ANALYSIS OF FOOD STAMP PROGRAM PARTICIPATION AND COSTS, 1970 - 1980

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PREFACE

This study is the result of a team effort by several members of the Economics Division of the Congressional Research Service. The initial project plan was developed by Warren E. Farb and Charles V. Ciccone.

The preparation of this report and analysis therein was performed by Mr. Bendt, with helpful comments from Messrs. Farb and Ciccone. The data was compiled by V. Amerkhail, J. Burton, D. Dunaway, and N. Sullivan.

SUMMARY

This study explores some of the causes of the historical growth in the food stamp program. The largest single factor in this growth was the internal expansion of the program to cover all geographic areas, including Puerto Rico. The underlying structure of food stamps participation that is determined will allow projections of costs and caseloads for the period 1978-1980.

Data for 41 counties for the years 1970-1973 were collected and analyzed. The most important factors in determining the percentage of a county's population receiving food stamps over the study period were the overall unemployment rate in the county, the long-term unemployment rate (those unemployed fifteen weeks or more) in the nation, and the percentage of the county's population receiving welfare. Higher levels of these variables were associated with higher levels of food stamp participation. A higher level of per capita income in a county tended to be associated with a lower level of food stamp participation. There also seemed to be a small positive effect of the average bonus value on participation.

The combined effects of these variables (with the addition of a time trend variable to measure the internal expansion of the program) predicted the 1974 and 1975 June national caseloads to within 1-2 percent of the actual caseload, after adjusting for Puerto Rico joining

the program. Using three sets of assumptions about the state of the economy in the period 1976-1980, three sets of the expected level of food stamp recipients and total bonus value are derived. The "control projection" (viewed as being most likely to occur) shows the number of food stamp recipients declining in 1976 and 1977, rising slightly in 1978 and 1979, and declining in 1980. Expected higher food prices, however, drive the projected total bonus value up steadily until 1980. A more pessimistic set of economic assumptions shows the same general pattern, but at higher levels of participation and cost. A more optimistic set of assumptions results in participation falling until 1978, with slight increases in 1979 and 1980. Costs are projected to rise very moderately under this set of assumptions due to relatively stable food prices.

Changes in the rate of participation among those eligible for the food stamp program would invalidate the projections of this study. Complex legislative or administrative changes in the food stamp program would also lessen the degree of certainty in the projected cost and caseload. However, to the extent that an underlying structure defined by cyclical variables such as income and unemployment exist, the results of this study should be useful in analyzing the food stamp program.

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Section I

INTRODUCTION

The extremely rapid increases in the number of participants and costs of the food stamp program in the last five years have generated a great deal of interest in the causes of this growth and trends for the future. This study investigates the effects of macroeconomic variables and policy variables on the number of food stamp recipients and the cost of the food stamp program. The results of this analysis of historical data is then used to determine what the size of the food stamp program is likely to be in the near future given alternative sets of assumptions.

The food stamp program was formally established in 1964, although there were some pilot projects earlier. Except for certain recipients of public assistance who are automatically eligible,[1/] households are eligible to participate in the food stamp program if their net income is less than the statutory limit for that size household (currently $553 per month for a household of four) and their liquid assets are less than $1,500 ($3,000 if two or more household members are over 65 years old). Net income is the result of certain deductions from gross income such as Federal, State, and local income taxes and Social Security taxes, child care, medical expenses, alimony and child support, educational expenses, ten percent of gross earned

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1/ Namely, most of those receiving aid to families with dependent children (AFDC) and supplemental security income (SSI).

income (up to $30 a month), disaster and casualty losses, and some shelter expenses (over 30 percent of income after all other deductions are taken). Virtually all participating households had monthly incomes of less than $1,000 in July 1975, with over 90 percent having had monthly incomes of less than $600.[1/] The coupon allotment is based on the monthly cost of food in the Department of Agriculture's "thrifty food plan" adjusted for household size and food price inflation (currently $166 for four people). The household pays an amount for the food stamps--the "purchase requirement"--which is lower than the face value of the stamps and determined by net income. The difference between the face value and the purchase requirement is the "bonus value." The Federal Government picks up the entire cost of the bonus value of the coupons and about 50 percent of the administrative costs.

In 1968, there were only 1,000 "project areas" (usually counties) with 2.5 million recipients monthly at an annual cost of $173 million (see Figure 1). By the end of 1971, there were over 2,000 project areas, as counties converted from surplus commodity distribution programs to food stamp programs. This conversion process continued with amendments to the Act in 1973 which mandated national operation of the program by July 1974. This goal was not actually accomplished, however, until January 1975. There are now over 3,000 project areas

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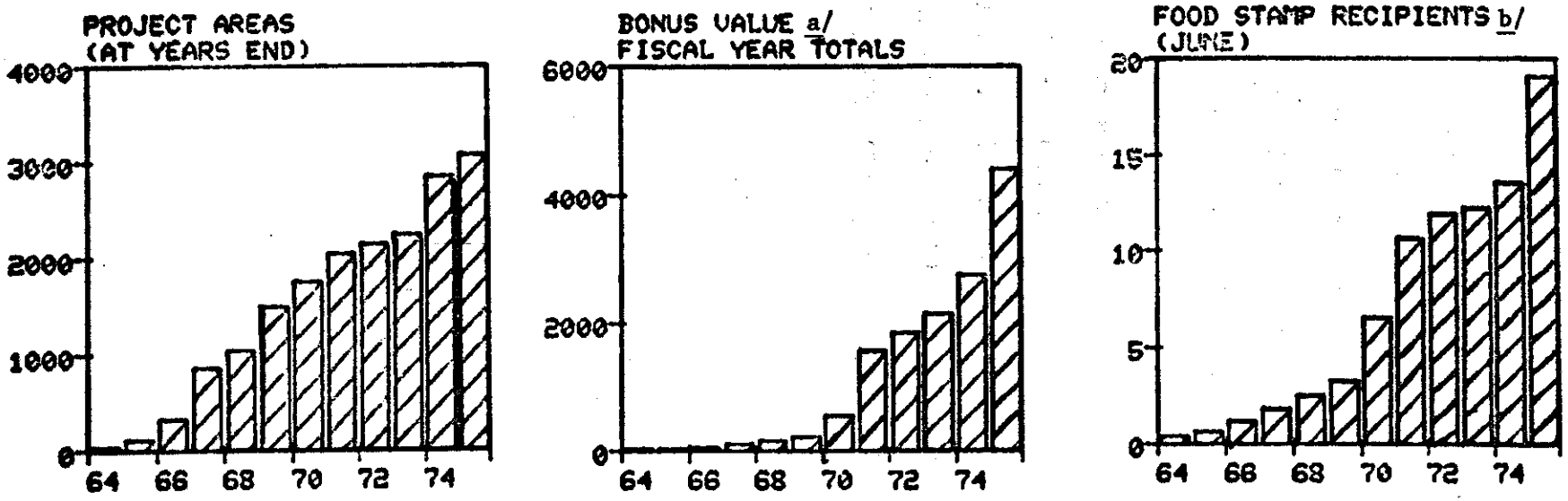
1/ United States Senate. Committee on Agriculture and Forestry. "National Food Stamp Reform Act of 1976: Additional, Supplemental, and Minority Views." Washington, U.S. Govt. Print. Off., March 13, 1976, p. 43.

