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# Federal Methodology: An Analysis of Farm Families and Asset Equity Removal

By Charles Turner

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*The purpose of this study was to evaluate specific changes made to the federal need analysis formula between aid years 1992-93 and 1993-94. The primary focus was the elimination of home and farm equity from the need analysis calculation. Changes in parental contributions and Pell Grant awards between aid years and formulae were examined. The results were compared and contrasted using paired t-tests for dependent sample means. The results suggest significant differences between need formulae and aid years. This study suggests an increasing trend toward higher unmet need and lower Pell Grant awards. It also implies that the most needy student may be losing gift assistance to more affluent applicants. As resources become scarce, these results may have implications for campus-based aid policy decisions and future adjustments to the need analysis construct.*

Over the years, the elements of need analysis have been constantly debated. As the structure developed, it was eventually based on some common economic principles (NASFAA, 1993b). Beyond these basic principles, there was also an acknowledgment of professional experience. Aid administrators have been allowed to review special circumstances and in certain instances they may adjust a family's expected contribution to reflect more accurately their unique circumstances. These professional adjustments have been primarily for individual circumstances and not for categorical adjustments. If an aid administrator's experience suggests that need analysis is unfair to a given population, it is unfortunately not within the administrator's domain to adjust this. If, however, the need formula puts undue pressure on campus-based funding, the administrator can request additional information and evoke an alternate calculation to alleviate that pressure.

This is significant for two reasons. First, exercising an alternate calculation to achieve a more equitable distribution of aid can place additional financial burdens on selected populations. Second, the use of alternate calculations has become a common practice, which suggests that some inadequacies may exist in the need analysis construct.

When Federal Methodology (FM) replaced Congressional Methodology (CM) in the 1993-94 aid year, it brought about a number of adjustments in the need analysis formula. One of those changes was removal of home equity and farm equity from the need calculation. Eliminating these assets from the need calculation represented a disregard for some common principles of equity (ACT, 1992b). Families who had invested money in home and farm were now given an obvious advantage over those who had not. This also opened the door for a potential redistribution of federal gift dollars from lower-income families with no assets to families with high asset holdings.

It is difficult to determine why farm assets were selected for exclusion from the need calculation in Federal Methodology. It is possible that this action was a belated response to the farm crisis of the mid-1980s, or perhaps it was a reaction to some other perceived weakness in the farm economy. Whatever

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*“It is difficult to determine why farm assets were selected for exclusion from the need calculation in Federal Methodology.”*

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the reason, the timing was peculiar. In the early 1980s, farming had experienced a severe downturn that bottomed out in 1985 (Edelman & Olsen, 1988). According to Edelman and Olsen (1988), in Iowa, for example, average farm income before taxes was only \$1,000 in 1985. Duffy and Stevens (1988) suggested that by 1987, farm income had increased substantially, due in large part to increased government payments. Poor grain production, weather-related losses, varying commodity prices, and harvest costs all contributed to fluctuating farm incomes in the 1990s (Jolly, 1993).

Based on Jolly's (1993) work, however, at least in Iowa, farming conditions appeared to have greatly improved by 1992. Jolly's studies showed that adjusted net cash income for Iowa farm families was nearly \$61,000 in 1992, which represented a substantial improvement over the 1980s. Further, Jolly's report and Edelman and Olsen's (1988) both included a rating matrix that scored the overall condition of Iowa farming operations.

These matrices assessed debt-to-asset ratios and yearly income, then rated each farm family into one of the following four categories: strong, stable, weak, or severely stressed condition. Jolly's work suggested that by 1993 nearly 80% of Iowa farm families were in strong or stable positions. Yet, 1993 was the year that brought the elimination of farm equity from the need analysis formula. This suggests that perhaps the ramifications of eliminating farm equity from the need calculation were not given adequate consideration prior to the implementation of Federal Methodology.

The Higher Education Amendments (HEA) of 1992 were designed to simplify the aid process while expanding access to federal programs (NAS-FAA, 1993a). This legislation represented a Congressional effort to appease the middle class by making college more affordable (Ostling, 1992). Elimination of home and farm equity was a major vehicle to that end. This mechanism for middle-class access, however, may have also been an avenue for affluent family access. Tax deductions, depreciation, and certain types of shelters make it possible for families to hold tremendous asset equities while demonstrating only a modest adjusted gross income (AGI). Using Federal Methodology, it would be possible for a family to hold millions of dollars in relatively unencumbered assets, while still qualifying for a Federal Pell Grant. Since every access of this nature would deplete the limited federal grant pool, it is reasonable to assume that FM changes may have represented an educational access detriment for low-income families without home or farm equities.

