United States
Department of
Agriculture

**Food and
Nutrition
Service**

Office of
Analysis and
Evaluation

The Relationship Between Overpayment and Underpayment Error Rates in the Food Stamp Program

A Preliminary Analysis

United States
Department of
Agriculture

Food and
Nutrition
Service

3101
Alexandria, VA 22302

Title Page

The Relationship Between Overpayment and Underpayment Error Rates in the Food Stamp Program: A Preliminary Analysis

Robert Dalrymple

Office of Analysis and Evaluation

Food and Nutrition Service

U.S. Department of Agriculture

November 1985

Title Page

The Relationship Between Overpayment and Underpayment Error Rates in the Food Stamp Program: A Preliminary Analysis

EXECUTIVE SUMMARY

As emphasis is placed on reducing overpayment errors in the Food Stamp Program through the error sanction system, policy makers have become concerned about the relationship between overpayment and underpayment error rates. Has the sanction system caused an emphasis on overpayment errors to the detriment of improving all payment errors? Has this emphasis resulted in administrative decisions that encourage judgements against clients?

The analysis uses quality control data from "Food Stamp Quality Control Executive Overview Fiscal Year 1983," published in April 1985. For the eight review periods since the implementation of the 1977 Food Stamp Act, this analysis suggests that the error sanction system has not resulted in increased underpayment error rates. Overpayment and underpayment error rate changes have tended to move together, with either increases or decreases in both rates. Analysis also suggests that there is no statistically significant correlation of the national error rates; i.e., national overpayment error rate levels are not systematically associated with national underpayment error rate levels. In addition, on an individual basis, only a few States had significant correlations, and these were mixed between positive and negative correlations. That is, in some States high overpayment error rates are associated with high underpayment error rates, and in other States the association is with low underpayment error rates. The most

consistent relationship found is that States with high overpayment error rates also tend to have high underpayment error rates, and vice versa, implying that error in general is a more consistent problem for States than the possibility of shifting error from overpayments and underpayments.

All analyses concerning the relationships between overpayment and underpayments are limited by several important factors. First, the history of the error sanction system is short so there are a limited number of data observations. Only eight semi-annual error rate review periods are available for analysis. The lack of observations reduces the sensitivity of the analysis and means that relationships between variables must be quite strong for the analysis to detect significant statistical relationships. Second, underpayment error rates in this period have been uniformly low and lack variability in comparison to overpayment error rates. This makes an analysis of the relationship between the rates more difficult. Third, the analysis does not include underpayments which are payment denials to eligible households, because these data are not available from the Quality Control System.

The conclusion that the error sanction system has not resulted in increased underpayment error rates will be re-evaluated as the error sanction system ages. Payment error rates will continue to be monitored to detect any shift in the relationships.

Title Page

The Relationship Between Overpayment and Underpayment Error Rates in the Food Stamp Program: A Preliminary Analysis

1. INTRODUCTION

In recent years, Congress and the Administration have focused attention on the effectiveness of management in Federally funded/States managed income and food assistance programs. Accuracy, one of three major management goals that also encompass timeliness and equity, has been the center of attention because of the magnitude of inaccurate program payments. In the Food Stamp Program (FSP), with benefits funded fully by the Federal government, a net total of about $2.7 billion in benefits has been overpaid between Fiscal Years 1980 and 1983.

Payment errors can be divided into different groups. One group, overpayment errors, results in excessive payments to eligibles or payments to ineligibles. Between Fiscal Years 1980 and 1983, national overpayment error rates (the fraction of payments overpaid relative to total payments) have ranged between 8.0 and 10.5 percent, cumulating to over $3.7 billion in excessive payments. The second group of errors results in fewer benefits for eligibles than program rules specify. Within this group are underissued benefits to participants or underpayment errors.[1] National underpayment error rates have been

[1]The other type of error that results in fewer benefits than the program rules specify is payment denials to eligibles. The size of the payment that was denied eligibles is not determined when this type of error is identified. Thus there isn't any comparable measure of this type of error to the overpayment and underpayment error rates.

much smaller than overpayment rates, ranging between 2.3 and 2.6 percent over Fiscal Years 1980 and 1983 and accounting for $1.0 billion in underissued payments.

Congress enacted a new error rate sanction system in the Omnibus Budget Reconciliation Act (OBRA) of 1982 to strengthen the incentives and penalties for States to improve program management and reduce overpayment rates. OBRA 1982 replaced a sanction system that was based on the amount by which total payment error--over and underissuances combined--exceeded the national average total error, with a system that bases sanctions in the amount overpayments exceed a legislated threshold. That threshold was set at 9 percent in Fiscal Year 1983, 7 percent in Fiscal Year 1984 and at 5 percent in succeeding fiscal years. The sanction system parallels systems in the Aid to Families with Dependent Children (AFDC) and Medicaid programs, although their error rate threshold tolerance level is 3 rather than 5 percent. The new FSP error rate sanction system provides direct incentives for overpayment error reduction but does not address underpayment error. As overall program accuracy remains a significant program goal it is important to review the experience of the past four years to assess whether underpayment error rates have deteriorated under the new sanction system. This paper is a preliminary review and assessment of the implications of an overpayment error rate sanction system on underpayment error.

There are two alternative hypotheses on how the current error sanction system could affect underpayment error rates. First, as general administrative procedures improve, all types of payment accuracy

improve. In fact, some evidence associates the same household characteristics with overpayment errors as with underpayment errors.[2] If State managers focus procedural changes on these specific characteristics, reduction in all error types may occur.

The second hypothesis holds that there are different causes of overpayment and underpayment errors. As each of these causes is identified and corrected, overall payment accuracy will improve. However, any particular improvement may affect only one type of payment error. Depending on which causes are identified and corrected, it may appear that only one type of payment error is being corrected to the exclusion of the other. As a result, one type of payment error may improve while the other type remains constant or even increases.