Figure 1

GROWTH OF THE FOOD STAMP PROGRAM, 1964-1975



a/ In millions of dollars.

b/ In millions.

SOURCE: Department of Agriculture, Food and Nutrition Service, "Statistical Summary of Operations" for appropriate months and years.

with about 19 million recipients at an annual cost of over $5 billion. In the 1960's, the growth in the number of recipients and the total bonus value closely paralleled the growth in the number of project areas. Higher rates of inflation during the 1970's, however, have caused the growth in expenditures to outstrip the growth in recipients (see Figure 1).

The next section of this report discusses the data and methodology used in this study. Section III reports the results of the analysis of historical data. Section IV analyzes the impact of these results on future trends. The final section offers comparisons with other studies, possible applications of this study, and some general conclusions.

Section II

DATA AND METHODOLOGY

It is possible to analyze the macroeconomic aspects of the food stamp programs at three levels of observation: national, state, and county. Time series studies at the national level have recently been completed by the Department of Health, Education, and Welfare and the Congressional Budget Office.[1/] The state is an inappropriate unit of observation because numerous explanatory variables such as the unemployment rates and income levels differ greatly between areas in a state. For example, the overall economic conditions in Illinois as reflected by the statewide unemployment rate do not necessarily bear much of a relationship to the number of food stamps recipients in Cook County (Chicago) which comprises two-thirds of the total caseload in Illinois. One would expect the unemployment rate in Cook County to be a much more precise indicator. Since this problem of appropriate area size is mitigated with the county as the unit of observation, and since most food stamp project areas are counties, the county was selected as the most appropriate level to analyze.[2/, 3/]

1/ The HEW study by Martin Holmer, Office of Income Security, is forthcoming. For details of the CBO study see William Hoagland, "Five Year Food Program Projections," unpublished memo of December 16, 1975.

2/ In a few states, central city areas were chosen instead where data are not available on the county level.

3/ For another study that uses cross-sectional county data, see Fred K. Hines, "Factors Related to Participation in the Food Stamp Program." Agricultural Economic Report No. 298, United States Department of Agriculture, Economic Research Service, July 1975. Hines uses 1970 census data, thus not studying the effects over time. See discussion in Section V.

It is useful to investigate a microeconomic model of food stamp participation before discussing the macroeconomic approach. In determining the factors that affect a particular household's decision to participate in the food stamp program, household income would be expected to be a major factor, since both eligibility and the bonus value depend upon income. Assets are also a major determinant of eligibility; deductible expenses affect the amount of the bonus value. The amount of the bonus value would be expected to exert a positive influence on participation, since a household with a small bonus value (the minimum bonus value for a four-person household is $24) may choose not to participate because "transaction costs" may exceed this bonus value. Transaction costs include items such as time spent at the certification office, trips to a food stamp vendor to purchase the stamps, and possible stigma attached to using the stamps at a supermarket. Whether or not the household receives any public assistance benefits would also be a factor, since such households are automatically eligible to participate and likely to be better informed of the food stamp program. Finally, the age, race, sex, and educational attainment of the household head, as well as the size and composition of the household (number of children, number of elderly members), most likely affect the decision to participate via tastes, stigma costs, or information.

Analogues of most of these variables exist at the aggregate level. The number of food stamp recipients per county is readily available,

as is the population of each county. The ratio of recipients to population or "food stamp participation rate" is the primary focus of this study.[1/] Ideally, since the filing unit is the household, a more suitable variable would be the ratio of participating households to the total number of households in a given county. Unfortunately, these data are not available.

The most appropriate readily available aggregate measure of income that affects the food stamp participation rate is per capita income. This variable is expected to have a negative influence on the food stamp participation rate. A more relevant variable specific to the low income population, e.g. the median income of the lowest quintile, is not available.

The average bonus value per recipient is expected to have a positive effect on the participation rate. This variable serves as a measure of the number of households for which the level of transaction costs is exceeded. In addition, it is also a measure of the level of deductions after controlling for household size, composition, and income.

A "welfare participation rate" is formed by dividing the number of AFDC recipients in each county by the county's population. Other public assistance recipients are excluded because they are a relatively small part of the caseload and the data are not as complete.

1/ The number of participants is easily recovered by multiplying by the total population. This ratio is not to be confused with the usual so-called "participation rate among eligibles." The numerator in both ratios is the number of participants, but in this study the denominator is the total population, not just those eligible. Estimating the participation rate instead of the number of recipients eliminates the need to control for population.

No direct analogues of assets or the demographic characteristics of the microeconomic formulations are available at the aggregate level to control for socio-economic status. [1/] However, the total unemployment rate is a measure of the status of each county's economy, while the long-term unemployment rate (those unemployed 15 weeks or more) for the nation is a better measure of the pervasiveness of economic hardship. People unemployed for long periods of time are more likely to have exhausted their savings, unemployment compensation benefits, and other resources and thus are more likely to turn to or become eligible for food stamps. Thus, higher rates of total and long-term unemployment are expected to be associated with higher levels of food stamp participation.

The effects of changing tastes and information about the food stamp program cannot be measured directly here. A time trend will capture the effects of these unmeasurable variables, as well as adjusting for normal growth in the other variables. This time trend is expected to have a positive effect on the food stamp participation rate.

To summarize how food stamp participation rates can be explained with a model using aggregated data, the following hypotheses are generated. The food stamp participation rate is expected to be higher with:

1/ Hines, op. cit., uses 1970 census data, and therefore can get measures of the demographic composition of counties.

-- higher average bonus;

-- lower per capita income;

-- higher welfare participation rate;

-- higher unemployment rate and a higher long-term unemployment rate;

-- the passage of time.