As a prelude to the implementation of FM in 1992, two research projects were conducted to help predict the new formula's effect on the aid population (ACT, 1992b, and College Board, 1992). The results of both studies suggested significant reductions in expected family contributions for all income levels. According to the assessment by the College Board (1992), substantial reductions in expected family contributions could be expected across all income levels. The ACT (1992b) study suggested similar results and noted that a number of students from families with higher-than-average home and farm equity would now gain eligibility for the Pell Grant program based on the exclusion of these assets. In fact, this study indicated that 3.5% of the aid population who had not been Pell Grant eligible under CM would be eligible under FM, and that this population demonstrated by far the highest net worth of all aid applicants, including those ineligible for a Pell Grant (ACT, 1992b).

This alarming finding illustrates access to the Pell Grant program that is potentially devastating to low-income, low-asset applicants.

## How Data Was Compared

This research was conducted with the assistance of the Office of Student Financial Aid and the Administrative Data Processing unit at Iowa State University. Iowa State University, a large, Midwestern, public, land-grant institution, boasts a significant population of students from farm families. The population chosen for this study consisted of actual 1992-93 aid filers who had indicated Iowa residency and some amount of parental farm ownership. A query of 1992-93 dependent student aid applicants meeting this criterion produced 2,147 records. That number represented approximately 12% of the total population of student aid applicants at Iowa State University in 1992-93. From that population, a random sample of 175 records was drawn, for use in this study, using a table from Beyer (1966). Independent variables included need analysis formulas and Pell Grant allocation schedules. Dependent variables included parental contribution (PC) and amount of Pell Grant.

Three data files (referred to as V1, V2, and V3) were developed for this study. File one (V1) consisted of original 1992-93 applicant data and was prepared for use in AllCalc2, a federally approved Congressional Methodology (CM) calculator produced by ACT (1992a), by which parental contributions and Pell awards were computed. The other two data files were V2 and V3. They were designed for use in AllCalc3, a federally approved Federal Methodology (FM) calculator produced by ACT (1993) that computed PCs and Pell awards using 1993-94 regulations. File two (V2) was original applicant data minus home equity, and file three (V3) was original data minus home and farm equity. It should be noted that in 1993-94, actual farm equity was excluded only for those applicants whose farm was their principal place of residence. Therefore, the files had to be adjusted accordingly to include or exclude farm equity from the need calculation.

Once created, the files were off-loaded to the AllCalc programs for need analysis calculation. When all records had been computed, they were moved to Microsoft Excel for statistical analysis. Based on the writings of Minium (1978) and Ary, Jacobs, and Razavieh (1985), paired t-tests for dependent sample means were chosen as the statistical tool. This type of test was chosen since the samples were dependent, and this program was more accessible than repeated measures. Though repeated measures might have given more detail, the paired t-test was deemed acceptable for performing the desired comparisons. The t-tests were used to compare the dependent variables, parental contribution and Pell Grant award.

Four sets of tests were performed. The V1-V2 and V1-V3 tests compared original data calculated using the CM formula (AllCalc2) to the same data calculated under the FM formula (AllCalc3). By using the V1-V2 test, it was possible to compare original 1992-93 calculations with a counterpart 1993-94 award, assuming off-farm residence, where farm assets were included in the need calculation. The same was done with the V1-V3 test, except that residence on the farm was assumed, and the farm equity was eliminated from the FM calculation. These tests were performed on both dependent variables.

It should be noted that the parental contributions in these made a more direct comparison between the CM and FM formulas than did the Pell calcu-

lation. The Pell computations performed are better described as old program versus new program. This assertion is made because in legislation separate from the Higher Education Amendments of 1992, the Pell Grant allocations were altered and the Pell payment schedule was changed slightly. As Rhind (1993) noted, the 1993 Appropriations Act changed the Pell Grant maximums from \$2,400 to \$2,300. It also changed the minimums from \$200 to \$400, with those who would have received between \$200 and \$399 subsequently receiving \$400 (Rhind, 1993). Therefore, it would be inaccurate to report Pell differences in these tests as solely the result of need formula changes.

A method was developed to differentiate Pell differences attributable to formula changes from those related to allocation schedule changes. Since AllCalc 3 did not accept prior year allocation amounts, another alternative was used. By using the Pell Grant payment schedule and available 1993 family contribution data, alternate V2 and V3 files were created. These files were original data with Pell Grant amounts altered to reflect 1992 allocations.

