower for criterion variable three than for criterion variables one and two. Not surprisingly, however, the same variables that were important in predicting expected parents' contribution from income and expected parents' contribution from assets are also important for predicting total parents' expected contribution for the applicant.

It is instructive to compare the results achieved in predicting total parents' contribution in Table 4 with those obtained in Table 3. For example, father's Federal Income Tax predicts with a coefficient of .42 whereas parents' combined Federal Income Tax has a coefficient of .50. Similarly, the use of variables formed by linear combination increased the asymptotic level of the multiple R from .63 to .77. The results of this analysis suggested the obvious possibility that financial need could be computed with fewer variables and, as a consequence, that the forms used to collect financial information from the family might be simplified.

[6]With a multiple R of this magnitude, the possibility for using a regression model to predict expected contribution seems intriguing. But a closer examination suggests serious inadequacies with this approach. First, the regression equation would not be computable for those individuals that did not supply the data required in the model. Second, financial data are not normally distributed and therefore render the model somewhat inappropriate. Finally, the procedure would be inflexible for individuals with circumstances that are not reflected in the variables considered by the multiple regression model.

[7]The number of children in college includes the applicant plus other family dependents who will be in college during the same year.

[8]The number of college years remaining is determined by assuming 2.5 years remaining for children enrolled and 4 years remaining for each child under 17 years of age who is not enrolled in college.

Table 4

Stepwise Regression Results in Predicting Parents' Expected Contribution

	Variables Added	*Multiple R for Criterion Variable 1 (Income)*
1.	Parents' Federal Income Tax	.85
2.	Parents' Nontaxable Income	.91
3.	Retirement Allowance	.92
4.	Net Value of Farm or Business	.92
5.	Applicant's and/or Spouse's Federal Income Tax	.92
6.	Parents' Taxable Income	.92
7.	Home Equity	.92
8.	Applicant's and/or Spouse's Income	.92
9.	Applicant's and/or Spouse's Nontaxable Income	.92
10.	Net Other Real Estate	.92

	Variables Added	*Multiple R for Criterion Variable 2 (Assets)*
1.	Parents' Investments	.53
2.	Net Value of Farm or Business	.74
3.	Net Value of Other Real Estate	.80
4.	Home Equity	.84
5.	Parents' Savings	.86
6.	Parents' Trusts	.88
7.	Parents' Other Debts	.88
8.	Retirement Allowance	.88
9.	Parents' Taxable Income	.88
10.	Applicant's and/or Spouse's Income	.88

	Variables Added	*Multiple R for Criterion Variable 3 (Total Parents' Contribution)*
1.	Parents' Federal Income Tax	.50
2.	Net Real Estate	.61
3.	Parents' Investments	.67
4.	Net Value of Farm or Business	.72
5.	Parents' Savings	.74
6.	Parents' Nontaxable Income	.76
7.	Home Equity	.76
8.	Parents' Trusts	.76
9.	Parents' Taxable Income	.77
10.	Parents' Other Debts	.77

This possibility was examined more carefully by comparing at different income levels parents' total contribution, as computed in the current ACT need analysis system, with total parents' contribution that was computed with combined financial variables. Since we were interested in an analysis of the financial data, we used five items of nonfinancial information that were not included in the multiple regression analysis but were necessary to compute expected contribution with the same general procedure that is used in the ACT need analysis system. These items were the number of exemptions, the number of children in college, the number of children not in college, the father's age, and the type of income (i.e., wage and salary, farm, or business). The variables used to compute parents' total contribution in the current ACT need analysis system and the variables used in the combined variable computation are listed in Table 5. The results of the two computations for a sample of 1,378 dependent applicants are compared in Table 6.