For the quantitative estimates discussed in the next section, data for the period 1970-1973 were collected for counties which were already participating in the food stamp program in 1970. Initially, one county from each state was chosen (Alaska, Hawaii, Washington, D.C., Puerto Rico,[1/] and the territories were omitted) to insure geographic representation, but some states did not have the necessary data available. The counties were purposely not chosen randomly, but rather in a manner intended to reflect their state's predominant rural or urban nature. For example, Cook County (Chicago) was chosen in Illinois, but Mingo County (population 33,000 in 1970) was chosen in West Virginia. The 41 counties included in the analysis are listed in Appendix B. These 41 counties and four years of data were pooled to give a sample of 164 observations with which to investigate the relationships described above.[2/]

1/ For the projections made in Section IV, Puerto Rico is treated separately because of its significant impact on total participation.

2/ Multiple regression was used to analyze this data. See Appendix A for more details.

Section III

RESULTS

In general, the results of the statistical analysis support the hypotheses stated in the last section. The average bonus value, the total unemployment rate, the long-term unemployment rate, and the welfare participation rate are all directly (positively) related to the food stamp participation rate. Per capita income is inversely (negatively) related to the participation rate. Of these variables, the welfare participation rate and the unemployment rates are the most important variables. There is also a significant and positive (upward) time trend. Including the effects of all of these variables, approximately 45 percent of the variation in food stamp participation rates between 1970 and 1973 is explained. The remaining 55 percent is explained by model misspecification (see Appendix A) or omitted variables. The effects of these variables in determining the food stamp participation rate during this period are discussed in more detail below.

1. Average bonus

For each dollar that the average bonus rose, the participation rate was relatively insensitive (holding other factors constant), rising only .04 of one percentage point.[1/] The fact that this effect is not significantly different from zero is likely due to the omission of effects of deductions and household size and composition. Since the coupon allotment is adjusted periodically for inflation, the fact that

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1/ Conversely, a one dollar decrease in the average bonus value decreases participation by .04 percentage points. The converse of all such inferences in this section will hold.

the average bonus value in the sample rose by only 9.4 percent while food prices rose by 20.2 percent between 1970 and 1973 is evidence of such omitted effects. Changing policy--such as the purchase requirement as a percent of income, or a standardized deduction instead of itemized deductions--would change the average bonus value. So would changes in the composition of the food stamp recipients, such as a shift toward lower incomes or higher deductions.

2. Per capita income

For each $100 that per capita income rose, the participation rate declined by .05 percentage points. Thus, if all other factors had remained constant, the nearly $500 increase in per capita income from 1972 to 1973 would have decreased the participation rate by about .25 percentage points, or more than one-half million recipients. The fact that the participation rate actually increased is due to the combined effects of other variables.

3. Unemployment rate

A 1.0 percentage point increase in the total unemployment rate, ceteris paribus, increased the food stamp participation rate by .2 percentage points; a 1.0 percentage point increase in the long-term unemployment rate, ceteris paribus, increased the participation rate by 1.0 percentage point. However, the effects of these two variables are not independent, since the long-term unemployment rate is a component of the total unemployment rate. The combined effect of a

1.0 percentage point increase in the total unemployment rate, taking this interaction into account, is to increase the long-term unemployment rate by about .7 percentage points, and to increase the food stamp participation rate by about .64 percentage points. 1/

4. Welfare participation

An increase of 1.0 percentage point in the welfare participation rate, ceteris paribus, increased the food stamp participation rate by .88 percentage points. Since AFDC recipients are automatically eligible for food stamps, this nearly one-to-one increase is not surprising.

5. Time trend

The time trend variable included to measure the effects of tastes and the level of information with respect to the food stamp program was estimated to be positive. In the absence of the effects of other variables, the food stamp participation rate would have increased by .4 percentage points per year. This gradual growth in the program is probably caused by increasing information through outreach programs and decreasing reluctance to use the program by those eligible.

As some indication of the magnitude of these effects, the actual changes in these variables for the nation between 1974 and 1975 are given in Table 1 along with the corresponding effect on the number of food stamp recipients. The table entries represent the net increases or decreases in the number of food stamp recipients if the 1975 levels had occurred in 1974. A more detailed discussion of how the model performs with respect to 1974 and 1975 appears in the next section.

1/ See discussion in Appendix A for the derivation of these figures.

Table 1

NET EFFECTS OF CHANGES IN THE FACTORS AFFECTING THE NUMBER OF FOOD STAMP RECIPIENTS, 1974 - 1975

Variable	Change, 1974-1975	Net effect on number of food stamp recipients
Average bonus value	+ $2.32	+ 190,000
Per capita income	+ $441	- 467,000
Total unemployment rate	+ 3.32%	+ 625,000
Long term unemployment rate	+ 2.10%	+ 3,502,000
Time trend	+ 1	+ 899,000
Total		+ 4,749,000

Notes: Changes based on data in Table 2. Net effects based upon results reported in this section and Appendix A. Since the change in the welfare participation rate was so small, its effect is omitted in this table.

SOURCE: Congressional Research Service, Economics Division.

Section IV

FUTURE TRENDS

A. Introduction

Forecasting future trends on the basis of past history is always somewhat risky. In general, it is necessary to assume that the relationship found to hold in the past will continue to hold in the future. In forecasting the participation rate in the food stamp program, additional caution must be exercised since the food stamp program was expanding extremely rapidly and the economy was relatively stagnant during the period of analysis. Table 2 indicates that given the results from Section III, the large rise in the food stamp participation rate is not surprising considering the steep increases in the total unemployment rate and the long-term unemployment rate. This increase in participation took place despite a growth in personal income and a relatively stable AFDC population.

A test of the validity of these results is to show the predicted number of food stamp recipients for 1974 and 1975 and compare these predictions with the actual figures for these two years. Table 3 summarizes the predictions.

Table 2

NATIONAL DATA ON FACTORS RELATED TO THE NUMBER OF FOOD STAMP RECIPIENTS

Year	Food stamp participation rate	Monthly average bonus	Per capita income	Unemployment rate	Long-term unemployment rate	AFDC participation rate
1970	3.16%	$14.16	$3,945	4.74%	.83%	4.05%
1971	5.10	13.33	4,173	5.64	1.41	4.94
1972	5.64	13.50	4,524	5.47	1.33	5.22
1973	5.77	14.52	5,015	4.67	.85	5.18
1974	6.36	19.36	5,429	5.23	1.03	5.08
1975	8.92	21.68	5,868	8.55	3.13	5.29

Note: All data for the months of June. Dollar amounts are in current dollars.

