

NBER WORKING PAPER SERIES

FOOD STAMPS AS MONEY AND INCOME

Daniel S. Hamermesh

James M. Johannes

Working Paper No. 1231

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
November 1983

Professor of Economics, Michigan State University and Research Associate, National Bureau of Economic Research; Associate Professor of Economics, Michigan State University. We thank Robert H. Rasche and Peter Schmidt for a number of helpful comments, and Thomas Gittings for providing some of the data. The research reported here is part of the NBER's research program in Labor Studies. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

November 1983

## Food Stamps as Money and Income

ABSTRACT

Food Stamps represent nearly \$11 billion of personal income in the United States. The coupons that are issued to represent the purchasing power available to recipients are also reserves for the commercial banking system. This study asks how closely these coupons are substitutable for what is usually considered as money, and how well Food Stamps function as a fiscal stabilizer (whether they increase consumption more than does ordinary income). The results, based on estimates for 1959-1981, suggest that Food Stamp coupons are perfectly substitutable for M1, and a revised money-supply series including "Food Stamp Money" is included in an Appendix. Estimates of consumption functions indicate that the MPC out of income in the form of Food Stamps is higher than that out of ordinary income. Taken together, the results suggest that the Food Stamp program is an automatic fiscal and monetary stabilizer--under its provisions, both the money stock and disposable income are increased during a recession.

Daniel S. Hamermesh  
Department of Economics  
Michigan State University  
East Lansing, Michigan 48824

(517) 355-7349

James M. Johannes  
Graduate School of Business  
University of Wisconsin  
Madison, Wisconsin 53706

(608) 263-7431

## I. Introduction

The Food Stamp program in the United States has grown into one of the largest noncategorical income maintenance programs run by the Federal government. In 1982 nearly \$11 billion worth of stamps were paid out to households containing 22 million members. Food Stamps have become the negative income tax that was never enacted. They are generally available, offer a minimum guarantee, and are reduced by some fraction (now .82) for each dollar of additional countable income the household obtains from other sources.

Unique among income maintenance programs, Food Stamp benefits are paid not in the form of checks, cash, or reimbursements to vendors, but rather in the form of specially printed Stamps that eligible recipients obtain at certified disbursement outlets near their homes. These stamps in turn are used to purchase qualifying commodities. (Until 1979 recipients were required to exchange cash for Food Stamps with a larger face value--the so-called purchase requirement.) Thus, Food Stamps serve two economic functions: they provide extra income to (some) consumers, and they also function somewhat like money, in that they serve as a medium of exchange for (at the very least) food transactions. In this study we examine the dual aspects--"moneyness and incomeness"--of this unusual program.

This analysis was motivated by the following considerations. First, despite the use of Food Stamps as a medium of exchange, Food Stamp money (which is different from Food Stamps issued, as we explain in the next section) is not included in any of the money series currently published by the Board of Governors of the Federal Reserve. To the casual observer this exclusion is puzzling, because Food Stamps are used as substitutes for

currency or coin in cash transactions.<sup>1/</sup> That Food Stamp money is excluded from the money stock should be even more startling to professional economists, for Food Stamps serve not only as a medium of exchange but also as high-powered or base money. Food Stamps held by banks (deposited by businesses) and Food Stamps deposited by banks at the Federal Reserve can be used as official reserves. Hence, Food Stamps are functionally equivalent to currency and coin for reserve purposes. That makes Food Stamps, de facto, high-powered money.

Second, Food Stamps have been shown to add little to the amount of food consumed by recipients (see Clarkson, 1976, and MacDonald, 1977) and to improve only slightly, if at all, the nutritional value of the food that is purchased (for example, Whitfield, 1982). This being the case, the income that is freed up by the receipt of Food Stamps must either be spent on other commodities or saved. If the stamps are treated like ordinary income, partly saved and partly spent, we may infer that the program's sole function is redistributive--shifting lifetime income from the average Federal taxpayer to recipients of the program. On the other hand, if it is treated differently--is allocated completely toward additional spending--we may infer that the program enables recipients to smoothe their lifetime consumption by maintaining spending during those periods of below-normal income when they receive Food Stamps.<sup>2/</sup> If this is the case the program offers consumption-smoothing as well as income redistribution as its justification. It does not, according to the evidence, meet its original goal of increasing the amount and nutritional content of the recipients' food consumption; but it may still help meet the new goal of consumption maintenance that has gradually devolved onto it.<sup>3/</sup>