Table 5

Variables Used to Compute Parents' Total Expected Contribution

Present ACT Need Analysis System	*Combined Variable Computation*
1. Number of Exemptions Claimed by Father	1. Total Number of Family Exemptions
2. Number of Exemptions Claimed by Mother	2. Number of Children in College
3. Person(s) with Whom Applicant Lives	3. Number of Children Not in College
4. Marital Status of Parents	4. Father's Age
5. Number of Children in College	5. Type of Income
6. Number of Children Not in College	6. Parents' Federal Income Tax
7. Age of Father	7. Net Real Estate
8. Age of Mother	8. Parents' Investments
9. Occupation of Mother	9. Net Value of Farm or Business
10. Occupation of Father	10. Parents' Savings
11. Father's Taxable Income	11. Parents' Nontaxable Income
12. Mother's Taxable Income	12. Home Equity
13. Father's Federal Income Tax	13. Parents' Trusts
14. Mother's Federal Income Tax	14. Parents' Taxable Income
15. Father's Nontaxable Income	
16. Mother's Nontaxable Income	
17. Parents' Savings	
18. Parents' Investments	
19. Market Value of Parents' Home	
20. Unpaid Mortgage on Parents' Home	
21. Market Value of Parents' Other Real Estate	
22. Unpaid Mortgage of Parents' Other Real Estate	
23. Parents' Other Debts	
24. Parents' Trusts	
25. Share of Farm or Business Owned by Parents	
26. Market Value of Parents' Farm or Business	
27. Outstanding Debts of Parents' Farm or Business	

Table 6

A Comparison of Parents' Total Contribution Computed with Two Different Sets of Variables

Income Level	Mean Expected Contribution: *Present ACT System*	*Combined Variable Computation*	*Mean Difference*	*Correlation*	*Number of Cases*
$ 0-5,000	$ 385	$ 490	$105	.99	317
$ 5,001-10,000	$ 890	$1,042	$152	.99	593
$10,001-15,000	$1,494	$1,630	$136	.98	361
$15,001 and Up	$3,891	$4,294	$403	.99	107
All Incomes	$1,165	$1,322	$157	.99	1,378

We see in Table 6 that although the combined variable computation procedure results in consistently higher parents' total expected contribution for all income levels, overall the mean difference between the two procedures is $157 or 13 percent. However, the fact that the correlation between the two computation procedures is either .98 or .99, suggests that the difference between the two procedures is such that systematic adjustments could be made to limit even further the differences that occur in the two procedures for computing total parents' expected contribution. For example, the present ACT need analysis system makes an adjustment for a housekeeping allowance if the mother works, an additional allowance against assets for widows, and it incorporates parents' other debts. Since each of these result in a reduction in expected contribution it is not unreasonable to conclude that we could minimize the difference in expected contribution by introducing these adjustments into the combined variable procedure for computing parents' expected contribution. Given the results in Table 6, with the relatively small differences in expected contribution and the clear possibilities for systematic adjustments to limit these differences even further, we conclude that the parents' expected contribution can be computed with fewer variables without sacrificing accuracy. We note further there is no bias by income level in the relative ranking of expected contribution.

Next we made a preliminary examination of base and estimated year income as reported by the parents of financial aid applicants. Base year income is defined as the most recent year in which the parents filed a Federal Income Tax return. Estimated year income is defined as the subsequent year.

For many years estimated year income has been considered the most important source of financial information because it is during the estimated year that the applicant's college expenses are incurred.[9] In spite of this fact, however, there are no studies in the literature that report on the validity, reliability, or stability of estimated year income. Harris and Schenk (1959) and the Illinois State Scholarship Commission (1969) have reported on the reliability of income reported for financial aid purposes, but both of these studies were concerned with base year income.

[9]The Office of Education [1968, (a) p. 7], for example, points to problems associated with the use of base year income because it may be out of date. Bowman (1969, pp. 4-5), on the other hand, discusses several problems that derive from the use of estimated year income.