There are four different ways to examine the relationship between overpayment and underpayment error rates. The first observes national error rates, noting the difference in the size of overpayment and underpayment error rates and the fluctuations in the error rates. A second examination is more systematic, looking at the change in the error rates from the first review period to the last. This approach tries to determine if both error rates have increased, decreased, or if one has increased while the other decreased. The third way utilizes the correlation coefficient to examine the relationship between the error rates across all the review periods, permitting a test for statistical significance.

---

[2]Dickinson, Russell, Wagner, West, Analysis of Case-Level Food Stamp Program Quality Control Data, SRI International, January 1984, page iii.

The last approach again utilizes the correlation coefficient to answer a different question about the relationship between the error rates. Rather than looking at the relationship over time for the nation or individual States, the correlation is calculated across States within a review period to determine if States with high overpayment error rates also tend to have high underpayment error rates.

2. DATA BASE AND ANALYTIC LIMITATIONS

The Food Stamp Program payment error rates are derived from the Quality Control System. States draw and review statistically representative samples from the State caseloads for accuracy in eligibility and benefit determinations. State reviewers identify any errors in these sample cases and report the payment error rate to their Federal Region. The Federal Regions also review a subsample of the State sample cases to identify any errors missed by the State reviewers. Depending on the results of this Federal review, the reported State error rates are adjusted and reported as the official State error rates.

This assessment is termed preliminary for several reasons. First and most important is the limited amount of data available for analysis. Error rates prior to Fiscal Year 1980 are inappropriate for use as the program differed substantially in the pre-1977 Act Law. Only eight review periods are available for Fiscal Years 1980-1983. Since Quality Control review periods were six months long in this time period, two observations are available for each fiscal year. Appendix tables 1 and 2 contain the error rates by State and at the national

level for Fiscal Years 1980-83. Lack of a longer time series makes it difficult to observe both trends and relationships in rates over time. Unfortunately, it is precisely those trends in individual underissuance and overissuance rates and the relationship of those trends that is critical to evaluating the effect of the sanction system on underissuance error rates.

Second, the fact that underpayment error rates are much lower and more stable than overpayment rates make them difficult to analyze. Much statistical analysis relies on how items or variables vary in relationship to each other. If the variable of interest does not vary much, the best analytic techniques may not uncover relationships. Underpayment error rates are much lower than overpayment error rates (See Table 1 and Figure 1). Overpayment error rates are about three to four times the size of underpayment error rates, averaging about 9.3 percent compared to 2.4 percent for underpayment error rates. Of course overpayment error rates should be larger than underpayment error rates since they are composed of two types of payment errors (overissuance and ineligibles) whereas underpayment error rates are composed of only one type (underissuance).[3]

Error rates fluctuate making it difficult to analyze how each type of error has moved over time. Note in Table 1 how the national underpayment error rates have fluctuated down and up only a small amount from 2.4 percent in the first review period to eventually

[3]The intent of the analysis is to measure the effect of an overpayment based sanction system on the relationship between payment errors. Because the payment error for denials is not determined in the Quality Control System this type of error is not included in the analysis.

Title Page

Table 1

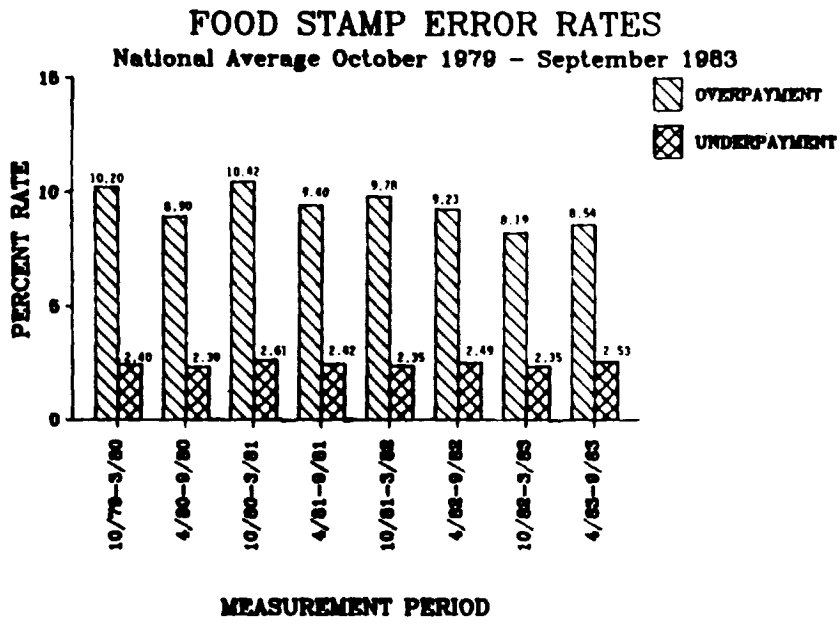
National Payment Error Rates, October 1979 to September 1983*

Measurement Period	Payment Error Rates	
	Underpayment	Overpayment
Fiscal Year:		
1980	2.35	9.51
1981	2.51	9.89
1982	2.44	9.57
1983	2.43	8.36
Review Periods:		
10/79 - 3/80	2.40	10.20
4/80 - 9/80	2.30	8.90
10/80 - 3/81	2.61	10.42
4/81 - 9/81	2.42	9.40
10/81 - 3/82	2.35	9.78
4/82 - 9/82	2.49	9.23
10/82 - 3/83	2.32	8.19
4/83 - 9/83	2.53	8.54

*Error rates as reported in "Food Stamp Quality Control Executive Overview Fiscal Year 1983," April 1985.

April 1985

Figure 1



April 1985

2.53 percent in the last period. The national overpayment error rates exhibit similar fluctuations, but with larger fluctuations (between 0.5 and 1.0 percentage points as compared to about 0.3 percentage points). These fluctuations make it difficult to determine specific trends in the error rates. Overpayment error rates have tended to decline, which is more obvious in the four fiscal year rates. Underpayment error rates have tended to fluctuate without any particular trend.