## II. Data and Estimation

The quarterly Food Stamp Money data used in this study were constructed from monthly data on Food Stamp issuances (FSI) and Food Stamp redemptions (FSR).<sup>4/</sup> Monthly Food Stamp redemptions were constructed by interpolating linearly annual data on Food Stamp destructions.<sup>5/</sup> Given these data on issuances and redemptions, Food Stamp Money (FSM) in month  $t$  is defined as:

$$FSM_t = S_t + .5 FSR_t, \quad (1)$$

where  $S_t$  is the dollar amount of Food Stamps outstanding at the end of month  $t$ , and  $FSR_t$  is the average amount of Food Stamps redeemed (used up) in  $t$  (so that we can assume  $.5 FSR_t$  is outstanding on average during  $t$ ).  $S_t$  is defined as:

$$S_t = S_{t-1} + FSL_t, \quad (2)$$

where  $FSL_t$  is the dollar amount of new issuances in  $t$  less the amount of those new issuances used up that period, i.e.,

$$FSL_t = FSI_t - FSR_t. \quad (3)$$

The series on FSM for 1959-1981 is shown in Appendix A.

Food Stamp income,  $FSY$ , is the difference between FSI and the purchase price of the Stamps. (Beginning in 1979 the purchase price was zero.) Thus we measure Food Stamps as money by our estimate of FSM, and as income by  $FSY$ , the net accretion to personal income provided by this program. Table 1

TABLE 1

Food Stamp Money and Income, M1 and Disposable Income,  
1959-1981 (in billions)<sup>a/</sup>

Fourth Quarter:	FSM	M1	FSY	Y-FSY
1959	0	141.2	0	343.5
1960	0	142.0	0	353.9
1961	.01	146.0	.03	375.3
1962	.02	148.7	.04	392.5
1963	.02	154.6	.07	415.9
1964	.02	161.4	.07	451.9
1965	.01	168.5	.15	493.6
1966	.02	173.2	.26	526.4
1967	.03	184.3	.44	560.9
1968	.04	197.8	.56	608.2
1969	.05	205.5	.76	659.1
1970	.20	215.5	2.68	708.8
1971	.36	229.9	3.18	764.2
1972	.45	249.5	3.84	845.2
1973	.41	263.9	4.21	946.1
1974	.52	276.4	6.84	1021.3
1975	1.24	290.2	8.53	1126.0
1976	2.00	308.1	8.36	1221.2
1977	2.81	333.3	8.03	1359.8
1978	3.81	360.8	8.21	1522.8
1979	3.15	387.5	7.76	1702.3
1980	3.06	415.8	9.02	1888.0
1981	4.42	425.3	10.40	2078.4

<sup>a/</sup> Food Stamp and disposable income are at annual rates.

presents the values of FSM and FSY, along with M1 and disposable income (less Food Stamps) for the fourth quarters of 1959-81. As the data make clear, the program's growth in the early 1970s rapidly increased its potential for affecting the money stock, and thus our ability to track the demand for money. So too, it implies that, to the extent Food Stamps are received by people whose marginal propensities to consume out of current income are unity because of liquidity constraints, one must separate FSY from other income to specify consumption functions correctly.

The questions of interest in this study are the extent of the "moneyness" and "incomeness" of Food Stamps. To examine the role of Food Stamps as money, consider a general short-run adjustment equation describing the demand for money:

$$\ln M = \lambda \ln M_{-1} + \gamma X + \epsilon \quad , \quad (4)$$

where M is a measure of the stock of money, X is a vector of variables,  $\lambda$  and  $\gamma$  are parameters to be estimated,  $\epsilon$  is an error term, and the subscript denotes a lag. Without discussing the specific form of the money-demand equation (the measure of the stock of money or the vector of variables included in X), we can rewrite (4) to include Food Stamp Money as:

$$\ln[M + \alpha \text{FSM}] = \lambda \ln[M_{-1} + \alpha \text{FSM}_{-1}] + \gamma X + \epsilon \quad , \quad (4')$$

where  $\alpha$  is a measure of the "moneyness" of Food Stamps,  $1 \geq \alpha \geq 0$ . The estimate of  $\alpha$  will indicate the extent to which holders of money view the outstanding stock of Food Stamps as a substitute for what is ordinarily defined as money. If  $\alpha = 1$ , FSM is performing the same functions, in terms of households' and businesses' demand for money, as M.

