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New Results in Support of the Fiscal Policy Ineffectiveness Proposition

1. INTRODUCTION

THE "POLICY INEFFECTIVENESS" PROPOSITION of the new classical macroeconomics theory is well known. Under the joint hypotheses of rational expectations and flexible prices, anticipated money and fiscal policy should not influence real output in the short run; only surprises matter.[1]

Recent empirical work has not provided much support for this proposition. Early work by Barro (1977, 1978) appeared to support the proposition that only money surprises affect U.S. real output. However, later research by Mishkin (1982a, b), Gordon (1982), and Makin (1982), among others has cast substantial doubt on these early findings by suggesting that both anticipated and unanticipated changes in money influence output. Several recent studies (McElhattan 1982 and Laumas and McMillin 1984) that have conducted analogous tests of the effects of fiscal policy have found that anticipated and unanticipated fiscal policy changes affect U.S. real output in the short run as well. These independent results concerning the short-term

[1]The new classical theory has its origins in Friedman (1968) and Lucas (1972). Important later statements can be found in Sargent and Wallace (1975) and McCallum and Whitaker (1979). In recent years the theory has found its way into macroeconomic textbooks, for example, Parkin (1984, chapter 24), and Hall and Taylor (1986, chapter 13).

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nonneutrality of anticipated monetary policy, on one hand, and of anticipated fiscal policy on the other hand, appear to concur in rejecting the hypothesis of policy ineffectiveness.

There is reason to view this rejection of the policy ineffectiveness proposition with some skepticism, however, because none of these studies investigate the effects of monetary and fiscal policy simultaneously. Real output is affected by a large number of factors, but excluding either monetary or fiscal policy would seem to create the greatest potential shortcoming. Typically, real output is regressed either on anticipated and unanticipated money growth, or on anticipated and unanticipated fiscal stimulus, where the anticipated policy variables are the predicted values from policy equations. To the extent that either anticipated or unanticipated monetary and fiscal policy actions are correlated with each other, previous tests of money neutrality that exclude fiscal variables and tests of fiscal neutrality that exclude monetary variables suffer from an omitted variables problem leading to biased coefficient estimates.

Interactive monetary and fiscal actions create the potential for an omitted variable problem in previous tests of policy neutrality. Sargent and Wallace (1975, 1981) argue on theoretical grounds that government deficits lead to more rapid money growth either contemporaneously or in the future under a fairly general set of circumstances. Empirical support for this relationship using U.S. time series data is reported by Hamburger and Zwick (1981), Levy (1981), Allen and Smith (1983), and Grier and Neiman (1987). Regardless of direct causal linkages, interaction effects may also be induced by monetary and fiscal responses to common shocks. For example, systematic monetary and fiscal responses to unemployment changes through feedback rules may cause covariation in policies. Section 2 briefly discusses the extent of the bias that results from omitting variables when testing policy neutrality in the presence of such interactions.

In the remaining sections of the paper we address the omitted variables problem associated with policy interaction effects by conducting joint tests of the effects of both anticipated and unanticipated monetary and fiscal policy on U.S. real output fluctuations. We reproduce the basic results of previous studies that, when tested separately, anticipated and unanticipated money on one hand and anticipated and unanticipated fiscal policy on the other are significant determinants of real output fluctuations. Our joint tests, however, suggest that fiscal policy is insignificant, while anticipated as well as unanticipated monetary policy remain significant in the short run. The rather surprising support for the fiscal ineffectiveness proposition proves robust to a wide variety of empirical model specifications and estimation procedures. Moreover, our joint tests cannot reject the hypothesis that in the long run all policies, either anticipated or unanticipated, are neutral.

In section 3 money growth and fiscal policy equations are specified using an atheoretical vector autoregression methodology, as in Mishkin (1982a, b) and Laumas and McMillin (1984). The predicted values from these equations serve as our measures of anticipated policy actions and are used to decompose actual policy movements into their unanticipated components. Contemporaneous and lagged values of these anticipated and unanticipated policy components are used as the explanatory variables in an equation for real output changes. These results are discussed in section 4. Several variants of this equation are estimated to test the robustness of earlier studies investigating the effects of anticipated and unanticipated policy actions. Section 5 investigates the robustness of the results to a variety of empirical model specifications and estimation procedures. A brief summary and conclusion follows in section 6.

2. OMITTED VARIABLES BIAS IN TESTS OF THE POLICY INEFFECTIVENESS PROPOSITION

Previous tests of the policy ineffectiveness proposition have typically regressed real output fluctuations either on anticipated and unanticipated money growth or on anticipated and unanticipated fiscal surpluses. As argued above, these output equations are likely to suffer from an omitted variables problem which biases tests of the policy ineffectiveness proposition if monetary and fiscal policies are causally related or covary in response to common factors.