Table 7

Comparison of Base Year and Estimated Year Parents' Income Averages According to Income Strata

Income Level	*Base Year*	*Base Year Average*	*Estimated Year*	*Estimated Year Average*	*Number of Students*	*Difference*
$ 5,000 and Less	1967	$ 2,798	1968	$ 3,502	615	+$ 704
	1968	$ 2,810	1969	$ 3,091	2,871	+$ 281
$ 5,001-10,000	1967	$ 7,485	1968	$ 7,487	882	+$ 2
	1968	$ 7,497	1969	$ 7,200	3,487	-$ 297
$10,001-15,000	1967	$12,044	1968	$11,575	532	-$ 469
	1968	$12,058	1969	$11,365	1,865	-$ 693
$15,001 and Above	1967	$18,993	1968	$16,459	150	-$2,534
	1968	$19,305	1969	$17,280	560	-$2,025
Total Sample	1967	$ 8,067	1968	$ 7,978	2,179	-$ 89
	1968	$ 7,687	1969	$ 7,384	8,783	-$ 303

When we examined the normative data for 1968-69 ACT financial aid applicants, we found that the mean income for all family members was $8,174 in 1967, $8,590 in 1968, and $8,232 for estimated 1969 year income.[10] The decline in 1969 income was difficult to understand in light of the rapid increases in personal income that occurred in the economy as a whole during 1969. In an effort to more clearly understand the differences between ACT aid applicants and the general public, a series of base year-estimated year comparisons were made.[11]

Base year and estimated year parents' income are compared for different levels of parents' income in Table 7. It is interesting to note the differences that occur at the four income levels. Although parents in the lowest level estimate that their income will increase (possibly due to pride?), the parents in all the other income levels estimate that their income will decline (possibly due to falsification or hedging). The decline in estimated year income increases as income increases and the differences exist for families reporting base year 1967 or base year 1968 although the effect is stronger for 1968.

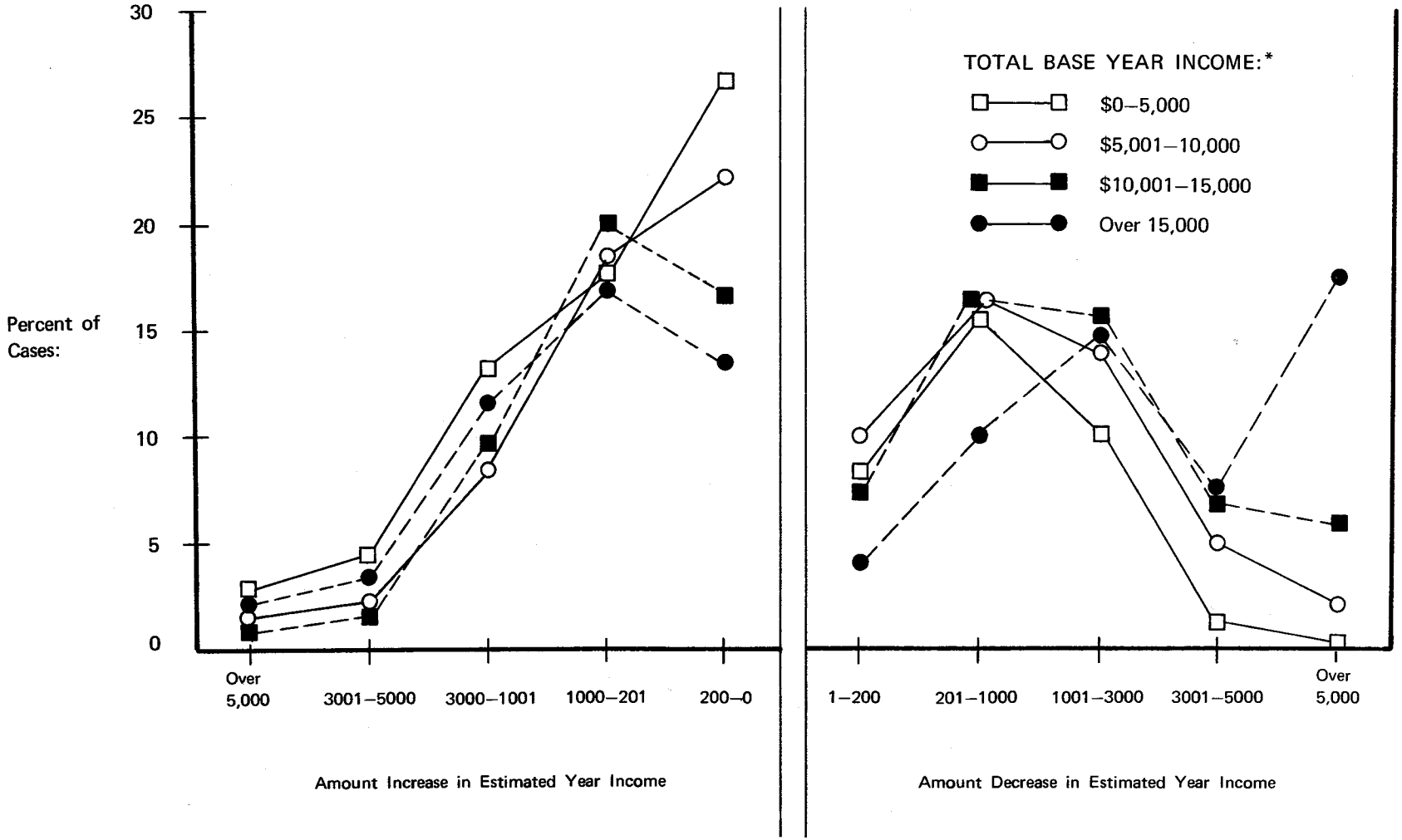
Figure 1 represents the basic magnitude and direction of the base-estimated year differences. For all income categories the modal response is to estimate slightly higher. There is, however, a pronounced shift in the higher income categories with a substantial percentage in the "Over $15,000" category responding with much lower estimated year figures.