With the new files, two additional t-tests were necessary. Both tests involving the Pell variable were replicated in this procedure. In short, the results section will report a V1-V2 Pell calculation and a V1-V2 (adjusted allocation) calculation. The same is true for the V1-V3 test. The results allowed the researcher to distinguish Pell changes attributable to formula from those caused by altered allocations.

The researcher hypothesized that, as had been suggested by ACT (1992b) and the College Board (1992), parental contributions would decrease significantly for all income levels, and Pell awards would be reduced for most income levels. The researcher further hypothesized that Pell Grants would now be awarded to families holding substantial asset equities who had not previously received grants, and that the funding for these awards would come from funds previously awarded to lower-income applicants.

### **Results Show Lowest Income Families Losing Grant Dollars**

**Inferential Statistics.** Two t-test calculations were performed on both dependent variables, parental contribution (PC) and Pell award. Two additional tests were also performed on the Pell variable in an effort to differentiate changes due to formula from variances created by the 1993 Pell allocation adjustments. The first test, V1-V2, compared original filer data calculated using Congressional Methodology to the same data calculated using Federal Methodology, which automatically excludes home equity. The comparison produced output scores above the critical t-level for both PC and Pell variables (see Tables 1 and 2). These outcomes indicated that both PC and Pell results were lower in 1993-94 using Federal Methodology than they were in 1992-93 under Congressional Methodology. As would be anticipated, the V1-V3 test, where V3 is original filer data calculated under FM and assuming on-farm residence (which therefore removed farm equity from the calculation) provided significant PC differences in the same direction as the previous test (see Table 3). The Pell difference for this test, however, was not significant (see Table 4), and produced results almost identical to the CM Pell awards. It should be noted that for both of these Pell comparisons, actual 1993-94 allocations were used.

To determine Pell differences attributable only to the formula, it was necessary to conduct two additional calculations. These calculations were replications of the previously conducted tests involving the Pell variable,

**TABLE 1**  
**Paired T-Test Results for PC in V1-V2 Comparison**

Type	V1-Variable	V2-Variable
Mean	2333.33	2147.56
Standard Deviation	3131.308	2878.33
Observations	175	175
Differential	174	174
t	3.321***	

**TABLE 2**  
**Paired T-Test Results for Pell Grant in V1-V2 Comparison**

Type	V1-Variable	V2-Variable
Mean	908.286	834.857
Standard Deviation	953.624	931.589
Observations	175	175
Differential	174	174
t	2.133*	

**TABLE 3**  
**Paired T-Test Results for PC in V1-V3 Comparison**

Type	V1-Variable	V2-Variable
Mean	2333.331	1721.24
Standard Deviation	3131.308	2402.737
Observations	175	175
Differential	174	174
t	4.992***	

**TABLE 4**  
**Paired T-Test Results for Pell Grant in V1-V3 Comparison**

Type	V1-Variable	V3-Variable
Mean	908.286	908
Standard Deviation	953.624	920.875
Observations	175	175
Differential	174	174
t	0.007	

\*P<.05

\*\*P<.01

\*\*\*P<.001

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*“Using Federal Methodology, it would be possible for a family to hold millions of dollars in relatively unencumbered assets, while still qualifying for a Federal Pell Grant.”*

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except that 1992-93 Pell allocations were used in place of the actual 1993-94 allocation schedule. The results of these tests were considerably different from the previous outcomes. Using the 1992-93 allocation schedule, there is no longer a significant Pell difference for the V1-V2 test (see Table 5). As was previously the case in the V1-V3 test, there again is no significant difference in Pell awards, yet this time, instead of equal average awards, the V3 data actually produced a higher Pell award (see Table 6). These results suggested that for the Pell variable, the Pell allocation schedule was a more critical factor than the formula change itself.

When reviewing the t-test tables and examining the level of significance demonstrated, one caution should be noted. Test-wise error rate does not reflect the experiment-wise error rate when multiple groups are compared. If the test-wise error rate is .05, in order to set experiment-wise error at that level, an adjustment (Bonferoni's adjustment) needs to be made in the alpha level. This can be accomplished by dividing the initial alpha by the number of comparisons being tested. In this study, that would be .05 divided by six, for a new alpha of 00833. Thus, for experiment-wise error purposes, the t-tables could be reevaluated using 00833 alpha. This adjustment, in turn, creates a new critical t-value level. In this study the adjustment did not alter outcomes and is noted here for clarity and informational purposes only. By performing this adjustment, the potential for making a Type I error, or inappropriately rejecting the null, are vastly reduced (C. Sorenson, personal communication, October 13, 1994).