Obviously, national error rate patterns reflect relationships in State error rates, since the national error rate is a weighted average of the State error rates (where each State's total payment relative to the national payment is its error rate's weight). For the most part, State error rates show the same difference in size between overpayment and underpayment error rates and exhibit the same degree of fluctuations by error rate type over time. Overall, States appear to be decreasing their overpayment error rates (see Table 2). About one-half of the States have error rates greater than the national error rate in each review period. The counts in the last column of Table 2 indicate the degree of fluctuations in the State error rates. For example, no more than 30 States had overpayment error rates exceeding 10.0 percent in any one review period. Yet, 43 <u>different</u> States had overpayment error rates in excess of 10.0 percent at least once over all eight review periods. Underpayment rates appear more concentrated. Only 2 States have had their underpayment error rates exceed 5 percent.

Table 2

Number of States[a] with Error Rates Exceeding Selected Levels
By Review Period and Type of Error Rate

Number of States with Underpayment Error Rates Equal To or Greater Than:	UNDERPAYMENT ERROR RATES — Review Period 10/79-3/80	4/80-9/80	10/80-3/81	4/81-9/81	10/81-3/82	4/82-9/82	10/82-3/83	4/83-9/83	At Least One Period
2.0 percent	34	32	37	38	37	30	35	33	52
2.5 percent	16	18	24	20	19	22	18	21	42
3.0 percent	9	11	12	11	9	14	8	14	29
5.0 percent	0	0	2	0	1	0	0	0	2
National Underpayment Error Rate	2.40%	2.30%	2.61%	2.42%	2.35%	2.49%	2.32%	2.53%	

Number of States with Overpayment Error Rates Equal To or Greater Than:	OVERPAYMENT ERROR RATES — Review Period 10/79-3/80	4/80-9/80	10/80-3/81	4/81-9/81	10/81-3/82	4/82-9/82	10/82-3/83	4/83-9/83	At Least One Period
5.0 percent	53	53	52	54	53	53	51	50	54
8.0 percent	44	36	47	38	38	44	25	32	51
9.0 percent	36	23	37	31	30	35	18	21	49
10.0 percent	30	17	26	23	22	18	12	18	43
11.0 percent	17	8	20	14	13	12	9	9	32
National Overpayment Error Rate	10.20%	8.90%	10.42%	9.40%	9.78%	9.23%	8.19%	8.54%	

[a]Possible total of 54 composed of the 50 States, District of Columbia, Puerto Rico (for the first five periods), Virgin Islands, and Guam.

April 1985

Title Page

The counts and national error rates in Table 2 also indicate another pattern in the error rates. In the first four review periods, the national underpayment error rates exhibit a pattern where the rates are higher in the first half of each fiscal year than in the second half. The pattern reverses in the last four review periods. The same pattern is reflected in the counts at the 8.0 and 9.0 percent thresholds for overpayment error rates. The first pattern lasts a

Title Page

Chart 1

National Error Rates

Change over 8 periods:	Overpayment	Underpayment
Time: 10/79-03/80 rate	10.20	2.40
Time: 04/83-09/83 rate	8.54	2.53
Absolute Change	-1.66	0.13
Percent change	-16.27	5.42

Chart 2

Change over 7 periods:		
Time: 10/79-03/80 rate	10.20	2.40
Time: 10/82-03/83 rate	8.19	2.32
Absolute Change	-2.01	-0.08
Percent change	-19.71	-3.33

The error rates for the first review period (10/79-3/80) are contained in the first row, while the rates for the last review period (4/83-9/83) are in the next row of Chart 1. By subtracting the rates for the first period from the last period, one would conclude that overpayment error rates have declined while underpayment error rates have increased. When measured as a percent change (dividing the change by the error rate level in the first period), overpayment error rates have declined about 16 percent while underpayment error rates have increased 5 percent over the four years. The conclusion from this analysis is that national overpayment error rates have a negative relationship with underpayment error rates--one rate increases while the other rate decreases.

However, when the same analysis is repeated using the first and seventh review periods (see Chart 2), then there is a different conclusion. Now both error rates have declined and indicate a positive relationship over time.

National rates can mask important fluctuations. Table 3 compares how States have fared relative to each other in changes in their error rates over the eight review periods. The table presents selected States which have displayed the greatest reduction or increase in their overpayment error rates. First the percent change in the State's error rates was calculated, then States were ranked from those with the greatest reduction in their error rates to those with the greatest increase, and numbered from 1 to 53 accordingly. Table 3 presents the 15 States with the greatest percentage decrease and the 15 States with the greatest percentage increase in the overpayment error rates. The first column is their overpayment error rate ranking, and the second column is their underpayment ranking. The signs following their ranking indicate if the percent change was a decrease (-) or an increase (+) in the error rate. The last column is the corresponding correlation coefficient for each State over the eight review periods and will be discussed in section 5.

There is a tendency for those States that have done well in reducing their overpayment error rates to have also done well in reducing their underpayment error rates. Ten of the fifteen States with the largest percentage decrease in their overpayment error rate (number 1 to 15) also have a percentage decrease in their underpayment error rates (a minus sign in the second column). There is a similar tendency for

Table 3

Comparison of Selected States Ranked[a] by the Percent Change in Their Overpayment and Underpayment Error Rates From 10/79-3/80 to 4/83-9/83

State	Rank and Sign of Percent Change in Overpayment Error Rates	Rank and Sign of Percent Change in Underpayment Error Rates	Correlation Coefficient
Nevada	1-	10-	.4200
Delaware	2-	25+	-.1110
Nebraska	3-	2-	.4281
Maryland	4-	12-	.4736
District of Columbia	5-	24+	-.0794
West Virginia	6-	19-	.5861
Iowa	7-	23+	.1332
New York	8-	9-	.6311*
Illinois	9-	8-	.3834
Rhode Island	10-	17-	.3713
Tennessee	11-	14-	.8478*
Montana	12-	6-	.4613
Georgia	13-	15-	.3522
Kansas	14-	27+	.2371
Wisconsin	15-	31+	.4371
Oklahoma	39+	45+	.1004
Utah	40+	35+	-.2577
Minnesota	41+	28+	-.7768*
Florida	42+	40+	-.1139
Colorado	43+	49+	.4728
Connecticut	44+	16-	.5621
Oregon	45+	30+	.6479*
Arkansas	46+	43+	.4336
Washington	47+	37+	-.2942
Alaska	48+	11-	-.1766
Virgin Islands	49+	51+	.3179
Wyoming	50+	52+	.0298
Massachusetts	51+	34+	.3981
Guam	52+	53+	.1572
Vermont	53+	48+	.6788*

*Statistically significant at the 90 percent level.