[10] Op. Cit., *Your Financial Aid Applicants,* p. 48.

[11] Parents are requested to provide income information for 1967, 1968, and 1969 on the 1968-69 FFS. Base year income is then defined as the last year in which the parents filed their income tax and estimated year is defined as the subsequent year. If, for example, 1967 was the last year in which the parents of a particular applicant filed their income tax, estimated year income for this family would be 1968. If, on the other hand, a family filed in both 1967 and 1968, 1968 would be the base year income and 1969 would be the estimated year. Because it is possible to identify, on the history file, which year is base year income for each family, it is possible to compare base year 1967 income with estimated year 1968 income and base year 1968 income with estimated 1969 year income.

Figure 1

Differences Between Estimated Year and Base Year Total Parents' Income According to Income Strata



*The total for each income level equals 100 percent. Thus, each line demonstrates the distribution of base-estimated year income variation for each income interval.

Table 8 illustrates a number of important relationships about the stability of income for various family members. In contrast to father's and spouse's incomes, the applicant's income appears to be quite unstable. Total parents' income shows about the same degree of stability at each of the four income levels. Mother's nontaxable income is quite stable. The exemptions claimed by the father and spouse are the most stable, probably because these individuals are the major wage earners. Table 8 reports correlation coefficients for those applicants using 1968 as base year; substantially the same results were obtained in analyzing those reporting 1967 as base year.

Table 8

Stability of Income Figures (Base vs. Estimated Year)*

	Income Intervals				
	$0-5,000	*$5,001-10,000*	*$10,001-15,000*	*Over $15,000*	*Total*
1. Taxable					
a) Father	.77	.57	.68	.71	.80
b) Mother	.70	.63	.86	.81	.71
c) Applicant	.53	.61	.83	.56	.63
d) Spouse	.53	.77	.81	.95	.86
2. Nontaxable Income					
a) Father	.85	.93	.66	.74	.78
b) Mother	.89	.90	(.97)	(.96)	.92
c) Applicant	.68	.67	(.82)	(.81)	.72
d) Spouse	(.72)	(.28)	(.97)	(-)	.48
3. Exemptions Claimed					
a) Father	.96	.97	.96	.97	.96
b) Mother	.38	.94	.91	(.99)	.59
c) Applicant	.82	.88	.35	.98	.61
d) Spouse	.88	.94	(.98)	(1.00)	.94
4. Total Parents' Income	.50	.46	.46	.59	.84

*Base Year is 1968. Approximately 8,800 records were read. Because some cells had N-counts below 50, their correlation coefficients may be subject to fluctuations. These celis are indicated by parentheses.