Equation (4') is estimated using data covering 1959:II-1981:IV. The disturbance term is specified as  $\varepsilon = \rho\varepsilon_{-1} + v$ , where  $v$  is assumed to be white noise. To derive the parameter estimates in (4') the likelihood function describing the equation (presented in Appendix B) is maximized by searching the grid of values of  $\alpha$  on the closed interval  $[0,1]$ .

Consider now how income in the form of Food Stamps affects consumer spending. Assume that nonrecipients of Food Stamps,  $1-F$  of the population, have  $(1-\theta F)$  of total disposable permanent income  $Y_P - FSY$ , where  $\theta$  is the ratio of Food Stamp recipients' other income to per-capita disposable income. Assume, following Hamermesh (1982), that nonrecipients spend according to:

$$C = a_0 + a_1 [Y_P - FSY] + a_2 W, \quad (5)$$

where  $Y_P$  is real permanent disposable income,  $W$  their real wealth, and  $C$  their real consumption. We assume that all wealth is held by nonrecipients, a reasonable assumption given the asset limitations on eligibility for the program.

Define the fraction of recipients who can borrow easily or who have savings that enable them to smooth lifetime consumption as  $1-\beta$ . The fraction  $[1-\beta]F$  of the population will consume out of their permanent income



(including the Food Stamps that they consider to be part of permanent income) exactly as the nonrecipients whose behavior is described in (5). They receive  $[1-\beta]\theta F$  of  $Y-P-FSY$ , and  $[1-\beta]$  of  $FSY$ .

The remaining fraction of Food Stamp recipients,  $\beta$ , has income so low relative to its permanent income that additional dollars in the form of ordinary income or Food Stamps enable them to smooth lifetime consumption by one dollar for each dollar of additional Food Stamp or other income. Such people,  $\beta F$  of the population, receive  $\beta FSY$  of total Food Stamp income and  $\beta\theta F$  of  $[Y-FSY]$ , non-Food Stamp income in the entire economy, and spend all of it.

Accounting for the behavior of all three groups--nonrecipients, recipients who are capable of smoothing consumption, and those who are not--aggregate consumption is described by:

$$C = a_0 [1-\beta F] + a_1 \{ [Y-P-FSY][1-\beta\theta F] + FSY[1-\beta]F \} \quad (6) \\ + a_2 W + \beta\theta F [Y-FSY] + \beta F FSY + \delta ,$$

where  $\delta$  is an error term appended to the aggregation of spending by the three categories of income recipients in the economy. Equation (6) is estimated by nonlinear least squares, also over the period 1959:III-1981:IV, and also under the assumption that the error term follows a first-order autoregression. No time series is available on  $\theta$ ; but it is likely, given the eligibility requirements for Food Stamps, that  $\theta \ll 1$ . Based on survey evidence for several years, we assume  $\theta$  is constant at  $.3\bar{6}$ . The estimate of  $\beta$  from (6) provides a measure of the fraction of recipients of Food Stamps whose ability to smooth consumption spending is enhanced by the receipt of income in the form of Food Stamps.

### III. Estimates of the "Moneyiness" of Food Stamp Money

The test of the "moneyiness" of Food Stamp Money is, as described above, the test of the hypothesis that  $\alpha$  in (4') above equals one. The first step is to specify some explicit functional form for money demand. Unfortunately, there is no single money demand specification that enjoys a consensus among economists (see Hafer and Hein, 1979). Consequently, we present results for three well-known specifications of the demand for money. These are the Goldfeld (1976), Friedman (1978), and Hamburger (1977) specifications.

Formally, we estimate the following money-demand equations for various values of  $\alpha$  over the period 1959:I-1981:IV, and for two subperiods, 1959:I-1974:I and 1979:II-1981:IV:

$$\begin{aligned} \ln \left[ \frac{M_t + \alpha \text{FSM}_t}{P_t} \right] &= b_0 + b_1 \ln \frac{Y_t}{P_t} + b_2 \ln \text{RCP}_t + b_3 \ln \text{RTD}_t \\ &+ b_4 \ln \left[ \frac{M_{t-1} + \alpha \text{FSM}_{t-1}}{P_{t-1}} \right] ; \end{aligned} \quad (7)$$