[a]Ranking is from the States with the greatest decrease (decreases have minus signs) to those with the greatest increase (increases have plus sign) in the percent change in their error rates. The possible total number of States is 53 consisting of the 50 States, the District of Columbia, Guam, and the Virgin Islands.

April 1985

those States that have had increasing overpayment error rates to have also had increasing underpayment error rates. Thirteen of the fifteen States with the largest percentage increase in their overpayment error rates (numbered 39 to 53) also have a percentage increase in their underpayment error rates (a plus sign in column two).

Although these tendencies exist in the State data over four years, the error rates fluctuate enough that results for individual States may differ by period. This was illustrated with the national error rates, and is a problem of choosing only two review periods for comparison. Measuring the national relationships by using only two data periods produced different results depending on which periods were chosen. Correlation, on the other hand, summarizes relationships across all the data periods and offers a statistical test of whether or not the correlation is meaningful.

4. CORRELATION COEFFICIENTS AND THEIR APPLICATION TO ANALYZING THE RELATIONSHIP BETWEEN ERROR RATES

A correlation coefficient is a statistic that measures the degree of association between two variables. Its usefulness in this analysis is to indicate the type of relationship between overpayment and underpayment error rates, and whether the relationship is statistically significant. The correlation coefficient has a value of zero if there is no association between the variables. If high values of one variable are associated with high values of the other variable (and conversely low with low) the correlation coefficient is positive. It is negative if high values of one variable are

associated with low values in the other. As the associations get stronger the value of the correlation coefficient gets closer to 1 (or -1 for negative correlations). A perfect correlation has the value of 1 and the observations lie along a straight line.

An advantage of the correlation coefficient is that it is independent of the relative size of the two variables. The association measured by a correlation coefficient is a function of whether high values of one variable tend to be associated with high or low values of the other variable, and not how high one variable is relative to the other. This property is useful in the analysis of overpayment and underpayment error since overpayment error rates tend to be three to four times the size of underpayment error rates.

One deficiency of correlation analysis in this application is that the relatively few data points available (only 8 or 6 in some analyses) require a very stringent test for statistical significance. Chart 3 shows the minimum value a correlation must exceed at different sample sizes before it can be considered statistically significant at the 90 percent level. As shown, a correlation of .306 would be significant if 30 data points are available, but a correlation must be twice as strong (.621) when only 8 data points are available. Thus the associations must be strong in this analysis with only 8 review periods before they can be considered statistically significant.

Chart 3

Minimum Correlation Levels for Statistical Significance
at the 90 Percent Level for Various Sample Sizes

Sample Size	Minimum Correlation Level
5	.805
6	.729
8	.621
10	.549
20	.378
30	.306
62	.212

Second, correlation coefficients have several interpretation deficiencies for this analysis. Ideally the analysis requires a measure of how error rates have changed to know if overall accuarcy is improving or if accuracy in one type of error is improving while accuracy in the other type is not. Unfortunately, correlation coefficients do not indicate the direction of change in the error rate. They simply indicate if high values of one error rate tend to be associated with high or low values of the other rate. Having examined the national overpayment error rates, we know that they have tended to decline over the eight review periods. A positive correlation would indicate that underpayment error rates have also tended to decline. However, the positive correlation alone doesn't indicated this. It can be inferred only with the prior knowledge that national overpayment error rates have tended to decline. In fact, a positive correlation can just as easily indicate rising error rates as declining ones. A simple case study will illustrate this problem.

The error rates for Oregon exemplify how a statistically significant positive correlation can be the result of both error rates tending to increase together over time. Figure 2 graphically presents the error rates from the eight review periods. Overpayment error rates tend to be increasing. Figure 3 graphically presents the same error rates when the review periods have been ranked from the one with the highest overpayment error rates to the one with the lowest rate. This is the same way a computer would array the data in calculating a correlation coefficient. Here it is clearer that review periods with high overpayment error rates also tend to have high underpayment error rates. It is this association that produces a statistically significant positive correlation, while over time the two rates have tended to increase.

Another interpretation deficiency of a correlation coefficient is that it doesn't indicate the size of the relationship between the error rates. For example, negative correlations indicate that high values of one error rate are associated with low values of the other error rate. A statistically significant negative correlation coefficient however, cannot indicate if underpayment error rates are rising rapidly or only a little. Again, a case study will illustrate.

The error rates for Minnesota exemplify how a statistically significant negative correlation can occur with a much larger decrease in overpayment error rates than increase in underpayment error rates. The error rates for Minnesota are graphed in Figure 4 as they occurred over time. With the fluctuations in the error rates it is difficult to infer a trend. In Figure 5 the review periods are ranked from the