Consider the following "true" reduced-form relation between real output growth (Y) and current and lagged values of anticipated fiscal (AF), unanticipated fiscal (UF), anticipated monetary (AM), and unanticipated monetary (UM) policy, with an orthogonal error term (ϵ):

$$Y_t = \sum_{i=0}^{n} b_{1,i} AF_{t-i} + \sum_{i=0}^{n} b_{2,i} UF_{t-i} + \sum_{i=0}^{n} c_{1,i} AM_{t-i} + \sum_{i=0}^{n} c_{2,i} UM_{t-i} + \epsilon_t \,. \qquad (1)$$

If money "matters" and the set of coefficients ($c_{1,0}, \ldots c_{1,n}; c_{2,0} \ldots c_{2,n}$) are not all equal to zero, the estimated coefficients from a regression of Y_t on AF_{t-i} and UF_{t-i} alone will be biased. In the case of the coefficients for, say, anticipated fiscal policy, the extent of this bias can be calculated as

$$\sum_{k=0}^{n} c_{1,k} p_{1,ki} + \sum_{k=0}^{n} c_{2,k} p_{2,ki} \,, \; i = 0 \ldots n$$

and depends on (i) $c_{1,k}$ and $c_{2,k}$, the coefficients of the omitted variables—anticipated and unanticipated monetary policy, and (ii) $p_{1,ki}$ and $p_{2,ki}$, reflecting the correlation between the omitted variables and anticipated fiscal policy.[2]

Previous work indicates that the covariation between money growth and fiscal deficits is likely to be significant, for example, Hamburger and Zwick (1981), Levy

[2]Note the similarity between this issue and that of proper interpretation of "St. Louis" nominal income equations which include contemporaneous and lag money supplies, but exclude other (correlated) fiscal variables. See Sims (1972).

(1981), Allen and Smith (1983), and Grier and Neiman (1987), suggesting a potentially important omitted variables bias. One plausible case is that an anticipated fiscal surplus is negatively related to anticipated money growth ($p_{1,ki} < 0$), and anticipated money growth in turn is positively related to real output growth ($c_{1,k} > 0$). In this circumstance the effect on output of a rise in the fiscal surplus would be subject to a potentially significant downward bias. Thus omitting monetary variables could cause a rise in the budget surplus to appear to have a more contractionary impact than in fact is the case.

In the remainder of this paper we proceed to demonstrate the significance of this bias in prior tests of policy effectiveness.

3. MEASUREMENT OF ANTICIPATED AND UNANTICIPATED POLICY CHANGES

Our basic methodology is the two-step procedure used by Barro (1977, 1978), Makin (1982), and Kormendi and Meguire (1984), among others. In the first step of this procedure, described in this section, anticipated policy equations are specified and estimated. From these equations anticipated and unanticipated policy movements are identified and used as the explanatory variables in the (second step) equation for real output changes. Pagan (1984) has noted that the two-step procedure employed here is biased *against* acceptance of the policy neutrality null hypothesis. Our results failing to reject the null are therefore stronger than the two-step procedure suggests.[3] Nonetheless, in section 5 we discuss the robustness of our results to alternative estimation procedures including the correction for generated regressors bias.

We follow others (Mishkin 1982a, b and Laumas and McMillin 1984) in using an atheoretical statistical technique to specify anticipated policy equations since it is difficult on theoretical grounds to exclude any information available to economic agents. We include variables in our monetary and fiscal policy equations which are of macroeconomic relevance and which are easily available to the public in their attempts to predict future policy stance. As measures of monetary and fiscal policy stimulus we use the percent change in M1, denoted by M_t, and the change in the real middle-expansion trend budget deficit as a percent of potential GNP, denoted by F_t.[4] The explanatory variables included in the equations include lagged values of M_t and F_t; the unemployment rate, U_t; the percent change in the GNP deflator, P_t; the change in the three-month T-bill rate, R_t; as well as a constant, time trend, and seasonal dummies.[5]

[3]Mishkin (1982a, b) argues that joint estimation of the policy prediction equation and the output equation is preferable. Cecchetti (1986) suggests a more general procedure that allows for an incomplete information set in the prediction equation and time-varying coefficients in the output equation. The significance of different estimation techniques is discussed below in footnote 12.

[4]Real middle-expansion trend budget deficit figures were computed by deflating the nominal figures for the difference between expenditures and receipts by the GNP deflator. Potential GNP was obtained from the fitted values of a log-linear regression of GNP on time and a constant, corrected for serial correlation.