We pursued this problem by comparing 1968 base year income with 1969 estimated year income for those persons who filed an FFS during 1968-69 and 1969-70. With this procedure it was possible to compare estimated 1969 income, as reported on the 1968-69 FFS, with base year 1969 income, as reported on the 1969-70 FFS, for the same persons.

Table 9

Comparison of Parents' Taxable Incomes As Reported on FFS's for Different Years

	1968-69 FFS's			1969-70 FFS's		
Taxable Income Year	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*
1968	9,413	4,444	62			
1969	8,696	4,130	60	9,326	4,010	59

Although it was possible to obtain only a small sample of families that qualified to be included, the preliminary results reported in Table 9 are of interest. The same pattern that existed in Table 7 is found in Table 9: 1969 estimated year income, as reported on the 1968-69 FFS, showed a $717 decrease. Yet when the 1969-70 FFS's were examined for the same people, we found that the income actually earned in 1969 exceeded estimated 1969 earnings by $630. The correlation between 1969 estimated year income as reported on the 1968-69 FFS and that reported as base year on the 1969-70 FFS was .76, on the small sample available of 52 students. Using Fisher's r to z transformation, the lower and upper 95% confidence limits for the population correlation coefficient are .61 and .86 respectively.

The possibility of simplifying the FFS by curtailing the number of years for which financial information is requested is not yet clear. We have identified some important and interesting questions in regard to the comparison of base year incomes. But the results are not definitive in the sense that several explanations are possible. It can be argued, for example, that the parents of aid applicants are atypical and therefore their incomes should not coincide with incomes in the economy as a whole. But such an hypothesis fails to account for two important facts. First, there is an increase in income from 1967 to 1968 for ACT aid applicants. Second, the responses for the aid applicants that were followed up indicated that an anticipated drop in 1969 income did not actually materialize.

Clearly, the financial aid officer must be able to satisfy himself that significant income decreases for the estimated year are *bona fide*. And since the reliability of estimated year income is called into question by these results, it might be appropriate to design an alternative procedure for identifying changes in estimated year income. This would be particularly important for low-income families, because they appear to be unique as a group in thinking that their income will rise. Consequently, heavy reliance upon estimated year income for low-income families would likely operate to their disadvantage.