**Descriptive Statistics.** The average mean score difference among comparisons offers a more concrete dollar analysis of the data. For simplicity, average mean score differences are referred to in raw score form throughout this section. Comparing mean differences could project potential student aid package changes using direct dollar comparisons.

The V1-V2 test was perhaps the most valuable examination in this study, since this comparison represented what most 1992-93 aid applicants were facing under Federal Methodology going into 1993-94. The results of this pairing suggested an average PC decline of \$184 and an average Pell reduction of \$74. These results are noteworthy because they suggest that new money must be found to fund increased student need and lost Pell Grant dollars.

The V1-V2 Pell adjusted allocation comparison showed that, had 1992-93 allocations been used in 1993-94, the average difference in Pell awards would have been \$24 instead of \$74. This suggests that had the allocation schedule not been changed, students still would have faced a slight reduction in their Pell awards. Surprisingly, both adjusted Pell allocation tests (V1-V2 & V1-V3) produced the same \$50 increase over projected 1993-94 awards using the 1993-94 allocation schedule. In this study, therefore, the effects of allocation changes can be offset by adding \$50 to the 1993 awards. This finding suggests that much of the Pell disparity reported is attributable to allocation changes, but some is formula-related.

The V1-V3 test produced a \$612 disparity in PC, but a nearly identical Pell award. This result implies two things. First, with home and farm equity eliminated from the 1993-94 calculation, Pell Grants are similar to original 1992-93 awards. Second, this same formula will produce a considerably higher

**TABLE 5**  
**Paired T-Test Results for Pell Grant Adjusted Allocation**  
**In V1-V2 Comparison**

Type	V1-Variable	V2-Variable
Mean	908.286	883.429
Standard Deviation	953.624	975.834
Observations	175	175
Differential	174	174
t	0.704	

*“Tax deductions, depreciation, and shelters make it possible for families to hold tremendous asset equities while demonstrating only a modest adjusted gross income.”*

**TABLE 6**  
**Paired T-Test Results for Pell Grant Adjusted Allocation**  
**In V1-V3 Comparison**

Type	V1-Variable	V3-Variable
Mean	908.286	957.143
Standard Deviation	953.624	966.949
Observations	175	175
Differential	174	174
t	-1.153	

student need. Again, looking at the adjusted Pell allocation comparison, adding \$50 means that, had the 1992-93 schedule been used, the 1993-94 Pell awards for V3 would have been higher than the original 1992 (V1) awards.

The V1-V2 test strongly suggests that the average aid filer will have higher need but a lower Pell award under Federal Methodology. The V1-V3 analysis implies that farm owners will demonstrate a much higher need while receiving a grant similar to what they would have received in 1992-93. This, however, is misleading. Though the average grant appears to be the same, the distribution of funds among income levels is not (see Table 7). In fact, for those with incomes below \$10,000, grants decreased significantly, while for all other income levels the awards were larger. This was true even though the low-income families held the highest average assets, which suggests that low-income families holding no assets will suffer the biggest losses under Federal Methodology. This strongly suggests that the lowest income families will suffer losses in Pell Grants in favor of increased awards to those in higher income brackets. Thus, for the general aid population, low-income, low-asset families will suffer the most. As grants are reduced, they will have no asset, or collateral, to draw on to replace the lost support. It is also noteworthy that the Pell Grant recipients in this study have, on average, home and farm equity holdings of between \$72,000 and \$106,000. These findings support the goal of increasing aid access for middle-class and upper-class families.

In regard to the researcher's hypotheses, the results indicate, in nearly all



cases, parental contributions are reduced using the 1993 formula. Elimination of home and farm equity appears to be the primary reason for this decrease. The FM analysis itself is actually less asset sensitive than the CM formula; however, the FM analysis never includes home equity and excludes farm equity (as of 1994) for nearly all farmers. Neither of these assets was excluded under the 1992 CM formula, and therefore, it is reasonable to attribute declines in PC to asset removal factors.