Figure 2

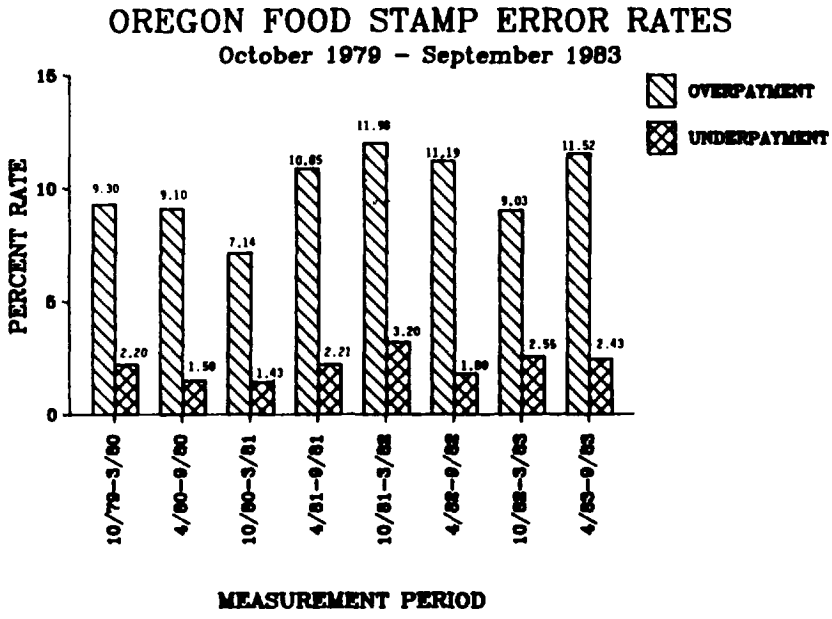
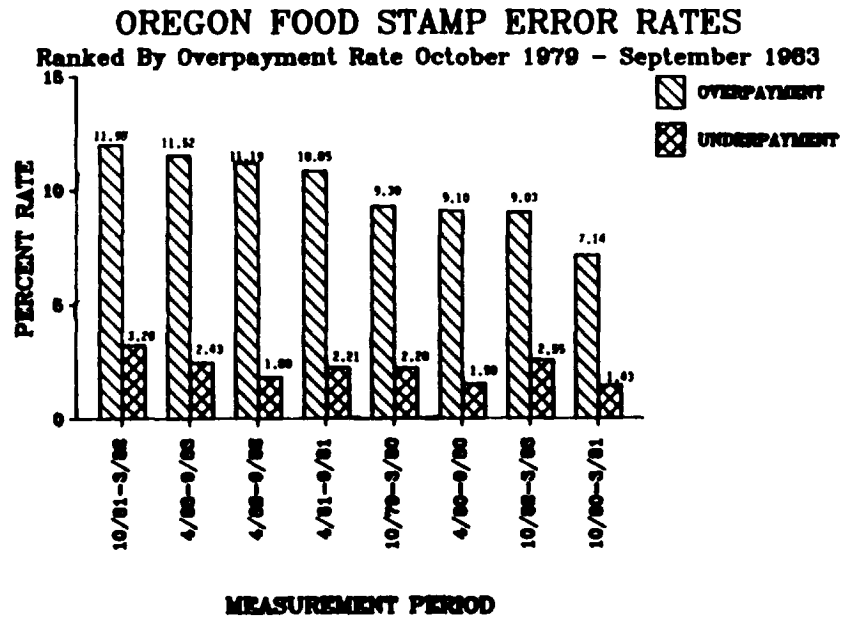


Figure 3



April 1985

Figure 4

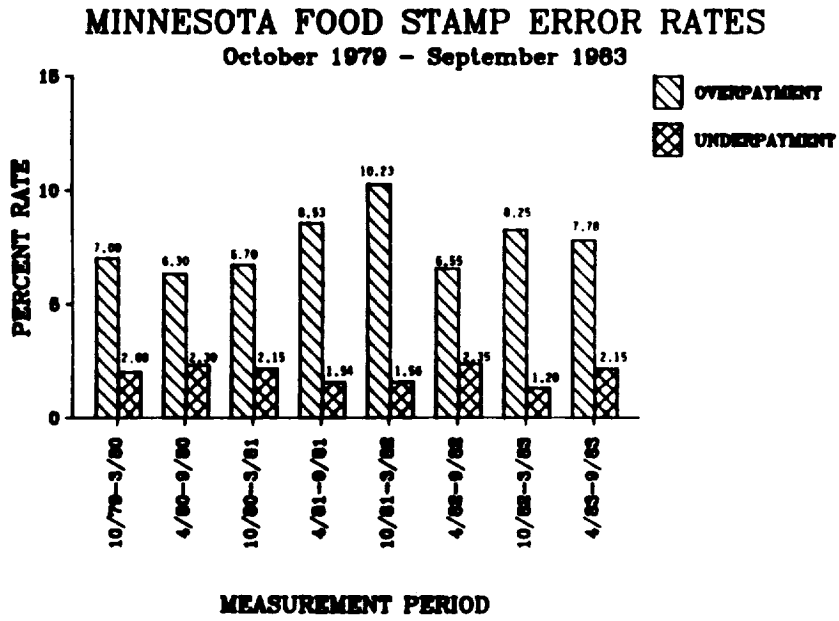
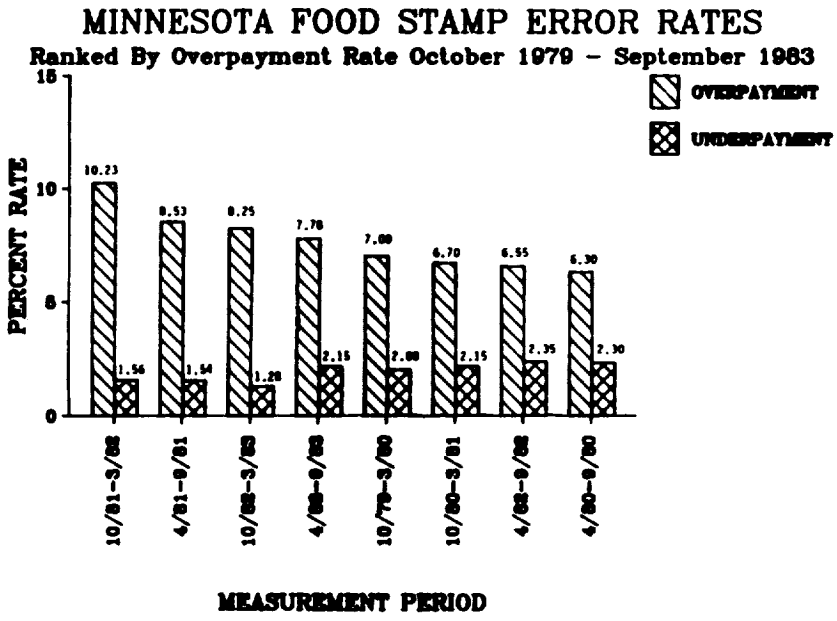