[5]Data for all variables was obtained from the Citibank data tapes, except for government expenditure and receipt figures. Nominal statistics for the latter using the middle expansion trend measure were

Theil's $\bar{R}^2$ (minimum standard error) criterion is used to specify the appropriate lag length of the variables in the two equations. We treat the set of variables in each equation in parallel fashion and impose a common lag length. Lag lengths between four and eight were estimated and the equation with the highest $\bar{R}^2$ was chosen for the fiscal and monetary prediction equations, respectively. Throughout this procedure we retain all explanatory variables irrespective of their individual or joint significance.

The choice of a common length lag structure, following Mishkin (1982a, b), has the advantage over sequential procedures designed to exclude lags on particular variables (for example, Laumas and McMillin 1984) in that the results of the latter will in general be dependent on the particular order of variables in the sequence considered. The disadvantage is that sometimes insignificant lags are included in the equations, which gives less efficient estimators. Unbiased estimates of the regressors are obtained, however, and this presumably is the most important criterion for prediction purposes.

The choice of retaining all explanatory variables contrasts with McMillin and Laumas and Mishkin who drop particular sets of variables in their final specifications if they are not jointly significant (at the .05 level). While our approach implies that sometimes insignificant variables are included in the equations with some loss of efficiency, as with the choice of maintaining a common lag length, it lessens some of the arbitrariness in explanatory variable selection. We examine the sensitivity of these results to an alternative procedure for choosing the equation in section 5.

The policy equations are estimated with quarterly data over the 1960:4–1985:4 period.[6] The highest $\bar{R}^2$ is found at seven lags for both the monetary and fiscal anticipated policy equations. The coefficient estimates and summary statistics are presented in Table 1. F-statistics for the null hypothesis that the coefficients of each lagged set of explanatory variables are not significantly different from zero are presented in Table 2.

Similarly to Laumas and McMillin (1984), lagged unemployment is a joint significant predictor of the budget surplus (at the .07 level). In contrast to Laumas and McMillin, we find lagged price inflation is also significant (at .07), while the lagged budget surplus (with a significance level of .55) is not.[7] Similarly to Mishkin, we find lagged money and interest rates play a significant role in predicting money. Unemployment plays a significant role in predicting money as well as the budget surplus, creating the potential for covariation in the two series. The lagged budget surplus

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obtained from the *Survey of Current Business,* May 1987 (1985:1–1985:4), November 1986 (1984:1–1984:4), March 1985 (1981:1–1983:4), and from unpublished data provided by the Department of Commerce (1959:1–1980:4). All data, except for interest rates, are seasonally adjusted. These data are available upon request.

[6]The start point of the sample was determined by the unavailability of consistent M1 data prior to 1959:1. In addition, data on the budget surplus are available only from 1955 on.

[7]Laumas and McMillin (LM) report on $\bar{R}^2$ of 0.46 in their fiscal policy equation. We obtain an R^2 of 0.48; the corresponding $\bar{R}^2$ is 0.18. Dropping money growth and inflation from the equation "improved" the significance level of lagged budget surpluses to 0.29, still below the results of LM.