SOURCES: 1. Food stamp participation rate and average bonus: Department of Agriculture, Food and Nutrition Service, "Statistical Summary of Operations."

2. Per capita income: Department of Commerce, Bureau of the Census, Consumer Population Reports no. 101, "Consumer Income."

3. Total unemployment and long-term unemployment rate: Department of Labor, Bureau of Labor Statistics, Monthly Labor Review.

4. AFDC participation rate: Department of Health, Education, and Welfare, National Center for Social Statistics, "Public Assistance Statistics," report A-2.

Table 3

ACTUAL AND PREDICTED NUMBER OF FOOD STAMP RECIPIENTS

Year	Actual	Predicted	% Error
1974	13,480,185	13,794,299	+ 2.3%
1975	19,051,134 a/	18,806,808 a/	- 1.3 a/

a/ Includes 1,524,061 recipients from Puerto Rico.

Note: June figures.

SOURCE: Actual numbers taken from Department of Agriculture, Food and Nutrition Service, "Statistical Summary of Operations." Predicted numbers calculated by Congressional Research Service, Economics Division.

When an adjustment for the recipients from Puerto Rico is added into the 1975 prediction, the predictions for both years deviate only slightly from the actual figures. This adjustment is easily justified since 1975 was the first year that residents of Puerto Rico were eligible for the food stamp program and since Puerto Rico is not included in the United States population data.

B. Assumptions

The fact that the model predicts reasonably well in the short run beyond the scope of the estimation period is, of course, encouraging. However, a forecast beyond the present experience where there is no available corroborating data still must rest upon numerous assumptions. The basic source for these data is the January forecast by Data Resources, Inc. (DRI) labelled Cycle Long, which is viewed as being "most likely" to occur.[1/] A discussion of the assumptions made about each of the variables in the model follows.

1. Population. Growth will continue at the recent trend rate of 2.1 lifetime births per female. These estimates are the Census series II for July 1 of each year.[2/]

2. Per capita income. Growth of about 10 percent per year is forecast. In real terms, this annual rate is about 3-4 percent, implying an inflation rate of about 5-6 percent per year.

3. Total and long-term unemployment rate. The total unemployment rate trends downward to 1980, with a slight rise in 1978-79. Only the total unemployment rate is forecast by DRI. The long-term rate is forecast on the basis of the relationship estimated in Appendix A between the long-term rate and the total unemployment rate.

4. Welfare participation rate. As Table 2 shows, the rate has been quite stable the last few years, declining slightly in 1973 and 1974

1/ See Data Resources Review, January 1976, for more details.

2/ The July 1 figure is very close to being an annual average. For example, in 1975, the July 1 population was 213,631,000 and the annual average was 213,570,000.

before rising slightly in 1975. The rise in 1975 can mostly be attributed to the unemployed parent segment of AFDC. Given that the other components of the welfare population are even more stable with respect to economic fluctuations, the average for the four-year period 1972-75 is used for the future. Unpublished data from the Department of Health, Education, and Welfare show the expected number of AFDC recipients fluctuating around 11.0 - 11.3 million between 1976 and 1980. If these projected levels do indeed result, since the population is rising the welfare participation rate may actually decrease. However the constant rate was assumed as being most likely to occur. 1/

5. Average bonus. It is assumed that the monthly average bonus value per recipient grows at the rate of inflation as measured by the food component of the consumer price index. 2/ Actually, it is the coupon allotment, not the bonus value, that is indexed to the inflation rate in the stamp legislation. Hence the assumption that the average bonus value grows at the rate of the food price index implicitly assumes

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1/ A study of the AFDC program in 1975-1980 forecast approximately these same levels. See Kevin Hollenbeck, An Analysis of the Impact of Unemployment and Inflation on AFDC Costs and Caseload (Washington, D. C.: Mathematica, Inc., February, 1976).

2/ Hoagland, op. cit., found the allotment for a family of four growing at a rate of $.96 for every 1 point rise in the food price index. Using two different sets of assumptions he estimated the average bonus per recipient to be about either $26.20 or $31.75 in 1980. These values bracket the figure in Table 5 ($28.63) and are close to the figures in Table 6 ($26.77 and $30.82).

the effects of income and deductions in calculating the bonus value remain the same.

6. Puerto Rico. The level of participation in Puerto Rico is assumed to remain at its nearly saturated 1975 level, i.e., about 1.5 million recipients. Participation in the other territories (Guam and the Virgin Islands) is negligible.

The specific values of these variables are shown in Table 4. One should remember that although the assumptions on which these values are based are viewed as being the most reasonable, alternatives are available. The values resulting from more optimistic and more pessimistic sets of assumptions are given in Table 5. 1/

In the optimistic forecast, the unemployment rate trends steadily downward. The upward cycle in the unemployment rate in 1978-79 is much sharper in the pessimistic forecast. Food prices are also up much more sharply. The per capita income figures are left in nominal terms since the operating regulations for coupon allotments and net income limits are in nominal terms. In the pessimistic forecast, however, real per capita income is growing at only about 2-3 percent per year compared to 4-5 percent per year in the more optimistic scenario.

1/ These are the DRI forecasts from February 1976 called OPTIM and PESSIM.

Table 4

FORECAST VALUES, 1976 - 1980
Control Projection

Variable	1976	1977	1978	1979	1980
Population, U.S. (thousands)	215,074	216,814	218,678	220,662	222,769
Per capita income	$6,449	$7,091	$7,645	$8,291	$9,114
Total unemployment rate	7.4%	6.4%	6.6%	6.9%	5.9%
Long-term unemployment rate	2.2%	1.6%	1.7%	1.9%	1.3%
Welfare participation rate	5.2%	5.2%	5.2%	5.2%	5.2%
Average bonus	$23.25	$24.63	$26.04	$27.34	$28.63
Percent change	7.2%	6.0%	5.7%	5.0%	4.7%
Recipients in Puerto Rico	1,524,061	1,524,061	1,524,061	1,524,061	1,524,061

SOURCE: See text.