$$\begin{aligned} \ln \left[ \frac{M_t + \alpha \text{FSM}_t}{P_t} \right] &= c_0 + c_1 \ln \left( \frac{W_t}{P_t} \right) + c_2 \ln \text{RCP}_t + c_3 \ln \text{RTD}_t \\ &+ c_4 \ln \left[ \frac{M_{t-1} + \alpha \text{FSM}_{t-1}}{P_{t-1}} \right] ; \end{aligned} \quad (8)$$

$$\begin{aligned} \ln \left[ \frac{M_t + \alpha \text{FSM}_t}{Y_t} \right] &= d_0 + d_1 \ln \text{DPR}_t + d_2 \ln \text{RGL}_t + d_3 \ln \text{RTD}_t \\ &+ d_4 \ln \left[ \frac{M_{t-1} + \alpha \text{FSM}_{t-1}}{Y_t} \right] , \end{aligned} \quad (9)$$

where  $M$  is shift-adjusted M1B,  $Y$  is nominal GNP,  $P$  is the GNP deflator,  $\text{RCP}$  is the commercial paper rate,  $\text{RTD}$  is the rate on time deposits,  $W$  is net private-

sector wealth, DPR is the dividend-price ratio, and RGL is the rate on long-term government bonds.<sup>7/</sup> Equation (7) is the Goldfeld specification, (8) is Friedman's and (9) is Hamburger's. In addition to results based on (7)-(9), estimates using equations like (7)-(9), but with a measure of the yield on consols (see Amsler, 1984), are also presented.

The equations were estimated for subperiods for two reasons. First, Food Stamp Money is relatively unimportant before 1974 (see Table 1). Second, it is well-known that conventional money-demand functions such as (7)-(9) exhibit some instability after 1973. Hafer and Hein (1982, p. 11) have argued that the apparent instability is due to a once-and-for-all-level shift in the intercept of the money-demand function around 1974:II. To account for this shift we have included a dummy variable for the period 1974:II-1981:IV in the regression for the whole sample period. As is standard in the money-demand literature, each equation was estimated using the Cochrane-Orcutt procedure. The estimates of the  $b_i$ ,  $c_i$  and  $d_i$  are close to those that have appeared elsewhere.

Table 2 presents the values of the log-likelihood function for each of the three money-demand specifications in the different subperiods, for  $\alpha=0$  and  $\alpha=1$ . The numbers in parentheses are t-statistics testing the null hypothesis that  $\alpha=0$  against the alternative that  $\alpha \neq 0$ . Two results stand out. In all cases except two (the Goldfeld equations for the first subperiod) the log-likelihood function is larger for  $\alpha=1$  than for  $\alpha=0$  (and in fact reaches its peak in the interval  $[0,1]$  at  $\alpha=1$ ). Also, the t-statistics indicate that in some cases one can reject the hypothesis that  $\alpha=0$ , i.e., that the Food Stamp Money is not money, albeit at fairly low confidence levels. Based on this evidence, it seems reasonable to conclude that Food Stamp Money is money.

TABLE 2

Log-Likelihood Values for Alternative Money Demand Specifications<sup>a/</sup>

<u>Specification</u>	<u>Period</u>					
	<u>1959:II-1981:IV</u>		<u>1959:II-1974:I</u>		<u>1974:II-1981:IV</u>	
	$\alpha = 0$	$\alpha = 1$	$\alpha = 0$	$\alpha = 1$	$\alpha = 0$	$\alpha = 1$
Goldfeld--(7)	-164.68 (.81)	-164.36	-44.17 (-1.36)	-45.09	-71.52 (.78)	-71.21
Using consol rate	-134.03 (2.28)	-131.44	-35.84 (-.70)	-36.19	-62.37 (.66)	-62.16
Friedman--(8)	-165.03 (.71)	-164.77	-17.96 (.64)	-17.76	-71.90 (.72)	-71.64
Using consol rate	-135.86 (2.99)	-131.40	-9.58 (1.19)	-8.36	-63.33 (.65)	-63.12
Hamburger--(9)	486.10 (1.07)	486.67	355.64 (.62)	365.83	156.60 (.85)	156.96
Using consol rate	495.83 (.55)	495.98	353.25 (.72)	353.51	164.86 (.76)	165.16

<sup>a/</sup> t-statistics in parentheses here and in Tables 4.