This study suggests that non-farm families can expect a substantial decrease in Pell Grant awards (if there is not substantial change in appropriations). The study further implies that this would have been true even using 1992-93 Pell allocations, though the reduction would have been smaller. The outputs further indicate that farm owners would receive a grant similar to the one received in 1992-93. Had Pell Grant allocations not been altered, these grants actually would have increased. This result is important, because it implies that the higher a family's asset equity, the more they benefit from the new program. This represents a direct contrast to the stated access goals of student financial aid.

In the absence of increased grant resources, it may be assumed that student loan indebtedness will continue to increase. With high needs, and equal or lower grant allotments, students will seek additional resources to fund higher education. The most accessible means are federal student loans. Factor in continued tuition increases, expanded loan limits, and the availability of unsubsidized loans, and the trend toward increased borrowing may be expected to continue.

The changes made between 1992-93 and 1993-94 appear to have been purely for the benefit of middle-income families. For low-income students who already demonstrated maximum need, the 1993-94 changes hindered more than helped. First, federal grant assistance declined in 1993. Second, asset elimination in the need formula allowed more middle-income applicants to receive Pell Grants, which increased program costs. Third, with more students in the program, policy-makers are less likely to raise allocated Pell Grant maximums. Fourth, low-income students with maximum financial need in most cases have already borrowed to the full extent of federal loan programs. As costs continue to increase, no additional assistance is available to these students. Finally, increased need for middle-income families puts more pressure on already scarce institutional resources and makes it difficult to discern who is truly needy.

## **Summary and Conclusions**

The results of this study, in many ways, approximate the findings of the ACT (1992b) report and, the College Board (1992) report. This study, however, more explicitly shows the amount of equity being excluded by Federal Methodology, and it suggests that the lowest income families are losing federal grant dollars to more financially able families.

The size and localized nature of this project make its applicability to the total aid population somewhat suspect, but the research leaves no doubt that many low-income families are receiving less grant money under Federal Methodology than they had been getting under Congressional Methodology. To determine the full impact of this problem, a national study would be quite useful. Knowing the amount of grant money that lowest income families have

**TABLE 7**  
**V1-V3 PC and Pell Change Comparison**  
**By Income And Asset Level**

Parent AGI	N	Average Total Home & Farm Equity	Average Parental Contribution Change	Average Pell Change
<\$0 - \$9,999	23	105,867	-336	-393
\$10,000 - \$19,999	27	86,912	-217	+138
\$20,000 - \$29,999	39	72,294	-245	+60
\$30,000 - \$39,999	44	96,947	-845	+38
\$40,000 - \$49,999	26	80,635	-1157	+27
\$50,000 - \$69,999	16	93,787	-940	+25

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*“The results of this study should be alarming to those who believe in the premise of equal educational opportunity regardless of economic status.”*

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lost annually, and to whom those funds have gone, would provide the necessary impetus for potential corrective action. Many of the 1992 legislative changes were beyond the scope of this study and were therefore not addressed in this research. It would be valuable, however, to assess the exact ramifications of other 1992 changes in a manner similar to what has been done in this research, to determine how some of these changes may have affected the student aid public.

Simplification was certainly an objective of the 1992 Reauthorization. For low-income families, however, it appears that the simplification initiative had some unintended consequences. The results of this study should be alarming to those who believe in the premise of equal educational opportunity regardless of economic status.

Home and farm equity are key components in the economic formula to determine net worth, and as such, they should be collected and considered in aid determination. Need analysis has its basis in economic principles, and treating the owner of a \$200,000 debt-free home in the same manner as a person holding no assets does not appear to be equitable. Based on Federal Methodology's asset treatment, however, this is the practice being employed.

A more logical, efficient, and equitable approach to need analysis might be to bring assets back into the formula, and revise old methods for assessing them. Works such as Jolly (1993), Duffy and Stevens (1988), and Edelman and Olsen (1988) provide a sound theoretical framework from which to start. As mentioned earlier, these farm surveys categorize farmers into four levels of solvency. Debt-to-asset ratios are compared with cash flow, and the farm family is rated in one of four categories (Jolly, 1993, and Edelman & Olsen 1988). Perhaps the need analysis formula could do the same for home and farm assets. The formula could, for example, assess equity at 100% for those in strong positions, 75% for those in stable positions, 25% for those in weak positions, and have no assessment for those classified as insolvent. The exact rating system and assessment breakdown would need to be determined, but with the assistance of economists and agriculture professionals, a more viable asset treatment could be developed. This would take time and money, but it seems a better use of funds than continuing to divert Pell Grant money from the truly needy and delivering those funds to the more affluent.

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