Table 5

ALTERNATIVE FORECAST VALUES, 1976-1980

Variable	Optimistic					Pessimistic				
	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980
Population (thousands)	215,074	216,814	218,678	220,662	222,769	215,074	216,814	218,678	220,662	222,769
Per capita income	$6,415	$7,013	$7,559	$8,090	$8,714	$6,428	$7,067	$7,543	$8,090	$8,832
Total unemployment rate	7.5%	6.6%	6.0%	5.7%	5.4%	7.6%	7.1%	8.1%	8.7%	7.8%
Long-term unemployment rate	2.3%	1.7%	1.4%	1.2%	1.1%	2.4%	2.0%	2.7%	3.2%	2.5%
Welfare participation rate	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%
Average bonus % change	$23.02 6.2%	$24.01 4.3%	$24.80 3.3%	$25.70 3.6%	$26.77 4.2%	$23.05 6.3%	$24.57 6.6%	$27.15 10.5%	$29.13 7.3%	$30.82 5.8%
Recipients in Puerto Rico	1,524,061	1,524,061	1,524,061	1,524,061	1,524,061	1,524,061	1,524,061	1,524,061	1,524,061	1,524,061

SOURCE: See text.

C. Caseload

Since the estimates of recipients in this section are based on annual averages, they themselves should be regarded as annual averages, although they are probably very close to what July 1 participation would be. If the growth rate is constant--either steadily up or steadily down--throughout the year, the annual average and the July 1 level would be identical. Even for a year where the growth rate was positive and then turned negative (as 1975 was for the number of food stamp recipients), the two levels are likely to be quite close. 1/

The number of recipients is expected to fall steadily in the next two years from an annual average of 18.8 million in 1975 to 17.4 million in 1976 and 16.6 million in 1977 (see Table 6). Figure 2 shows that this downward trend nearly parallels the drop in the unemployment rate as recovery takes place. The pattern in 1978-80 is also very nearly parallel to the path of the unemployment rate. This joint movement is hardly surprising in light of how important the unemployment rate was found to be in explaining the variation in the 1970-1973 period, especially the long-term unemployment rate. It should be noted that the drop in the unemployment rate in 1972-73 did not cause a drop in the number of recipients, though the rate of increase was slowed. The food stamp program was still expanding too rapidly internally (by increasing the number of project areas and intensifying outreach efforts) for external

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1/ Participation was 17.89 million in January, peaked at 19.34 million in April, and declined to 18.83 million by December in 1975. The annual average was 18.82 million; the June and July figures were 19.03 and 18.80 million respectively.

Table 6

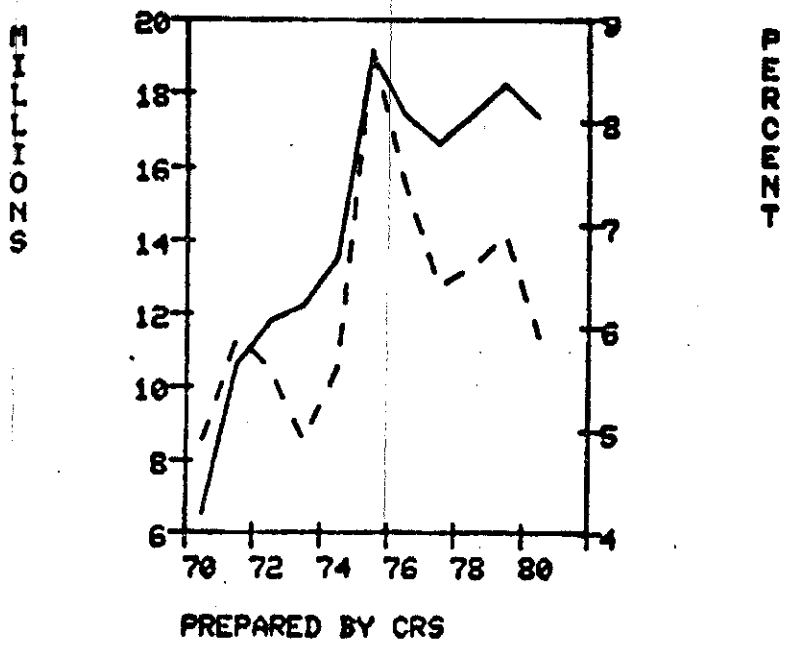
NUMBER OF FOOD STAMP RECIPIENTS UNDER ALTERNATIVE ECONOMIC FORECASTS

Year	Control	Optimistic	Pessimistic
1976	17,411,611	17,554,861	17,684,061
1977	16,581,533	16,832,761	17,444,861
1978	17,369,097	16,670,561	19,632,161
1979	18,234,671	16,920,661	21,282,661
1980	17,338,120	17,119,361	20,262,361

SOURCE: Congressional Research Service, Economics Division.

Figure 2

FOOD STAMP RECIPIENTS AND THE UNEMPLOYMENT RATE



- - - - unemployment rate.

_____ number of recipients.

influences such as the unemployment rate to have their expected net effect.

The differences between the two alternative forecasts and the control projection are not really significant until 1978. The more pessimistic forecast shows a weaker recovery and a corresponding smaller decline in the number of food stamp recipients in the next two years. It should be noted that the more optimistic forecast is a simple trend line until 1980. The control projections are based on the assumption of a stronger-than-trend recovery in 1976 and 1977, though the end points in 1980 of these two forecasts are about the same. Table 6 shows these alternative estimates of the number of food stamp recipients.

Under the more favorable economic conditions of steadily decreasing unemployment and increasing incomes of the more optimistic forecast, the number of food stamp recipients rises slowly in the period 1978-1980. The positive effect of the variables measured by the time trend (changing tastes and levels of information) is large enough to offset these downward pressures on the number of recipients.

Although these three alternatives are sufficiently different to establish a reasonable range of estimates, an infinite number of alternative forecasts are possible. Changing any of the six assumptions discussed above would change the estimated number of food stamp recipients.[1/]

1/ The more detailed discussion in Appendix A will allow the interested reader to make additional forecasts based on assumptions of his own choosing.

D. Costs

Estimates of future costs of the food stamp program can be derived by multiplying the estimated number of recipients by the forecast average bonus value. This number is the estimated cost of a typical month; multiplying by 12 gives an estimate of the calendar year total. 1/ It should be noted, however, that these estimates of costs are extremely sensitive to the assumptions about the average bonus mentioned in Part A of this section regarding net income and deductions.

With the above caveat in mind, the cost estimates corresponding to the control projections are given in Table 7. On a fiscal year basis, the estimated costs of the food stamp program rise continuously after 1976. However, on an average monthly or calendar year basis, the rise in estimated costs ends in 1980, with slight reductions from 1979 levels. These reductions are due to an expected decline in the caseload which offsets the expected rise in the average bonus (see Table 4).

Under the assumptions of both the more optimistic and the more pessimistic forecasts the estimated costs rise steadily, though at much different rates (see Table 8). The difference between these two sets of cost estimates is primarily due to the very different rates of

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1/ Estimates of fiscal year costs may be obtained by adding together the appropriate proportions of each of the calendar year cost estimates, e.g. FY 1977 costs = (1/4 CY 1976 costs + 3/4 CY 1977 costs).