Figure 5



April 1985

period with the highest overpayment error rate to the one with the lowest rate. In this figure the inverse (negative) relationship between overpayment and underpayment error rates is more clearly visible. High overpayment error rates are associated with low underpayment error rates, and vice versa. Overpayment error rates range from 11.98 to 7.14 percent, while the underpayment error rates range from 3.20 to 1.43 percent, usually less than the national average for this period. If the error rates had actually occurred in this order, it might be concluded that significant improvement has occurred in overpayment error rates with very little increase in underpayment error rates. As a result, a negative correlation would not be cause for alarm.

5. CORRELATION ANALYSES OF THE RELATIONSHIP BETWEEN OVERPAYMENT AND UNDERPAYMENT ERROR RATES

Several different analytical questions can be posed for correlation analysis to determine the type and statistical significance of the relationship between overpayment and underpayment error rates: How are error rates related over all the eight periods? Has the presence of the error sanction system in the last six periods affected the relationship? Both of these questions are investigated with the national and State data. Very few of the resulting correlations are statistically significant leading to the conclusion that there isn't a strong consistent relationship between overpayment and underpayment error rates.

The national overpayment and underpayment error rate correlation is a positive, but weak (statistically insignificant) correlation. Over the eight review periods the national correlation has a value of .39, which is less than the .62 necessary for statistical significance. This supports the earlier observation that overpayment error rates have tended to decline while underpayment error rates have tended simply to fluctuate.

Consistent correlations do not exist across all the States. The majority of correlations were statistically insignificant at the 90 percent level. Thirty-three States had positive correlations, but only six were statistically significant (Table 4). Only one of the twenty with negative correlations was statistically significant.

While correlations are not consistent across States, there is a tendency for the overpayment and underpayment error rates to increase or decrease together. The signs on the correlation coefficients discussed earlier (Table 3) support this conclusion, with a few exceptions. Nineteen of the twenty-three States in Table 3 whose error rates changed in the same direction between review periods one and eight had positive correlations as well (only four of which are significant). Thus the relationship between the error rates for these States tended to be somewhat consistent among all the review periods, although not consistent enough to be statistically significant. Likewise three of the seven States whose change in error rates moved in opposite directions also had negative correlations. The eight exceptions to this pattern in Table 3 (Iowa, Kansas, Wisconsin, Utah, Minnesota, Florida, Connecticut, and Washington) have a positive

relationship indicated by similar signs on the percent change of the error rates and a negative correlation, or vice versa. These eight are like the national error rates. The change in the national error rates over the eight review periods indicated a negative relationship (overpayments decreased and underpayments increased) but the correlation is positive. When the national error rate change is measured over the first seven review periods, both rates decreased, and support the positive relationship indicated by the correlation.

Error sanctions were not levied in Fiscal Year 1980, the first two points among the eight review periods. If the sanction system has encouraged benefit accuracy, then the relationship may be more consistent over just the last six review periods. Restricting correlation analysis to the last six periods focuses the analysis on the period with the sanction system. Again the correlation of the national error rates is weak, positive, and statistically insignificant with a value of .47. The relationship is not any more consistent over the period with the sanction system than it is over the longer period. Likewise, the State correlations remain mixed with most of the correlations statistically insignificant. There are only eight States with statistically significant correlations, four of which also had statistically significant correlations using all eight review periods (Table 4). The error rate relationship is no more consistent over the sanction periods than over the longer time period (eight versus seven significant correlations). The inconsistency in the error rate relationships is further demonstrated by changes in significant correlations when different periods are used. Three States had statistically significant correlations when eight review

Table 4

States with Statistically Significant* Correlations
Over Eight and Six Review Periods

States	Correlation Coefficient
Over the eight review periods from October 1979 - September 1983:	
Tennessee	.9732
Hawaii	.8220
Michigan	.6976
Vermont	.6788
Oregon	.6479
New York	.6311
Minnesota	-.7768
Over the six review periods from October 1980 - September 1983:	
Hawaii	.9667
Tennessee	.9586
Vermont	.7942
Kansas	.7399
Minnesota	-.7296
Oklahoma	-.7651
California	-.7685
Washington	-.7773

*Statistically significant at the 90 percent level.

periods were considered but insignificant correlations when six review periods were considered. Another four States had statistically significant correlations over six periods, but not all eight review periods.

The final question addressed through correlation analysis—Do States with large overpayment error rates also tend to have larger underpayment error rates?—attempts to measure if a State is equally inaccurate in both types of its payment error relative to other States. In this analysis, error rates of all States are pooled together within a single review period and then the correlation is calculated.

There is a tendency for States with high overpayment error rates to also have high underpayment error rates. The correlation coefficient for a review period is weak, positive, and usually statistically significant. Five of the eight correlations are statistically significant, and all are positive. They range from .10 to .60 (Table 5) indicating that there is a tendency for States with high overpayment error rates to also have high underpayment error rates. But at the same time the wide range in values indicates that this relationship is not very stable. As in all the prior analyses, the conclusion is that the relationship is weak and indicates that many things are affecting these error rates that a simple analysis of the rates alone cannot capture.

Table 5

Correlation of Overpayment and Underpayment Error Rates Across States by Review Period

Review Period	Correlation Coefficient
October 1979 - March 1980	.5954*
April 1980 - September 1980	.3453*
October 1980 - March 1981	.1894
April 1981 - September 1981	.1870
October 1982 - March 1982	.1035
April 1982 - September 1982	.4333*
October 1982 - March 1983	.5215*
April 1983 - September 1983	.3946*

*Statistically significant at the 90 percent level.