APPENDIXES

Appendix A

Intercorrelation Matrix for FFS Variables *

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
2.	02																										
3.	01	00																									
4.	(47)	--	05																								
5.	78	30	03	(33)																							
6.	08	81	19	--	20																						
7.	-04	-02	86	(43)	01	20																					
8.	(56)	--	06	78	(46)	--	(-01)																				
9.	18	(02)	03	--	17	(-17)	(-03)	--																			
10.	(-04)	(08)	(-12)	--	(12)	(-16)	(-25)	--	(67)																		
11.	(-17)	(-23)	43	-03	(-09)	(-15)	(58)	--	(02)	(-28)																	
12.	--	--	--	--	--	--	--	83	--	--	--																
13.	14	(10)	-01	--	02	(03)	00	--	(-18)	-89	--	--															
14.	06	(10)	-09	--	00	(00)	-10	--	(05)	-04	--	--	93														
15.	10	-04	02	--	12	-03	-02	--	(-02)	(-18)	(-03)	--	07	(00)													
16.	00	03	18	--	-06	(-24)	10	--	(-03)	(-01)	(08)	--	(05)	(05)	29												
17.	42	13	02	(35)	32	11	-01	(35)	-10	(27)	(-07)	--	30	31	15	14											
18.	33	19	05	--	31	12	05	--	(-06)	(-24)	(-17)	--	50	46	17	23	72										
19.	-26	(-09)	(-08)	--	-23	--	(-22)	--	(-07)	--	--	--	(30)	(-01)	(-02)	(10)	(13)	(19)									
20.	00	-04	18	(15)	02	(02)	18	(02)	(-22)	(-22)	(20)	--	(04)	(-09)	03	-06	03	-10	(24)								
21.	(09)	-32	(18)	(10)	(-08)	--	(12)	--	--	--	--	--	--	--	(17)	(55)	(29)	(-03)	--	(-12)							
22.	--	--	(32)	(75)	--	--	(55)	(58)	--	--	--	--	--	--	--	--	--	--	--	(30)	(16)						
23.	--	--	(24)	(67)	--	--	(47)	(51)	--	--	--	--	--	--	--	--	--	--	--	(11)	--	(96)					
24.	56	08	54	63	75	26	58	61	25	25	42	(49)	10	14	06	-07	27	31	-17	07	(05)	(49)	(39)				
25.	02	-01	06	20	02	-11	06	(32)	-08	05	03	--	15	00	36	63	24	13	64	10	(24)	(23)	(-02)	03			
26.	26	04	36	58	35	-03	40	58	15	13	25	(53)	17	03	36	57	33	25	61	12	(20)	(52)	(37)	50	88		
27.	02	07	17	--	05	11	14	--	02	12	(35)	--	00	-01	18	-01	09	00	11	68	(27)	--	--	03	08	09	
28.	27	03	35	51	35	-02	39	56	14	14	23	(31)	16	03	37	56	34	26	61	19	(19)	(40)	(23)	49	88	99	20

*—indicates N-count less than 10 (correlation coefficient omitted); ( ) indicates N-count less than 50 (correlation coefficient printed). Decimal points were omitted for the sake of convenience. The list of variables is given in Appendix B.

Appendix B

List of Variables Correlated in Appendix A*

1. Father's Taxable Income
2. Mother's Taxable Income
3. Applicant's Taxable Income
4. Spouse's Taxable Income
5. Father's Federal Income Tax
6. Mother's Federal Income Tax
7. Applicant's Federal Income Tax
8. Spouse's Federal Income Tax
9. Father's Nontaxable Income
10. Mother's Nontaxable Income
11. Applicant's Nontaxable Income
12. Spouse's Nontaxable Income
13. Value of Parents' Farm or Business
14. Debt of Parents' Farm or Business
15. Parents' Savings
16. Parents' Investments
17. Parents' Home Value
18. Parents' Home Mortgage
19. Net Value of Parents' Other Assets
20. Applicant's and/or Spouse's Savings
21. Applicant's and/or Spouse's Investments
22. Applicant's and/or Spouse's Home Value
23. Applicant's and/or Spouse's Home Mortgage
24. Parents' Contribution from Income
25. Parents' Contribution from Assets
26. Total Parents' Contribution
27. Total Student's Resources
28. Total Family Contribution

*Income figures are for 1968. With the exception of variables 19 and 27, all variables included valid zero responses.

References

American College Testing Program. *Handbook for Financial Aid Officers.* Iowa City,Iowa: Author, 1969.

American College Testing Program. Research and Development Division. 1969 Revision in Expected Family Contribution for the ACT Student Need Analysis Service. Iowa City, Iowa: Author, 1969.

Bowman, J. L. *On the Determination of Effective Income in CSS Needs Analysis Procedures.* Princeton, New Jersey: College Scholarship Service, 1969.

Crawford, N. C., Jr. The Federal Income Approach to Need Analysis. *National ACAC Journal,* 1962, *8,* 11-14.

Harris, B. B., & Schenk, Q. F. Financial Need and College Scholarships. *The Personnel and Guidance Journal,* 1959, *37,* 497-499.