Table 7

ESTIMATED BONUS COSTS OF THE FOOD STAMP PROGRAM, CONTROL PROJECTION, 1976 - 1980
(in billions)

	Average Month	Calendar Year	Fiscal Year
1976	$.405	$4.858	$5.034*
Transition Quarter	--	--	1.214
1977	.408	4.901	4.890
1987	.452	5.427	5.295
1979	.499	5.982	5.843
1980	.496	5.957	5.963

* Includes $2.605 billion actually spent in July-December 1975.

SOURCE: Congressional Research Service, Economics Division.

Table 8

ESTIMATED COSTS OF THE FOOD STAMP PROGRAM,
ALTERNATIVE PROJECTIONS, 1976 - 1980

More Optimistic				More Pessimistic			
Year	Average Month	Calendar Year	Fiscal Year	Year	Average Month	Calendar Year	Fiscal Year
1976	.404	4.849	5.029*	1976	.408	4.891	5.051*
Transition Quarter	--	--	1.212	Transition Quarter	--	--	1.223
1977	.404	4.850	4.850	1977	.429	5.143	5.080
1978	.413	4.961	4.933	1978	.533	6.396	6.083
1979	.435	5.218	5.154	1979	.620	7.440	7.179
1980	.458	5.499	5.429	1980	.624	7.493	7.480

* Includes $2.605 billion actually spent in July-December 1975.

SOURCE: Congressional Research Service, Economics Division.

change forecast in the food price index and hence the average bonus value. The dramatic cycle of unemployment and food stamp recipients in the more pessimistic forecast also affects the rate of change in the cost estimates, with large increases expected in 1978 and 1979, but only a slight increase in 1980. In the more optimistic forecast, the projected decline in the caseload in the next two years is enough to almost offset the expected increase in the average bonus. After 1978, however, the projected rising caseload and rising average bonus accelerate the rate of increase in the estimated costs.

These estimated cost figures offer a range from which to choose. However, an infinite number of cost estimates can be derived by making different assumptions about the changes in the average bonus. Additionally, each of these assumptions can be applied to any one of the many possible projections about the future caseload.

Finally, it should be reiterated that the average bonus need not increase at the rate of change of the food price index. It is the allotment, not the bonus value, which is indexed. Thus, changes in income, deductions, or the policies which affect the calculation of the bonus value will affect the estimated costs of the food stamp program. If the impact of changes like these on the average bonus value can be calculated, then cost estimates can be easily derived as above. Other types of impact on the estimated future costs of the food stamp program are outside the scope of this paper.

Section V

CONCLUSIONS

Any empirical study, especially one in which forecasts are made, is rife with assumptions and opportunities for errors. The first subsection discusses two previous studies which corroborate some of the results of this study. The second subsection deals with some limitations and applications of this study.

A. Other studies

Two previously cited studies by Hines and Hoagland offer partially contrasting methodologies with that chosen for this study. Hines chose to analyze the 1697 counties which were already participating in the food stamp program in May, 1970 using decennial census data. Conversely, Hoagland chose to analyze quarterly national data for the period 1971 to 1975. Both the cross-section and time series approaches are valid; however, this study is unique in its attempt to combine both forms of data.

Hines had the advantage of being able to control for demographic effects of the composition of a county's population with respect to age, race, and residence (urban vs. rural). [1/] For reasons not explained, he did not attempt to measure the effect of income or the average bonus value. However, he included the total unemployment rate, the welfare participation rate, and a time trend in attempting to explain the food

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1/ This discussion is based upon alternative 2 in appendix table 2, p. 16 in Hines, op. cit.

stamp participation rate. Hines estimated an upward time trend of about .37 percentage points per year, compared with .42 percentage points in the present study. The estimated effect of a 1.0 percentage point increase in the welfare participation rate is to increase the food stamp participation rate by .81 percentage points, quite close to the .88 percentage points effect found in this study.

Lastly, Hines found the effect of a 1.0 percentage point increase in the total unemployment rate is to increase the food stamp participation rate by .35 percentage points. 1/ This figure is substantially higher than the .2 percentage point effect reported in Section III. However, Hines also included the labor force participation rate as an explanatory variable, finding it had a negative effect on the food stamp participation rate. But clearly the unemployment rate and labor force participation rate are interrelated. As the unemployment rate rises, the labor force participation rate tends to decline as discouraged workers (perhaps those who have been unemployed a long time) drop out of the labor force. Correcting for this interrelation (as it was necessary to correct for the interrelation between the total and long-term unemployment rates), the total effect of a 1.0 percentage point increase in the unemployment rate is a .46 percentage point increase in the food stamp participation rate. The figure is lower than the total effect of .64 percentage points reported in Section III, but the

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1/ Hines did not attempt to measure the effect of the long-term unemployment rate.

generally lower level of unemployment in 1970 compared with 1974 and 1975 accounts for most of this difference.[1/]

In Hoagland's model, neither the average bonus value nor per capita income affects the number of food stamp recipients directly. Rather, he formed the ratio of the food stamp eligibility income cut off (weighted by the number of recipients) to per capita disposable income. This variable attempts to control for policy parameters (such as deductions) in a much different way than does letting per capita income and the average bonus have separate effects. Hoagland does incorporate the welfare participation rate and the total unemployment rate into his model. He found that an increase of 1.0 percentage point in the unemployment rate would increase the food stamp participation rate by .23 percentage points. In the present study, the separate effect of unemployment is estimated to increase participation by .2 percentage points. The only apparent explanation for the discrepancy between the effect of a 1.0 percentage point increase in the welfare participation rate on the food stamp participation rate--increases of .43 and .88 percentage points for Hoagland's and the present study, respectively-- is sampling variability. Hoagland's estimated effects are based on 19 observations, compared with 164 in the present study. Of course, the estimate from this study is also subject to error. Statistically,

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1/ In the current study, the estimated total effect of a change in the overall unemployment rate depends upon the level from which the change is made. See Appendix A for further details.

it is fairly likely that the "true" effect of a 1.0 percentage point increase in the welfare participation rate lies between these two figures.

The fact that these two studies tend to corroborate the estimated effects of included variables in this study strengthens the analytic results. Somewhat less certainly, this corroboration should increase the confidence one has in the forecasts made in Section IV.

B. Limitations and applications

The alternative forecasts for 1976-1980 outlined in Section IV show one way that the results of this study can be used to determine the effects of alternative sets of assumptions on the food stamp program. However, there are two assumptions which underlie all three alternative forecasts, or indeed, any other forecasts based on this study.