TABLE 1

ANTICIPATED FISCAL AND MONETARY POLICY EQUATIONS, 1961:1–1985:4

Explanatory Variable	F_t		M_t	
Constant	−0.34	(−0.91)	2.17	(1.74)†
M_{t-1}	0.05	(1.41)	0.51	(4.14)**
M_{t-2}	0.04	(1.18)	−0.01	(−0.04)
M_{t-3}	−0.01	(−0.19)	−0.02	(−0.13)
M_{t-4}	0.04	(1.09)	−0.12	(−0.91)
M_{t-5}	0.02	(0.60)	0.02	(0.12)
M_{t-6}	−0.02	(−0.42)	0.07	(0.50)
M_{t-7}	0.03	(0.82)	0.04	(0.32)
F_{t-1}	−0.17	(−1.40)	0.14	(0.34)
F_{t-2}	−0.12	(−1.01)	0.05	(0.13)
F_{t-3}	−0.28	(−2.39)**	−0.08	(−0.20)
F_{t-4}	−0.08	(−0.70)	0.16	(0.41)
F_{t-5}	−0.18	(−1.52)	0.01	(0.02)
F_{t-6}	−0.06	(−0.46)	−0.38	(−0.91)
F_{t-7}	−0.16	(−1.39)	−0.64	(−1.68)
U_{t-1}	−0.59	(−2.77)**	−1.49	(−2.10)*
U_{t-2}	1.02	(3.46)**	2.73	(2.75)**
U_{t-3}	−0.66	(−3.00)**	−1.30	(−1.76)†
U_{t-4}	0.08	(0.70)	−0.44	(−1.07)
U_{t-5}	0.56	(2.40)**	1.19	(1.51)
U_{t-6}	−0.93	(−3.12)**	−2.64	(−2.65)**
U_{t-7}	0.52	(2.68)**	1.71	(2.64)*
P_{t-1}	−0.04	(−0.32)	0.16	(1.10)
P_{t-2}	0.03	(0.65)	−0.08	(−0.54)
P_{t-3}	−0.05	(−1.18)	−0.07	(−0.49)
P_{t-4}	0.08	(1.78)†	0.02	(0.16)
P_{t-5}	0.08	(1.82)†	−0.20	(−1.36)
P_{t-6}	−0.07	(−1.68)	−0.13	(−0.90)
P_{t-7}	0.07	(1.59)	0.35	(2.40)*
R_{t-1}	−0.03	(−0.36)	−1.68	(−6.88)**
R_{t-2}	0.05	(0.55)	−0.10	(−0.32)
R_{t-3}	0.07	(0.67)	−0.02	(−0.07)
R_{t-4}	0.05	(0.53)	−0.04	(−0.12)
R_{t-5}	0.12	(1.26)	−0.10	(−0.29)
R_{t-6}	0.07	(0.81)	−0.44	(−1.42)
R_{t-7}	−0.03	(−0.31)	−0.16	(−0.54)
Trend	−0.02	(−2.03)*	0.03	(0.99)
$R/\bar{R}^2$	0.48/0.18		0.77/0.64	
S.E.E.	0.58		1.93	
$Q(30)$	22.1 (0.85)		19.1 (0.94)	

NOTE: F_t = change in the real high employment budget deficit relative to potential GNP, M_t = percent change in M1, U_t = unemployment rate, P_t = percent change in the GNP deflator, R_t = change in 90-day Treasury bill rate. t-statistics are in parentheses after the coefficient estimates. The marginal significance level of the Q-statistic is also in parentheses. Coefficients significant at the .10, .05, and .01 (two-tail) levels are indicated by †, *, and **, respectively.

coeficients, unlike Mishkin's result, are not jointly significant in predicting money.[8] In practical terms, these dissimilarities are not of great significance, since, as shall be seen below, we are able to reproduce the basic second-step regression results of Laumas-McMillin and Mishkin using these prediction equations.

[8]One possible explanation is the Mishkin measures the budget surplus in nominal terms, rather than in real terms as we do. Another is that Mishkin uses a different sample range, 1954:1–1976:4.

TABLE 2

F-STATISTICS FOR EXPLANATORY POWER IN ANTICIPATED POLICY EQUATIONS

Explanatory Variable	F_t		M_t	
M_{t-i}	1.08	(0.39)	3.33	(0.00)**
F_{t-i}	1.53	(0.17)	0.56	(0.78)
U_{t-i}	1.94	(0.08)†	1.95	(0.08)†
P_{t-i}	2.02	(0.07)†	1.23	(0.30)
R_{t-i}	0.50	(0.83)	10.34	(0.00)**

NOTE: See Table 1 for variable definitions. All variables are entered with seven lags. The *F*-statistics are distributed asymptotically F (7,63) and test the null hypothesis that the coefficients of all seven lagged coefficient values for each variable are equal to zero. The marginal significance levels are in parentheses after the *F*-statistics.

4. OUTPUT EFFECTS OF POLICY CHANGES

The predicted values from the estimated equations in columns (1) and (2) of Table 1 are used as measures of anticipated fiscal policy (AF_t) and monetary policy (AM_t), respectively. The corresponding residuals represent measures of unanticipated fiscal (UF_t) and monetary (UM_t) policy, respectively. The output effects of these policy changes are determined by estimating equation (1) through the regression of real output growth (Y_t) on both anticipated and unanticipated policy components over the period 1965:1–1985:4. The equation is estimated following Mishkin (1982a, b) using polynomial distributed lags (PDLs), and following Laumas and McMillin, with a fifth-degree polynomial with sixteen lags and a far-end constraint.[9,10] This specification is motivated by the intent to best put our results into perspective with the prior work of these authors.

The estimated results of equation (1) are presented in Table 3. Column (1) of Table 3 presents the coefficient estimation results from regressing real output growth on anticipated and unanticipated fiscal policy only, and may be compared to Laumas and McMillin. The second column presents the results from regressing real output growth on anticipated and unanticipated money, and may be compared to Mishkin. The last column of Table 3 includes both money and fiscal policy, anticipated and unanticipated, in the real output growth equation. Table 4 presents *F*-statistics and the corresponding marginal significance levels for the null hypothesis that all coefficients for each set of policy variables (AF_{t-i}, UF_{t-i}, AM_{t-i}. UM_{t-i}) are equal to zero.