The Aid to Families with Dependent Children (AFDC) Program has a sanction system similar to the one in the Food Stamp Program (FSP). Its error rates can be analyzed to see if anything more can be learned about the relationship between overpayment and underpayment error rates over time. The AFDC sanction system was implemented earlier than the one in the FSP. There is some difference in determining the sanction liability in these two systems which may affect a comparison of the correlations between systems. However the initial analysis simply looks to see if the AFDC error rates exhibit the same inconsistent relationships as the FSP error rates. The AFDC data is restricted to the five review periods (from 10/79 to 3/82) that are available corresponding to the same time period as the FSP analyses.

The correlations of the AFDC error rates exhibit the same mix of values and lack of statistical significance as were calculated for the FSP. The correlation of the national error rates is stronger (.78), but still statistically insignificant. Only four States had statistically significant positive correlations, and four had statistically significant negative correlations. There isn't a consistent relationship between overpayment and underpayment error rates.

Appendix Tables

Title Page

Appendix Table 1

State Overpayment* Error Rates by Review Period from 10/79-3/80 to 4/83-9/83

State	Review Periods							
	10/79-03/80	04/80-09/80	10/80-03/81	04/81-09/81	10/81-03/82	04/82-09/82	10/82-03/83	04/83-09/83
Connecticut	9.60	10.30	14.14	13.44	13.29	12.90	13.75	11.85
Maine	10.40	8.00	9.76	6.50	7.79	9.24	6.20	10.69
Massachusetts	11.10	9.90	12.37	10.32	13.65	12.39	10.78	15.24
New Hampshire	9.10	3.40	13.29	11.81	15.33	17.08	11.16	8.75
New York	15.90	14.80	15.03	12.41	14.06	8.73	10.41	10.45
Rhode Island	15.10	12.30	11.75	9.19	8.71	9.08	8.36	9.49
Vermont	12.00	8.90	9.44	8.99	9.63	10.64	8.80	24.03
Delaware	12.30	7.50	7.84	7.07	6.09	5.82	4.87	5.03
Dist. of Columbia	18.20	11.50	13.79	12.45	11.32	10.88	11.25	8.63
Maryland	14.70	14.50	13.74	14.57	10.67	8.74	7.40	6.33
New Jersey	9.30	7.50	10.03	8.82	8.50	8.88	7.85	8.05
Pennsylvania	11.40	6.40	10.49	8.66	11.87	9.85	10.31	10.44
Puerto Rico	9.40	7.60	11.36	7.75	8.44			
Virgin Islands	12.70	12.20	14.96	6.51	3.39	14.69	12.71	16.80
Virginia	7.20	8.10	3.39	5.75	6.97	9.58	6.84	6.05
West Virginia	7.50	7.30	7.70	10.24	8.99	9.16	6.79	4.34
Alabama	8.70	7.90	8.47	6.29	5.42	6.03	5.88	8.19
Florida	9.10	3.60	12.46	13.22	10.77	9.68	9.48	11.01
Georgia	10.40	8.80	9.20	10.41	6.61	10.23	7.44	7.54
Kentucky	8.10	6.30	9.06	6.56	7.07	7.22	6.71	7.09
Mississippi	10.10	10.60	9.83	10.35	8.90	9.32	7.25	9.45
North Carolina	10.20	9.30	9.86	12.83	9.56	11.56	7.09	8.70
South Carolina	11.50	9.50	8.40	9.65	11.53	9.03	7.56	10.25
Tennessee	10.30	10.50	11.81	10.84	10.97	9.05	6.83	6.84
Illinois	12.00	7.90	9.08	8.00	7.68	10.26	6.96	7.50
Indiana	8.20	6.80	9.04	7.19	6.80	7.98	8.67	8.87
Michigan	10.50	10.10	9.38	9.24	9.08	8.90	7.49	7.91
Minnesota	7.00	6.30	6.70	8.53	10.23	6.55	8.25	7.78
Ohio	7.70	9.10	8.32	7.23	8.69	8.43	6.35	7.44
Wisconsin	10.80	8.60	11.12	9.48	10.63	12.10	8.42	8.13
Arkansas	8.50	6.50	8.80	9.52	9.49	9.79	7.33	10.66
Louisiana	11.00	7.70	10.33	10.56	9.88	9.54	7.47	10.05
New Mexico	13.80	12.60	12.82	13.86	13.09	12.60	12.37	10.45
Oklahoma	7.60	6.40	9.82	8.79	7.51	8.50	9.36	8.23
Texas	8.10	7.20	8.95	9.60	10.31	8.58	8.70	6.37
Colorado	8.40	8.80	11.70	13.88	14.58	13.88	15.02	10.25
Iowa	12.90	8.10	10.65	7.90	9.18	9.32	9.36	7.59
Kansas	11.90	9.20	11.60	10.68	10.15	9.26	9.41	8.78
Missouri	8.00	8.00	8.82	8.25	6.80	8.03	7.55	6.81
Montana	7.90	10.20	15.40	11.59	7.31	7.80	5.44	5.61
Nebraska	14.50	10.10	11.01	11.02	10.33	10.97	7.93	6.48
North Dakota	5.10	7.90	4.39	5.83	7.16	6.59	5.71	4.22
South Dakota	10.10	8.30	10.48	6.18	11.10	10.15	7.82	7.86
Utah	10.10	11.50	8.43	7.31	7.19	12.21	15.37	11.10
Wyoming	10.90	10.00	11.52	13.43	8.36	9.05	5.09	14.47
Alaska	10.40	13.30	21.38	24.92	21.21	20.32	13.99	13.71
Arizona	11.10	10.70	15.09	9.42	12.63	11.61	11.13	8.36
California	7.20	7.80	8.66	5.70	9.28	8.02	6.93	6.63
Guam	4.20	8.40	4.58	11.23	4.98	5.66	7.52	7.61
Hawaii	4.80	4.20	7.01	6.93	6.68	5.25	3.97	4.59
Idaho	10.60	10.00	8.76	10.29	7.37	9.43	7.47	9.67
Nevada	5.10	3.10	3.66	3.08	1.45	1.52	2.73	1.55
Oregon	9.30	9.10	7.14	10.85	11.98	11.19	9.03	11.52
Washington	8.30	7.90	9.00	7.14	10.31	9.11	9.35	10.89
U.S. totals	10.20	8.90	10.42	9.40	9.78	9.23	8.19	8.54

* Overpayment error rates include overpayments to eligibles and payments to ineligibles.