Illinois State Scholarship Commission. Income Reliability Study for 1969-70 Programs. Deerfield, Illinois: Author, 1969.

Orwig, M. D. An Analysis of Need Analysis Methods Used in Institutions of Higher Education. Unpublished, 1968.

Orwig, M. D. *Your Financial Aid Applicants.* Iowa City, Iowa: American College Testing Program, 1969.

U.S. Department of Commerce. *Survey of Current Business,* 1969, *49* (12).

U.S. Office of Education, Department of Health, Education, and Welfare. *Determining Awards under Federal Student Aid Programs,* Washington, D.C.: Author, 1968. (a)

U.S. Office of Education, Department of Health, Education, and Welfare. *Students and Buildings,* Washington, D.C.: Author, 1968. (b)

ACT Research Reports

This report is the thirty-third in a series published by the Research and Development Division of The American College Testing Program. The first 26 research reports have been deposited with the American Documentation Institute, ADI Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington, D. C. 20540. Photocopies and 35 mm. microfilms are available at cost from ADI; order by ADI Document number. Advance payment is required. Make checks or money orders payable to: Chief, Photoduplication Service, Library of Congress. Beginning with Research Report No. 27, the reports have been deposited with the National Auxiliary Publications Service of the American Society for Information Science (NAPS), c/o CCM Information Sciences, Inc., 22 West 34th Street, New York, New York 10001. Photocopies and 35 mm. microfilms are available at cost from NAPS. Order by NAPS Document number. Advance payment is required. Printed copies may be obtained, if available, from the Research and Development Division, The American College Testing Program. The reports are indexed by the *Current Contents, Education,* Institute for Scientific Information, 325 Chestnut Street, Philadelphia, Pennsylvania 19106.

The reports since January 1968 in this series are listed below. A listing of previous reports is included in each of several items published by The American College Testing Program: *Your College Freshmen* (pp. 158-160), *Your College-Bound Students* (pp. 107-109). A complete list of the reports can be obtained by writing to the Research and Development Division, The American College Testing Program, P. O. Box 168, Iowa City, Iowa 52240.

No. 23 *The Effects of Selecting College Students by Various Kinds of High School Achievement,* by L. L. Baird & J. M. Richards, Jr. (ADI Doc. 9955; photo, $3.75; microfilm, $2.00)

No. 24 *Do They Do What They Say They Will Do?* by S. W. Lutz (ADI Doc. 9988; photo, $5.00; microfilm, $2.25)

No. 25 *Changes in the Vocational Plans of College Students: Orderly or Random?* by J. L. Holland & D. R. Whitney (ADI Doc. 10051; photo, $3.75; microfilm, $2.00)

No. 26 *The Flow of High School Students to Schools, Colleges, and Jobs,* by L. L. Baird & J. L. Holland (ADI Doc. 10053; photo, $6.25; microfilm, $2.50)

No. 27 *Forecasting Academic Success in Specific Colleges,* by D. P. Hoyt (NAPS No. 00254; photo, $3.00; microfilm, $1.00)

No. 28 *A Description of Graduates of Two-Year Colleges,* by L. L. Baird, J. M. Richards, Jr. & L. R. Shevel (NAPS No. 11306; photo, $3.00; microfilm, $1.00)

No. 29 *An Empirical Occupational Classification Derived from a Theory of Personality and Intended for Practice and Research,* by J. L. Holland, D. R. Whitney, N. S. Cole & J. M. Richards, Jr. (NAPS No. 00505; photo, $3.00; microfilm, $1.00)

No. 30 *Differential Validity in the ACT Tests,* by N. S. Cole (NAPS No. 00722; photo, $3.00; microfilm, $1.00)

No. 31 *Who Is Talented? An Analysis of Achievement,* by C. F. Elton & L. R. Shevel (NAPS No. 00723; photo, $3.00; microfilm, $1.00)

No. 32 *Patterns of Educational Aspiration,* by L. L. Baird (NAPS No. not available at this time.)