The first column of Table 3 tells a story very similar to Laumas and McMillin's

[9]In Mishkin's actual specification the log of real GNP is regressed on a constant, current and twenty lagged values of anticipated and unanticipated money, and a time trend, with a correction for fourth-order autocorrelation. The coefficients for the monetary policy variables were constrained to fit along a fourth-order polynomial with the far endpoint constrained. Mishkin employs a nonlinear, least-squares estimation technique that imposes restrictions across the policy and output equations.

[10]The estimation period starts at 1965:4 to accommodate the long lags used for the explanatory variables. With the sample for money supply and budget surplus changes beginning in 1959:1, the sixteen lags on anticipated and unanticipated policy and the additional seven lags in the policy prediction equations used up the first twenty-three observations. This leaves 1965:1 as the start date. Note that while Table 2 of Laumas and McMillin (p. 470) states that their sample range extends from 1961:3 through 1982:4, this range refers to the explanatory policy variables. Given their specification of sixteen lags, the sample range of the dependent variable is 1965:4–1982:4, which is comparable to ours.

(1984, p. 471) basic results: both anticipated and unanticipated fiscal policy matter, and anticipated policy seems to matter more.[11] Both anticipated and unanticipated policy apparently have permanent impacts on real output since the sum of the individual coefficients for anticipated fiscal policy and unanticipated fiscal policy are statistically significant at the .01 and .05 percent levels, respectively. Table 4 indicates that, in addition, the joint hypothesis that anticipated fiscal policy is uncorrelated with output growth ($b_{1,i} = 0$) cannot be rejected at the .05 level.

We also reproduce Mishkin's (1982, p. 122) basic conclusions even though his time interval (1954:1–1976:4) and methodology are somewhat different: both anticipated and unanticipated money matter, but anticipated money seems to play a more important role in influencing output fluctuations.[12] As shown in Table 4, the joint hypothesis that contemporaneous and lagged anticipated money is not associated with real output growth ($c_{1,i} = 0$) is rejected at the .05 level of confidence. The hypothesis that unanticipated money is unrelated to output ($c_{2,i} = 0$) is also rejected. Initial lags on money (shown in Table 3) in both instances are generally positive and significant, and are followed by negative coefficient values at longer lags.[13] Although both sets of variables clearly play an important role in explaining short-run output fluctuations, long-term money neutrality cannot be rejected since the sums of coefficients for both anticipated and unanticipated money are not significantly different from zero.

The final estimation equation—the complete model of equation (1)—is shown in column 3 of Tables 3 and 4. The results are quite different from Laumas and McMillin. None of the individual coefficient values is significant for anticipated and unanticipated fiscal policy at the .05 level. As evidenced by the low t-statistics for the sums of the lags and the low F-statistics, the hypotheses of any short-term or long-term influence of fiscal policy on output growth is rejected. However, the joint hypothesis that either unanticipated monetary policy (UM_{t-i}) or anticipated monetary policy (AM_{t-i}) are uncorrelated with real output growth can be rejected at the .05 level of confidence.[14] Even in this case, however, both unanticipated and anticipated fiscal and monetary policy are apparently neutral in the longer term as the sum of individual coefficients is not significantly different from zero in all cases.

The earlier finding that fiscal policy influences output growth in the absence of

[11]Laumas and McMillin find AF_{t-i} is significant at lags 1–14, while UF_{t-i} is significant at lags 4 through 16.

[12]Mishkin (1982a, b) uses a nonlinear simultaneous estimation procedure for estimating the policy prediction and output equations. Cecchetti (1986) implements a more robust procedure that applies under more general assumptions. Our results conform to theirs, however, indicating that potential shortcomings in the two-step procedure may not be serious in practice. This accords with Mishkin's finding that differences between his and earlier findings by Barro (1977, 1978) and Barro and Rush (1980) are primarily due to the inclusion of lagged policy measures, not estimation techniques.

[13]Mishkin found AM_{t-i} to be significantly positive for lags 0 to 8, and significantly negative for later lags, and UM_{t-i} to be significantly positive only for lag 0.

[14]In other regressions we use unseasonally, rather than seasonally, adjusted money growth in our prediction equations. In the resulting second-stage output regression, anticipated monetary policy was found not to have any significant explanatory power in the short run either. Since we are unable to obtain seasonally adjusted data for all of the other explanatory variables in the prediction equations, we are uncertain of the robustness of this result. The role of seasonal adjustment of the data is an area we are exploring further.