The first underlying assumption is that the effects of increasing participation among those eligible are fully captured in the estimated upward time trend. A recent Senate study reported participation rates among eligibles to range from 16 percent to 77 percent across states, with the national average being either 31 percent or 37 percent, depending on the assumptions made about the number of part-year participants. 1/ A more recent study found the national participation

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1/ U.S. Senate. Select Committee on Nutrition and Human Needs, Report on Nutrition and Special Groups, appendix B to Part I--Food Stamps, by Gary W. Bickel and Maurice MacDonald, "Participation Rates in the Food Stamp Program: Estimated Levels for 1974, by State." Washington, U.S. Govt. Print. Off., 1975.

rate among eligibles (about 51 million) to be about 37 percent in July 1975.[1/] After taking the assets test into account, the number of eligibles falls to about 37 million and the participation rate rises to about 50 percent. Holding economic factors that would affect eligibility constant, such as per capita income and the average bonus value, the effect of the time trend is to increase participation by slightly less than one million people per year. If outreach programs were intensified and the participation rate among eligibles increased, this rate of increase of participants not attributable to economic or policy changes would be higher.

An attempt to forecast the participation rate among those eligible for the food stamp program beyond the effects measured by the time trend variable is outside the design of this study. One possible means of measuring the trend in the participation rate would involve developing a series of estimates of the participation rate in each of the previous years the food stamp program was in operation, perhaps combining information about participation in food distribution programs. This resulting time series could then be analyzed and projections made for the future.

1/ Harold Beebout, Mary Frances leMat, and Allen Kendall. The Impact of the Resources Test and Survey Income Underreporting on Food Stamp Eligibility Estimates (Washington, D.C.: Mathematica, Inc., January 1976).

The second underlying assumption of forecasts based on this study is that there will be no administrative or legislative changes in the food stamp program. Actually, this assumption is somewhat more restrictive than it need be. For example, the expansion of the food stamp program to cover Puerto Rico was a legislative change that could be accounted for by simply adding a constant to the values forecast. It is possible that the effects of other proposed changes could also be approximated by adding a constant value or a trend value. One proposed change in the food stamp program would restrict eligibility to households with income below the poverty level. Given estimates of the reduction in those eligible and the participation rate, a constant adjustment could be derived that could be subtracted from the expected number of recipients from Section IV.

Other changes may not be so amenable to easy adjustments. One proposed change involves granting a standard deduction from gross income instead of allowing itemized deductions. Besides affecting the number of those eligible, the average bonus value would also be affected. If both of these effects can be quantified, it may still be possible to obtain estimates of the cost and caseload of the food stamp program. The effect on the number of those eligible could be added or subtracted from the expected number of recipients from Section IV as above. The change in the average bonus value would also affect the number of recipients, changing the food stamp participation rate

(in the population) by 4 one-hundredths of one percentage point for each dollar the average bonus changes. Once the new estimate of the number of recipients is obtained, the new estimate of the cost is straightforward. The effects of other proposed changes in the food stamp program could be analyzed in a similar manner.

C. Other considerations

This study has examined the food stamp program out of its normal context. In the real world, the food stamp program is just one part of a much larger macroeconomic model in which feedback loops exist. For example, the food stamp program shares certain characteristics with income maintenance programs such as AFDC and SSI in that the amount of earned income (as well as unearned income) received affects the amount received from the transfer program. Conversely, the amount received from the transfer program may affect the amount of labor supplied by the recipient. 1/

The loss in precision or bias in the estimates from ignoring this simultaneity cannot be readily calculated. It is an area of concern that permeates almost all empirical work. If this study had tried to take into account these feedbacks or others that may exist, the model would have quickly become intractable.

1/ See, for example, articles about the Pennsylvania-New Jersey Graduated Work Incentive Experiment in Journal of Human Resources, vol. IX, no. 2, Spring 1974.

Another system of feedback loops exists within the set of variables that were used to explain food stamp participation. In formulating an even more optimistic alternative than that presented in Section IV, the primary assumption to be changed would be the unemployment rate and the long-term unemployment rate. However, with a lower unemployment rate, per capita income would be higher. Thus, isolated changes in the set of assumptions may yield erroneous results unless the proper adjustments in the other variables are made. This study, like most others offers no easy answers, but rather hopes to shed some light on an otherwise shadowy subject.

Appendix A

TECHNICAL NOTES

The discussion in Sections III and IV dealing with the number of food stamp recipients or participation rate is based on the regression analysis reported in Table A1. All three equations are estimated by a generalized least squares procedure described by Balestra and Nerlove which pools the four years of data on the 41 counties. 1/

The first equation proved to have the greatest predictive capability with respect to 1974 and 1975, and is the equation on which the predictions in Section IV are based. Both the total unemployment rate (UR) and the long-term unemployment rate (LTUR) are included, although each variable by itself is not statistically significant at the 5 percent level of significance. 2/ Equations 2 and 3 drop UR and LTUR, respectively, to test the effect of their intercorrelation. LTUR by itself in statistically significantly different from zero at the 5 percent level; UR by itself is significantly different from zero at the 10 percent level. Both of the coefficients in equations 2 and 3 are higher than they are in equation 1, because the included variable is

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1/ See Balestra and Nerlove, "Pooling Cross Section and time Series Data in the Estimation of a Dynamic Model: The Demand for Natural Gas," Econometrica, July 1966.

2/ The "X percent level of significance" means that due to chance there is an X percent probability that there is no effect of that variable on the food stamp participation rate, i.e., that the coefficient is zero. Higher significance levels indicate more certainty about the magnitude of the effect.

Table A1

REGRESSION RESULTS FOR FOOD STAMP PARTICIPATION RATES
(Coefficients, with t-statistics in parentheses)

Symbol	Variable	Equation 1	Equation 2	Equation 3
--	Constant	-.099893	-.083741	-.101279
AVBON	Average bonus (in dollars)	.000386 (.45)	.000443 (.52)	.000309 (.36)
PCI	Per capita income (in dollars)	-.000005 (1.25)	-.000005 (1.19)	-.000007 (1.82)**
UR	Total unemployment rate (percent, e.g. 5.0)	.000888 (.58)	--	.002006 (1.52)*
LTUR	Long-term unemployment rate (percent)	.007871 (1.37)*	.009656 (1.99)**	--
PAR	Welfare participation rate (percent)	.008806 (7.69)***	.008746 (7.69)***	.009144 (8.09)***
TIME	Time (1947=1)	.004241 (1.95)**	.004080 (1.89)**	.004884 (2.27)**
--	R^2	.4556	.4545	.4494
FSR	Mean food stamp participation rate = .095070			

* Indicates coefficient is statistically significantly different from zero at the 10 percent level of significance.

