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ESTIMATING PARENTS' INCOME IN SUCCEEDING YEAR — ACCURACY OF PRESENT CSS SYSTEM

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INTRODUCTION

Much has been done in an effort to obtain the "best" income figure to be used as base measure for determining parental contribution toward college costs. Financial aid officers have continually urged CSS to continue reviewing the present system which uses "parental estimate" of future year net income. The major criticism is that parents' estimates of future year net income are inaccurate.

Studies have been done which indicate that parents tend to be conservative (that is underestimate) in their estimates of succeeding year income. Smith (1964) and Gannon (1967) matched CSS estimates with actual reports to Retail Credit Company. Smith found an average difference of $282 between Parental Estimates on PCS and reports to RCC. Gannon noted consistently higher income figures credited to parents by RCC than was reported to CSS. In 1970, Horch measured estimated effective income against actual effective income of parents at each of three income levels and calculated the mean difference between estimated and actual to be $512. Orwig and Jones in 1970 calculated this difference between estimated and actual to be $630.

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Horch and Sharon have recently completed (May 1971) yet another study for CSS in an attempt to determine the comparative accuracy of parents' contribution when calculated from each of three alternative measures of future year income: 1) parents' report of current income, 2) parents' estimate of future year income, and 3) prediction of future year income made from linear regression equations. The results of this study prove once more that the best single predictor of actual income is estimated income with a validity coefficient of .86, followed closely by current income with a validity coefficient of .83.

It would appear that once and for all the matter has been settled, but there still persists the feeling that in too many instances the actual income for the previous year, as reported on the renewal PCS', exceeds dramatically the estimates for that year. The result is smaller parental contributions, larger financial need and continued inequity in distribution of available financial aid funds!

A review of the recent Horch and Sharon study disclosed several areas of disagreement with the methodology employed. The basic disagreement, however, is with the sample employed in the study. With 62.7 percent of sample families having incomes below $10,000 and 93.1 percent of the sample families having incomes below $15,000, the statistics derived tend to be stabilized around the $9,000-$9,200 income level (mean of study). At this income level the opportunity to experience dramatic increases in income is rare (except in the case of a mother taking outside employment for the first time).

As in the Horch and Sharon study, two types of accuracy were considered. First, the accuracy of predictions for an individual was determined by the correlations between the predictors (estimated income) and the criterion (actual income). Second, the accuracy of predictions made for a *group* was assessed by comparing group averages on the predictors and the criterion. The two types of accuracy are not necessarily related. A measure could accurately predict mean group income but not the income of any individual within in that group. The results shown in Table 4 will demonstrate this difference in types of accuracy.

METHOD

The population studied consisted of all parents who filed a Parents' Confidential Statement with Wesleyan University for the academic year 1970 and whose son/daughter was awarded financial aid on the basis of information contained therein. Every sixth family who filed PCS's in consecutive years — both for academic year 1970 and academic year 1971 — was selected from the alphabetical files. No attempt was made to artificially control the income distribution of the sample (i.e. incomes above $19,999 were not excluded). Excluded from the sample, however, were two families for whom CSS was unable to calculate a parental contribution because of "unusual circumstances". The following income data were assembled for each family in the sample:

1) Estimated 1968 net income reported in 1967-68
2) Actual 1968 net income reported in 1969
3) Estimated 1969 net income reported in 1968-69
4) Actual 1969 net income reported in 1970

From information supplied by the sample families in 1969-70, families were classified, for purposes of this study by actual 1969 net income into three income classes.

RESULTS

Because the sample for this study consisted of families who filed PCS's in consecutive years, the possibility existed that it might not be representative of the entire population. Consecutive year filers are renewal candidates re-applying for financial aid received during the previous year (academic year 1969-70). Due to process of selection, it would be expected that the income of renewal candidates' families would tend to be lower than that of pre-freshman aid applicants.

Table 1 presents a comparison of income distributions of sample families with all pre-freshman CSS families at Wesleyan University — as reported in ISDS Phase I report.

TABLE 1
Comparison of Estimated 1969 Net Income of Sample Families and
Families who filed Pre-Freshman PCS's with CSS in 1968-69

Est. 1969 Net Income	Pre-Freshman PCS Filers	Sample Families
0 - 9,999	37.5%	36%
10,000 - 14,999	19.6%	32%
15,000 - over	42.9%	32%

Investigation of this table indicates that the greater proportion of families filing PCS's with Wesleyan *exceeds* the median income of the Horch-Sharon Study of May, 1971. It was evident that a further investigation of the mean deviation was necessary and the results of those calculations support the hypothesis that as income rises the degree of "conservatism" (underestimation of succeeding year income) also rises. The mean deviation between estimated and actual for incomes up to $9,999 was 393.36; for incomes between $10,000 and $14,999, the mean deviation was 662.37; and for incomes above $15,000, the mean deviation was 2155.42.