TABLE 3

Effects of Anticipated and Unanticipated Fiscal and Monetary Policy on Real Output Growth, 1965:1–1985:4

Coefficient	(1)		(2)		(3)	
Constant	1.97	(3.89)**	4.45	(2.26)*	3.82	(1.23)
$b_{1,0}$	2.56	(2.53)*			0.52	(0.42)
$b_{1,1}$	0.18	(0.23)			−1.36	(−0.79)
$b_{1,2}$	−1.41	(−1.79)†			−2.24	(−1.13)
$b_{1,3}$	−2.33	(−3.22)**			−2.33	(−1.17)
$b_{1,4}$	−2.73	(−3.90)**			−1.84	(−0.93)
$b_{1,5}$	−2.74	(−3.74)**			−0.98	(−0.51)
$b_{1,6}$	−2.49	(−3.32)**			0.04	(0.02)
$b_{1,7}$	−2.09	(−2.89)**			1.03	(0.58)
$b_{1,8}$	−1.65	(−2.41)*			1.84	(1.09)
$b_{1,9}$	−1.24	(−1.82)†			2.36	(1.42)
$b_{1,10}$	−0.93	(−1.29)			2.49	(1.49)
$b_{1,11}$	−0.75	(−1.02)			2.23	(1.34)
$b_{1,12}$	−0.71	(−1.01)			1.60	(1.05)
$b_{1,13}$	−0.77	(−1.18)			0.73	(0.57)
$b_{1,14}$	−0.86	(−1.29)			−0.19	(−0.19)
$b_{1,15}$	−0.88	(−1.19)			−0.89	(−1.04)
$b_{1,16}$	−0.66	(−1.04)			−0.99	(−1.43)
$\sum_{i=0}^{16} b_{1,i}$	−19.52	(−3.14)**			2.01	(0.13)
$b_{2,0}$	−1.81	(−1.97)†			−1.43	(−1.66)
$b_{2,1}$	−0.30	(−0.50)			−0.35	(−0.49)
$b_{2,2}$	0.13	(0.20)			−0.16	(−0.17)
$b_{2,3}$	−0.05	(−0.07)			−0.37	(−0.35)
$b_{2,4}$	−0.47	(−0.84)			−0.67	(−0.56)
$b_{2,5}$	−0.90	(−1.64)			−0.83	(−0.66)
$b_{2,6}$	−1.22	(−2.17)*			−0.76	(−0.61)
$b_{2,7}$	−1.34	(−2.42)*			−0.45	(−0.37)
$b_{2,8}$	−1.28	(−2.36)*			0.06	(0.05)
$b_{2,9}$	−1.08	(−2.50)*			0.67	(0.62)
$b_{2,10}$	−0.80	(−1.39)			1.26	(1.18)
$b_{2,11}$	−0.54	(−0.90)			1.72	(1.61)
$b_{2,12}$	−0.35	(−0.59)			1.95	(1.83)†
$b_{2,13}$	−0.28	(−0.47)			1.89	(1.80)†
$b_{2,14}$	−0.32	(−0.50)			1.53	(1.50)
$b_{2,15}$	−0.40	(−0.59)			0.95	(1.01)
$b_{2,16}$	−0.38	(−0.68)			0.34	(0.50)
$\sum_{i=0}^{16} b_{2,i}$	−11.39	(−2.03)*			5.35	(0.47)
$c_{1,0}$			0.17	(1.13)	0.22	(1.10)
$c_{1,1}$			0.13	(1.23)	0.12	(0.78)
$c_{1,2}$			0.15	(1.33)	0.12	(0.81)
$c_{1,3}$			0.17	(1.82)†	0.16	(1.20)
$c_{1,4}$			0.19	(2.30)*	0.21	(1.60)
$c_{1,5}$			0.18	(2.15)*	0.23	(1.75)†
$c_{1,6}$			0.13	(1.56)	0.21	(1.65)
$c_{1,7}$			0.06	(0.74)	0.16	(1.30)
$c_{1,8}$			−0.02	(−0.30)	0.07	(0.64)
$c_{1,9}$			−0.12	(−1.43)	−0.04	(−0.44)
$c_{1,10}$			−0.20	(−2.34)*	−0.15	(−1.66)
$c_{1,11}$			−0.26	(−3.00)**	−0.25	(−2.60)*
$c_{1,12}$			−0.29	(−3.49)**	−0.32	(−3.08)**
$c_{1,13}$			−0.28	(−3.44)**	−0.35	(−2.96)**
$c_{1,14}$			−0.22	(−2.42)*	−0.32	(−2.35)*
$c_{1,15}$			−0.14	(−1.32)	−0.24	(−1.65)
$c_{1,16}$			−0.06	(−0.60)	−0.13	(−1.08)
$\sum_{i=0}^{16} c_{1,i}$			−0.40	(−1.22)	−0.32	(−0.56)
$c_{2,0}$			0.54	(2.21)*	0.55	(2.24)*
$c_{2,1}$			0.38	(2.34)*	0.29	(1.30)