Title Page

Appendix Table 2

State Underpayment Error Rates by Review Period from 10/79-3/80 to 4/83-9/83

State	Review Periods							
	10/79-03/80	04/80-09/80	10/80-03/81	04/81-09/81	10/81-03/82	04/82-09/82	10/82-03/83	04/83-09/83
Connecticut	2.70	.80	2.66	3.63	2.66	4.17	3.31	2.27
Maine	2.00	2.10	2.90	2.34	1.91	1.85	1.73	3.00
Massachusetts	1.70	1.60	3.60	1.45	2.14	3.36	1.68	1.95
New Hampshire	2.30	1.60	2.75	2.58	2.05	1.54	2.69	1.12
New York	4.70	3.60	4.11	3.20	2.68	3.38	2.88	3.22
Rhode Island	3.10	2.80	2.33	2.00	3.31	1.56	2.52	2.61
Vermont	1.60	2.20	1.89	1.57	2.47	2.16	2.31	3.06
Delaware	1.30	3.10	3.89	1.64	2.51	1.61	2.30	1.34
Dist. of Columbia	3.40	4.10	5.20	4.41	7.32	4.33	2.77	3.49
Maryland	2.50	2.40	2.95	2.07	1.66	1.61	2.43	-1.94
New Jersey	1.70	2.00	1.81	2.39	2.41	2.24	1.77	3.14
Pennsylvania	2.30	2.20	3.05	1.93	1.45	2.60	2.20	1.83
Puerto Rico	1.90	1.60	2.07	2.07	1.85			
Virgin Islands	2.20	3.00	3.26	4.34	.95	3.20	4.68	4.89
Virginia	1.90	1.80	1.75	2.26	2.84	1.89	2.20	2.07
West Virginia	1.80	1.60	2.20	2.88	2.45	1.54	2.10	1.62
Alabama	2.10	1.70	2.25	1.70	2.07	1.55	2.06	1.86
Florida	2.70	2.20	2.53	2.08	2.16	3.27	2.43	3.85
Georgia	3.00	2.20	3.36	2.05	2.16	2.60	2.28	2.44
Kentucky	1.20	1.90	1.79	2.20	1.92	2.04	1.20	2.55
Mississippi	2.20	3.00	2.59	1.25	3.91	2.87	2.53	3.51
North Carolina	2.60	3.10	5.94	3.37	3.84	.93	3.04	3.57
South Carolina	2.10	2.20	2.10	2.55	1.33	3.17	2.03	3.06
Tennessee	2.50	2.10	2.62	2.35	2.35	2.24	1.88	2.01
Illinois	3.90	3.20	2.42	3.44	2.15	1.90	2.21	2.61
Indiana	2.10	1.40	.99	.80	2.45	2.21	2.20	1.92
Michigan	3.10	2.90	3.12	2.63	2.30	3.19	2.33	1.81
Minnesota	2.00	2.30	2.15	1.54	1.56	2.35	1.28	2.15
Ohio	1.50	1.20	1.82	1.69	1.82	1.30	1.33	1.43
Wisconsin	3.00	3.40	3.20	3.71	4.15	4.48	3.34	3.42
Arkansas	1.30	1.80	2.44	2.57	3.10	2.52	1.95	1.96
Louisiana	2.20	2.40	1.90	2.96	2.60	3.01	2.43	2.52
New Mexico	2.40	2.30	2.44	1.77	2.72	2.71	3.31	2.74
Oklahoma	2.00	2.60	2.42	3.12	3.97	3.28	3.55	3.26
Texas	1.70	1.80	1.96	2.31	2.27	2.21	1.95	2.87
Colorado	1.10	1.70	2.56	2.80	2.70	.99	2.42	2.24
Iowa	2.10	1.90	1.57	1.35	2.21	1.15	1.81	2.15
Kansas	1.90	2.90	2.95	2.12	1.60	1.43	1.75	2.02
Missouri	1.70	2.50	2.04	2.10	2.30	2.53	2.76	1.77
Montana	2.10	1.20	1.88	2.67	1.62	1.81	1.30	1.34
Nebraska	4.00	3.20	2.17	1.87	4.02	1.82	2.73	1.97
North Dakota	1.50	.80	2.51	1.49	1.97	.68	.00	1.50
South Dakota	2.10	.80	1.78	1.63	1.35	1.65	1.13	1.07
Utah	1.90	2.50	3.04	4.16	2.96	4.14	2.61	2.43
Wyoming	.60	1.40	1.13	1.19	.75	1.71	1.82	2.14
Alaska	3.00	2.30	.99	2.73	1.98	3.58	2.56	2.20
Arizona	2.50	3.40	3.60	3.95	2.81	2.68	3.27	3.27
California	2.60	3.50	2.96	3.35	2.75	3.21	3.83	3.68
Guam	.40	.70	1.91	1.96	2.22	1.12	1.19	1.63
Hawaii	2.10	1.70	2.38	2.29	2.40	1.33	1.15	1.33
Idaho	1.60	2.70	1.99	2.02	1.52	2.78	2.15	1.03
Nevada	1.70	1.80	1.41	.57	1.56	.16	.89	1.23
Oregon	2.20	1.50	1.43	2.21	3.20	1.80	2.55	2.43
Washington	1.20	1.40	1.57	2.42	1.66	1.76	1.50	1.63
U.S. totals	2.40	2.30	2.61	2.42	2.35	2.49	2.32	2.53