PREDICTION OF FUTURE YEAR INCOME

Need analysis should be based on the most accurate indicator of future income. It will be necessary to test the present system — parental estimates — for validity and if the present system is found to contain excessive errors, then alternate methods will be investigated.

The testing of the present method — parental estimates — was accomplished by comparing the parentally estimated income for 1969 and the actual income as reported on the subsequent year renewal PCS*. The results of this first testing are shown in Table 2.

TABLE 2
Comparison of estimated to actual income for 1969

Income Groups	Accurate within $500	Overestimated	Underestimated
below $10,000	32%	3.2%	64.5%
$10,000 - $14,999	23%	20.6%	56.4%
over $15,000	0%	10.0%	90.0%

* Validity of this "actual" income is the subject of a separate study.

The high percentage of families who demonstrated "conservatism" (under-estimated income for succeeding year) suggested that perhaps this particular year was in some way atypical. With the data originally collected, it was possible to compare parental estimates for 1968 with actual income for 1968 for the same sample of families. The results are shown in Table 3.

TABLE 3
Comparison of estimated to actual income for 1968

Income Groups	Accurate within $500	Overestimated	Underestimated
below $10,000	44%	12.5%	43%
$10,000 - $14,999	28%	9.0%	63%
over $15,000	8%	12.0%	80%

These results verify that the highest incidence of underestimation occurs in the over $15,000 income category. In the most recent study by CSS this group represented only 6.9 percent of the sample population!

Since the Horch and Sharon study (1971) utilized Pearson's r to affirm continued use of parental estimate because of the high correlation between estimated and actual income, Pearson's product-moment correlation coefficient was determined for this sample population. The results are shown in Table 4.

TABLE 4

	24 families	41 families	35 families
r est. - actual 1968	.949	.478	.918
r est. - actual 1969	.916	.450	.874

Worthy of note is the Pearson r of .918 for the over $15,000 group for 1968 actual income correlated with 1968 estimated income. The .874 r for 1969 incomes compares favorably with that for 1968 incomes although the mean deviation for this sample was $2,155.42 and 90 percent of the families underestimated their '69 income! This consistent underestimation accounts for the high correlation coefficient.

It was quite obvious that the present method in use by CSS — parental estimates — does contain excessive errors despite the high correlation co-efficients. Continued investigation was warranted to discover the mean deviation between estimated and actual expressed as a percentage of the estimated income for both 1968 and 1969. Table 5 illustrates the mean deviation between estimated and actual income for both 1968 and 1969 and also the mean actual growth in income during the same period (actual 1968 to actual 1969).

TABLE 5

Income	# filers	Mean Dev. Est. 68-Act. 69	Mean Dev. Est. 69-Act. 69	Income Growth Act. 68-Act. 69
0 - $9,999	36	— 9.8%	—15.0%	+12.5%
$10,000 - $14,999	32	— 7.5%	— 8.6%	+ 7.4%
$15,000 - over	32	—16.0%	— 8.0%	+10.0%

— denotes underestimated

The results shown in Table 5 indicate that there should be some predictive factor which could be applied to the actual income for a given year which would provide a more accurate measure of parental contributions. Horch and Sharon had success with a predictive factor calculated by computing least-squares parameters for the regression of actual on estimated income within each of the income groups. Their report states, p. 17, " . . . parents' contributions calculated from predicted income were more accurate for most groups than those calculated from current or estimated income." On p. 21 they further state, "With the higher income groups the size of underestimation of actual income is directly related to the amount of income . . . . the higher the income the larger the amount of underestimation."

Financial Aid officers at institutions with high student budgets and larger financial aid budgets are very concerned with this problem of underestimation in the higher income cases (over $15,000). The resultant lower parent contribution derived by CSS using estimated income as a base amount produces unwarranted increased financial need. It continues the inequity of available aid being awarded to students whose actual need is less than that indicated on the Financial Need Analysis Report.

RECOMMENDATIONS

Despite the claim of unfairness to low-income filers (0-$9,999), the actual parental contributions differed very slightly when using the least-squares parameters for the regression of actual on estimated income as a predictive factor. The positive aspects of the use of such a predictive factor should be emphasized especially as they relate to the over $10,000 income category of filers.

This study demonstrated a mean underestimation of 10.8 percent when measuring actual with estimated income.

Therefore, either a predictive factor based on least-squares parameters for the regression of actual on estimated income or a more simplified approach applying a percentage to previous year's income should be adopted to create the net income figure to be used as the base figure for the Financial Need Analysis Report.