Coefficient	(1)		(2)		(3)	
$c_{2,2}$			0.10	(0.63)	0.07	(0.26)
$c_{2,3}$			−0.18	(−1.29)	−0.10	(−0.35)
$c_{2,4}$			−0.40	(−2.98)**	−0.22	(−0.78)
$c_{2,5}$			−0.50	(−3.40)**	−0.30	(−1.07)
$c_{2,6}$			−0.49	(−3.10)**	−0.34	(−1.28)
$c_{2,7}$			−0.39	(−2.48)*	−0.35	(−1.44)
$c_{2,8}$			−0.22	(−1.51)	0.34	(−1.48)
$c_{2,9}$			−0.04	(−0.26)	−0.31	(−1.27)
$c_{2,10}$			0.12	(0.78)	−0.27	(−0.96)
$c_{2,11}$			0.21	(1.31)	−0.23	(−0.72)
$c_{2,12}$			0.22	(1.35)	−0.19	(−0.56)
$c_{2,13}$			0.13	(0.83)	−0.15	(−0.44)
$c_{2,14}$			−0.02	(−0.09)	−0.12	(−0.35)
$c_{2,15}$			−0.17	(−0.85)	−0.09	(−0.27)
$c_{2,16}$			−0.21	(−1.30)	−0.05	(−0.21)
$\sum_{i=0}^{16} c_{2,i}$			−0.90	(−0.69)	−2.14	(−1.30)
$R^2/\bar{R}^2$	0.30/0.20		0.43/0.35		0.53/0.38	
S.E.E.	3.80		3.42		3.33	
$Q(27)$	12.19 (0.99)		22.74 (0.70)		29.19 (0.35)	

NOTE: $B_{1,i}$, $b_{2,i}$, $c_{1,i}$, and $c_{2,i}$ refer to the coefficients on AF_{t-i}, UF_{t-i}, AM_{t-i} and UM_{t-i}, respectively in equation (1). t-statistics for the coefficient estimates and marginal significance levels for the Q-statistic are in parentheses. Coefficients significant at the .10, .05, and .01 (two-tail) levels are indicated by †, *, and **, respectively.

any consideration for monetary policy is apparently the result of omitted variables bias. A comparison of columns (1) and (3) of Table 3 indicates the extent of this bias. Omitting the role of monetary factors biases the coefficients for AF_{t-i} and UF_{t-i} downward; that is, it results in a seemingly significant negative effect of a rise in the budget surplus on output growth. All of the individually significant coefficients, with the exception of AF_{t-i} at lags 0 and 2, are either less negative or become positive once the monetary variables are included.

We also ran regressions over the shorter sample, 1965:1–1979:4, ending prior to a probable monetary policy regime shift. As with the results reported and discussed above, both anticipated and unanticipated fiscal policy affected GNP growth when considered alone, but not when the unanticipated and anticipated monetary policy variables were included. Interestingly, when considered alone, anticipated, but not unanticipated, monetary policy had a significant impact on output growth. When considered together with the fiscal policy variables, anticipated monetary policy was only marginally significant, while unanticipated monetary policy remained insignificant. The F-statistics, with corresponding marginal significance levels in

TABLE 4

F-STATISTICS FOR EFFECTS OF POLICY MEASURES ON REAL OUTPUT GROWTH

Explanatory Variable	(1)		(2)		(3)	
AF_{t-i}	4.88	(0.00)**			1.35	(0.26)
UF_{t-i}	1.72	(0.14)			1.10	(0.37)
AM_{t-i}			2.93	(0.02)**	2.48	(0.04)*
UM_{t-i}			3.38	(0.01)**	2.52	(0.04)*

NOTE: AF_t = anticipated fiscal policy, UF_t = unanticipated fiscal policy, AM_t = anticipated monetary policy, UM_t = unanticipated monetary policy. The F-statistics test the null hypothesis that the coefficients of contemporaneous and sixteen lagged values of each variable equal zero. The marginal significance levels are in parentheses after the F-statistics. Statistics significant at the .05 and .01 levels are indicated by * and **, respectively.

parentheses, for *AF*, *UF*, *AM*, and *UF* were .95 (.46), .98 (.44), 2.34 (.06), and .43 (.82), respectively.