We have shown that Food Stamp Money acts like M1, but is not included in any current definitions of money, and that Food Stamp Money begins to grow rapidly around 1974 (see Table 1). Perhaps Food Stamp Money is the "missing money" economists have been searching for since Goldfeld (1976).<sup>8/</sup> The fraction of "missing money" that might be accounted for by Food Stamp Money is presented in Table 3. Column (2) of Table 3 displays the average annual amount of (nominal) missing money, defined (as is frequently done) as the static forecast error of the Goldfeld money-demand equation from 1974 to 1979.<sup>9/</sup> Column (3) displays the average annual amount of nominal Food Stamp Money. The last column is the ratio of Food Stamp Money to missing money. While Food Stamp Money does not account for all the missing money, it clearly accounts for a sizeable part of it.

#### IV. Estimates of the "Incomeness" of Food Stamps

Before presenting estimates of (6), the equation that allows us to infer the fraction of Food Stamp recipients who spend each dollar of income, we estimate a simple equation describing consumption:

$$C = a_0' + a_1' [Y-FSY] + a_2' W + a_3' FSY + \lambda C_{-1} + \delta'. \quad (10)$$

Both (6) and (10) are estimated over the entire period and over each of the subperiods used in the previous section. The estimates of (10) are presented in the first three columns of Table 4. The parameter estimates other than  $a_3'$  are fairly standard and quite in line with those of previous work examining aggregate consumption. The estimates of  $a_3'$ , measuring the propensity to spend out of Food Stamps, always exceed the estimates of  $a_1'$ , the spending propensity

TABLE 3

## Food Stamp Money as a Fraction of the Missing Money

Year	Average Annual	Average Annual	Fraction
	Missing Money (\$ Billions)	Food Stamp Money (\$ Billions)	(3) ÷ (2)
(1)	(2)	(3)	(4)
1974 <sup>a</sup>	\$3.58	\$.48	.13
1975	5.33	1.00	.19
1976	5.62	1.77	.31
1977	6.12	2.59	.42
1978	7.59	3.45	.45
1979	8.30	3.38	.41
Average	6.09	2.11	.32

<sup>a</sup> Last three quarters.

TABLE 4  
Estimates of (10) and (6)

	Sample Period			Sample Period		
	1959:III- 1981:IV	1959:III- 1974:I (10)	1974:II- 1981:IV	1959:III- 1981:IV	1959:III- 1974:I (6)	1974:II- 1981:IV
$a_0'$ or $a_0$	-29.73 (-2.07)	-12.28 (-.58)	-90.21 (-1.66)	73.96 (3.34)	57.79 (3.17)	148.16 (2.27)
$a_1'$ or $a_1$	.455 (6.07)	.579 (6.28)	.446 (2.72)	.625 (7.36)	7.55 (9.52)	.629 (3.68)
$a_2'$ or $a_2$	.036 (2.81)	.025 (1.91)	.026 (1.03)	.032 (2.45)	.010 (0.87)	.049 (1.77)
$\lambda$	.346 (4.44)	.236 (2.25)	.472 (3.31)			
$a_3'$ or $\beta$	3.65 (2.67)	1.40 (.59)	4.47 (1.40)	22.02 (6.68)	59.96 (4.92)	21.46 (4.15)
$\rho$	.69 (8.97)	.84 (12.20)	.43 (2.43)	.93 (19.75)	.95 (17.66)	.64 (5.84)
$\bar{R}^2$ or Log L	.989	.979	.975	-281.9	-164.4	-103.3

out of other disposable income. (The difference is significant in the equation estimated over the entire sample.) This implies that Food Stamp recipients do behave differently on average from other consumers, for they spend a greater fraction of their incomes. This finding parallels that of Hamermesh (1982) on spending out of unemployment insurance benefits.

The estimates of (6), presented in the final three columns of Table 4, are not very satisfactory.<sup>10/</sup> Though the estimates of the spending propensities out of income and wealth are sensible, the point estimates of  $\beta$ , the fraction of Food Stamp recipients who spend their entire incomes, are far above one.<sup>11/</sup> Constraining the MPC out of Food Stamps to be one for some recipients, given that the estimates of (10) suggest it greatly exceeds one, produces these strange results.

The difficulties with the estimates of (6) clearly prevent us from attaching great confidence to conclusions we draw about the "incomeness" of Food Stamps. Nonetheless, the estimates of  $a_3^1$ , the propensity to spend out of Food Stamp income (in (10)), and of  $\beta$ , the fraction of recipients who spend all their income (from (6)), imply that this type of transfer income is more likely to be spent by its recipients than is a dollar of disposable income that is received by people other than Food Stamp recipients.