** Indicates coefficient is statistically significantly different from zero at the 5 percent level of signfficance.

*** Indicates coefficient is statistically significantly different from zero at the 1 percent level of significance.

SOURCE: Congressional Research Service, Economics Division.

apparently capturing the effect of the excluded variable. The other parameter estimates are remarkably robust between the three specifications as a result of low intercorrelations between UR and LTUR and the other independent variables. The correlation matrix is shown in Table A2.

Preliminary empirical work included running a separate cross-section version of equation 3 for each of the four years of the analysis period 1970-1973. 1/ In general, each equation gave a better fit, with coefficients of determination being about .65-.70, but larger standard errors resulted in lower significance levels. The coefficients of the average bonus and per capita income showed very little variation around the estimates derived from the pooled model, although the significance levels for per capita income were lower in the pooled model. However, there was considerable variation between the coefficients on the total unemployment rate and the welfare participation rate in the pooled model and the separate cross-sections.

The loss of significance of the coefficients on per capita income and the lower coefficients on the welfare participation rate can be explained by the de-trending effect of including time in the pooled model. Table A2 shows that these two variables are positively correlated with time and hence the effect of including time explicitly in the model is not unexpected. Furthermore, the standard errors of the coefficients

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1/ These results are available from the author upon request.

Table A2

CORRELATION MATRIX

	LTUR	UR	TIME	PCI	AVBON	FSR	PAR
LTUR	1.000						
UR	.241	1.000					
TIME	-.037	-.047	1.000				
PCI	-.110	-.280	.442	1.000			
AVBON	-.029	-.203	.159	-.211	1.000		
FSR	.050	.161	.097	-.483	.302	1.000	
PAR	.042	.153	.158	-.065	-.013	.649	1.000

SOURCE: See text.

on the welfare participation rate are quite large. The resulting 95 percent confidence intervals (the intervals around the estimates which are likely to contain the true values 95 percent of the time) include the estimate from the pooled model.

All of these differences really stem from the fact that the pooled model imposes more structure on the data than the four separate cross-sections do. In effect, the coefficients for each variable are constrained to be equal to a single value for each of the four cross-sections. To the extent that these constraints are not satisfied, there will be a loss of explanatory power in using the pooled model. This loss cannot be directly measured, however, because of the necessity to include time in the pooled model. 1/

For the purposes of prediction in Section IV, it was imperative to use the results of the pooled model. If the cross-sections were used, it would be impossible to determine which set of coefficients--the results from which year--to select. Thus, what is lost in the explanatory power of the pooled model is gained in knowledge about the structure underlying each of the cross-sections. This additional knowledge about the structure allows informed judgments to be made about the future, assuming the same underlying structure continues to operate in the future.

1/ If the pooled model were run without including time, one could perform a Chow test of the hypothesis of equal coefficients. This test is meaningless in this instance, however, because of the trend effects in per capita income and the welfare participation rate.

The procedure for calculating the net effect of an increase in the total unemployment rate attempts to adjust for the collinearity between these variables. From Tables 3 and A2 there seems to be a positive and non-linear relationship between LTUR and UR. To estimate this relationship, a simple linear regression of LTUR on UR and UR^2 was performed, using data from 1961-1975 (June of each year). The result of this regression is shown as equation 1 of Table A3. The Durbin-Watson statistic indicated autocorrelation may be present, so the data were transformed with rho = .42908 and rerun. The results adjusted for autocorrelation are shown in equation 2. No significant autocorrelation remains.

Equation 2 was used to predict the effect of a one point drop in UR, from 8.5 percent to 7.5 percent and from 7.5 percent to 6.5 percent (the relevant range for the prediction period in Section IV). The non-linearity caused by the quadratic term UR^2 makes it necessary to evaluate the effect at different levels. The equation for making the predictions is given below (the transformation for the constant term has already been made):[1/]

$$LTUR = .5336 + .42908 * LTUR_{-1} + .36034 * (UR - .42908 * UR_{-1}) + .0714294 * (UR^2 - .42908 * UR^2_{-1})$$

1/ The notation "-1" refers to a lag of one period.

Table A3

REGRESSION RESULTS FOR LONG-TERM UNEMPLOYMENT RATE
(COEFFICIENTS, WITH T-STATISTICS IN PARENTHESES)

	Equation 1	Equation 2
Constant	.737211 (1.33)	.934619 (1.70)
UR	-.293935 (1.51)	-.360340 (1.93)
UR^2	.065732 (3.99)	.071429 (4.70)
R^2	.9631	.9682
Durbin-Watson statistic	1.1708	1.9933
Number of observations	15	15

In the first instance, LTUR was predicted to be 2.2715 percent, a drop of .8550 percentage points; in the second, 1.7362 percent, a drop of .5355 percentage points. Section III used .7 percentage points as a rough approximation; Section IV used the actual estimates.

APPENDIX B

Counties Included in Analysis

State	County	Primary City
Alabama	Walker	
Arizona	Mohave	
Arkansas	Lee	
California	Los Angeles	Los Angeles
Colorado	Denver	Denver
Connecticut		Hartford
Florida	Dade	Miami
Georgia	Chatham	Savannah
Idaho	Minidoka	
Illinois	Cook	Chicago
Indiana	Marion	Indianapolis
Iowa	Dallas	
Kansas	Butter	Wichita
Kentucky	Jefferson	
Louisiana	E. Baton Rouge	
Maine	Androscoggia	
Maryland		Baltimore
Michigan	Wayne	Detroit
Minnesota	St. Louis	Duluth
Mississippi	Holmes	
Missouri		St. Louis
Montana	Lincoln	
Nebraska	Douglas	Omaha
New Jersey	Hudson	Jersey City
New Mexico	Berralillo	Alburquerque
New York	Niagara	Buffalo
North Carolina	Franklin	
North Dakota	Traill	
Ohio	Stark	Akron
Oregon	Multnomah	Portland
Pennsylvania		Philadelphia
South Carolina	Williamsburg	
South Dakota	Roberts	
Tennessee	Hamilton	Chattanooga
Texas	Bexar	San Antonio
Vermont	Bennington	
Virginia		Richmond
Washington	Pierce	Tacoma
West Virginia	Mingo	
Wisconsin	Milwaukee	Milwaukee
Wyoming	Laramie	

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