## V. Conclusion

The results presented in this paper indicate that Food Stamp Money acts like M1 and therefore must be included in definitions of money. It should be noted, however, that Food Stamp Money is not the same as Food Stamps issued. All stamps issued are not redeemed immediately; consequently, the stock of outstanding stamps must be carried forward in calculating Food Stamp Money. One important implication of the "moneyness" of Food Stamps is that, when the



amount of Food Stamps issued rises in a recession, the true money stock rises more rapidly than that published by the Federal Reserve. Thus an automatic fiscal stabilizer is also an automatic stabilizer of the money supply.

Income in the form of Food Stamps is spent in at least as great a proportion as other components of disposable personal income. Other studies have demonstrated that Food Stamps are relatively ineffective in meeting their goal of increasing food consumption, but effective in redistributing income. Our findings suggest they achieve the additional important result of enabling recipients, many of whom have temporarily low incomes, to maintain consumption nearer to their lifetime average consumption. While not an initial goal of the program, consumption smoothing is an additional argument in the program's favor in its capacity as a welfare measure. So too, the results indicate that, to the extent Food Stamp payments increase during a recession, the high propensity to spend them enables them to function as an effective automatic fiscal stabilizer of aggregate demand. Food Stamps represent large transfer payments that vary cyclically and that inherently directly change aggregate demand through the markets for both goods and money. In a macroeconomic context the Food Stamp program is both fiscal and monetary policy.<sup>12/</sup>

## APPENDIX A

## Food Stamp Money (FSM) and Income (FSY) (billions)

	FSM	FSY		FSM	FSY		FSM	FSY		FSM	FSY
			1967:I	.02	.08	1973:I	.49	1.00	1979:I	3.67	1.61
1961:II	\$.00	\$.00		.03	.09		.51	.99		3.41	1.67
III	.01	.01		.03	.10		.49	1.01		3.27	1.90
IV	.01	.01		.03	.11		.41	1.05		3.15	1.94
1962:I	.02	.01	1968:I	.04	.12	1974:I	.42	1.32	1980:I	3.15	2.22
	.02	.01		.04	.13		.46	1.35		3.18	2.26
	.02	.01		.04	.13		.46	1.49		3.14	2.26
	.02	.01		.04	.14		.52	1.71		3.16	2.26
1963:I	.02	.01	1969:I	.04	.16	1975:I	.73	2.00	1981:I	3.35	2.85
	.02	.02		.05	.17		.94	2.07		3.81	2.81
	.02	.02		.04	.18		1.09	2.13		4.17	2.70
	.02	.02		.05	.19		1.24	2.13		4.42	2.60
1964:I	.02	.02	1976:I	.06	.29	1976:I	1.47	2.25			
	.02	.02		.08	.43		1.72	2.19			
	.02	.02		.11	.53		1.87	2.09			
	.02	.02		.20	.67		2.00	2.09			
1965:I	.01	.02	1971:I	.29	.74	1977:I	2.23	2.16			
	.01	.03		.36	.76		2.46	2.07			
	.02	.03		.37	.78		2.84	2.03			
	.01	.04		.36	.80		2.81	2.01			
1966:I	.02	.05	1972:I	.37	.85	1978:I	3.06	2.14			
	.02	.06		.37	.88		3.34	2.06			
	.02	.06		.41	.94		3.58	2.07			
	.02	.07		.45	.96		3.81	2.05			

## APPENDIX B

The concentrated log-likelihood function for (4') is:

$$\mathcal{L}_\alpha = -N/2 [\ln(2\pi) + 1] - N/2 \ln[SSE/N] + \sum_i \ln J_i ,$$

where SSE is the sum of squared errors from least-squares estimation of (4') after the correction for autocorrelation;  $\alpha$  has been fixed at a particular value; N is the number of observations; and

$$J_i = \frac{1}{[M_i + \alpha FSM_i]^*} ,$$

where \* denotes the adjustment for autocorrelation.

$\sum_i \ln J_i = -N \ln(1-\hat{\rho}) - N \overline{\ln[M + \alpha FSM]}$ ; the last term is just the mean of the dependent variable in (4').

## REFERENCES

- C. Amsler, "A 'Pure' Long Term Interest Rate and the Demand for Money," Journal of Economics and Business (1984), forthcoming.
- M. Bane and D. Ellwood, "Slipping into and out of Poverty: The Dynamics of Spells," NBER Working Paper No. 1199, 1983.
- A. Blinder and R. Solow, "Analytical Foundations of Fiscal Policy," in G. Break et al, editors, The Economics of Public Finance, Washington, Brookings, 1974.
- K. Clarkson, "Welfare Benefits of the Food Stamp Program," Southern Economic Journal 43 (1976), 864-879.
- B. Friedman, "Crowding Out or Crowding In: Economic Consequences of Financing Government Deficits," Brookings Papers on Economic Activity (1978), 593-641.
- S. Goldfeld, "The Case of the Missing Money," Brookings Papers on Economic Activity (1976), 683-730.
- R. Hafer and S. Hein, "Evidence on the Temporal Instability of the Demand for Money Relationships in the United States," Federal Reserve Bank of St. Louis Review (December 1979), pp. 3-14.
- \_\_\_\_\_ and \_\_\_\_\_, "The Shift in Money Demand: What Really Happened?," Federal Reserve of St. Louis Review, (February 1982), pp. 11-16.
- M. Hamburger, "Behavior of the Money Stock: Is There a Puzzle?" Journal of Monetary Economics 3 (1977), 265-288.
- D. Hamermesh, "Social Insurance and Consumption: An Empirical Inquiry," American Economic Review 72 (1982), 101-113.
- M. MacDonald, Food Stamps, and Income Maintenance, New York, Academic Press, 1977.
- R.A. Whitfield, "A Nutritional Analysis of the Food Stamp Program," American Journal of Public Health 72 (1982), 793-799.

## FOOTNOTES

1/ There are frequent reports in the popular press of this use. For example, one official of the Department of Agriculture (which administers the program on the Federal level) stated (Time, August 23, 1982), "The [Food Stamp] coupons are a second currency. Anything you can buy with money, from electronics to houses to sex, you can buy with Food Stamps." The article continues with reports that Federal agents have used coupons to buy boats, cars, a gun with a silencer, marijuana and even a \$35,000 house.

2/ Bane and Ellwood (1983) demonstrate the continuing flow of households into and out of poverty. Since such flows presumably also exist into eligibility for Food Stamps (which is based partly on income level relative to the poverty level), it is correct to infer that many recipients' incomes are transitorily low.

3/ One senator noted, "I have seen the necessity for [Food Stamps]. Especially in times of severe economic crises, the need is all the greater." Statement of Patrick Leahy, Hearings of Senate Subcommittee on Agricultural Research and General Legislation, October 7, 1975, p. 49.

4/ Monthly issuances of Food Stamps over the period covered in this study were provided to us by the U.S. Department of Agriculture.

5/ Annual destruction data can be found in the Annual Reports of the Board of Governors of the Federal Reserve System.

6/ See U.S. Department of Agriculture, Food and Nutrition Service, Characteristics of Food Stamp Households, 1975, 1976, 1979 and 1980, for evidence showing that 80 percent of recipients have other income that places them below the poverty line. The poverty line is well below half the average income for equal-sized households.

7/ All the data except MLB and the Food Stamp data came from the FMP and Citibase data banks. Shift-adjusted MLB was taken from Board of Governors of the Federal Reserve System, "Revised Money Stock Data-March 1982." Data on F are from Social Security Bulletin, Annual Statistical Supplement, 1981, p. 78. All the data are available from the authors.

8/ The term derives from conventional money-demand functions' consistent overestimation of the amount of money (M1) in circulation since 1974. This overestimate has been labelled the "missing money."

9/ The Goldfeld equation used to generate these forecasts is (7), estimated over the period 1959:II-1974:I.

10/ YP is the exponential of the optimal forecast of log Y, estimated as:

$$\log Y_t = \log Y_{t-1} + .002820, \quad t = 8.33.$$

<sup>11/</sup> Equation (6) was also estimated with lagged consumption included as an additional independent variable. This modification did not qualitatively <sup>^</sup> change the results reported in the text. Similarly, allowing  $\theta=1$  lowered  $\beta$ , but the point estimates still exceeded one.

<sup>12/</sup> Blinder-Solow (1974, p. 4) state, "[A] transaction is pure fiscal policy if it is financed entirely with taxes, so that the public debt does not change, or if the debt-financed part of the expenditure does not alter the proportions of outstanding government obligations (including high-powered money)." By these criteria Food Stamps clearly are a mixed policy.