In order to shed light on the linkages between monetary and fiscal policies which may account for the omitted variables bias, Granger-causality tests of the effects of the anticipated and unanticipated policy measures on anticipated policies were performed. F-statistics for the joint significance of each set of lagged variables and t-statistics for the significance of the sum of each set of lagged variables are presented in Table 5. Interaction effects between anticipated fiscal and monetary policy are clearly evident. Unanticipated money growth leads anticipated fiscal policy, and both anticipated as well as unanticipated fiscal policy lead anticipated money growth. These results indicate that the interaction effects between policies—both anticipated and unanticipated—may be complicated, but are clearly evident and should be accounted for in tests of the policy neutrality hypothesis.

The result that a rise in both the anticipated and unanticipated federal government structural budget deficit (surplus) as a percent of potential GNP leads to a rise (fall) in U.S. money growth is consistent with the predictions of Sargent and Wallace (1975, 1981), and empirical evidence of the U.S. experience offered by Hamburger and Zwick (1981), Levy (1981), Allen and Smith (1983), and Grier and Neiman (1987). Grier and Neiman, in particular, find that the U.S. structural deficit is a major determinant of monetary expansion, and that its effect on money or base money growth between 1957 and 1983 has not varied across political regimes.

The result that unanticipated money growth apparently leads to a systematic or anticipated fiscal policy response has previously been noted as a theoretical possibility by Barro (1979), who presents a model of government behavior where money-based inflation causes deficits because the government acts to keep the quantity of real bonds constant. Moreover, Dwyer (1982) presents vector autoregressive evidence that does not reject this hypothesis. Our result, consistent with Barro's (1979) argument, may be consistent with other explanations as well. For our purposes, however, the important point is that interaction effects between monetary and fiscal policies cannot be rejected.

TABLE 5

GRANGER CAUSALITY TESTS OF POLICY MEASURES, 1962:4–1985:4

Causal Variable		AF_t		AM_t	
AF_{t-i}	F	2.24	(0.04)*	3.07	(0.01)**
	Σ	−0.92	(−2.21)**	−4.34	(−1.98)**
UF_{t-i}	F	4.58	(0.00)**	1.94	(0.08)†
	Σ	−1.28	(4.39)**	−3.15	(−2.06)**
AM_{t-i}	F	1.06	(0.40)	5.21	(0.00)**
	Σ	−0.03	(1.20)	0.65	(4.90)**
UM_{t-i}	F	3.26	(0.01)*	4.92	(0.00)**
	Σ	(0.23)	(2.62)**	−0.26	(0.55)

NOTE: Causality tests are performed for regressions in which all four policy variables are entered with seven lags. The table reports F-statistics which are distributed F (7,64) and test the null hypothesis that the coefficients for each variable are equal to zero. The marginal significance levels are in parentheses. The table also reports the sum of each set of lagged variables (Σ), with the corresponding t-statistic in parentheses. Statistics significant at the .10, .05, and .01 significance levels are indicated by †, *, and **, respectively.

5. ROBUSTNESS OF RESULTS

The specifics of the empirical methodology followed in the previous sections were motivated by an attempt to maintain comparability with previous studies in this area. However, a number of questions arise as to the robustness of the fiscal ineffectiveness proposition to changes in model specification and estimation procedure. In this section, we examine the robustness of this result to (1) employing an alternative method in deriving the proxies for the anticipated and unanticipated policy measures in the first step of our estimation procedure, (2) changes in the endpoint, polynomial degree, and lag-length restrictions associated with PDL specification of the second-step output regression, and (3) correcting for the generated regressors bias associated with the policy measure proxies used in the second-step estimation.

A summary of the results for each of these robustness tests is presented in Table 6. Each panel (A–F) corresponds to a particular model specification, and is described in detail below. Column 1 shows the F-statistics (F) and marginal significance levels (in parentheses) of the null hypothesis test that the contemporaneous and lagged values of anticipated fiscal policy (AF_{t-i}) or unanticipated fiscal policy (UF_{t-i}) are jointly equal to zero when monetary variables (Am_{t-i} and UM_{t-i}) are

TABLE 6

ROBUSTNESS TESTS OF ALTERNATIVE MODEL SPECIFICATIONS FOR EFFECTS OF FISCAL POLICY ON REAL OUTPUT GROWTH

Model Specification	Variable		(1) Without AM_{t-i} and UM_{t-i}		(2) With AM_{t-i} and UM_{t-i}	
A. Policy Measures Derived from FPE Procedure	AF_{t-i}	F	3.33	(0.01)**	1.07	(0.38)
		Σ	−13.72	(−2.10)*	−1.96	(0.15)
	UF_{t-i}	F	1.28	(0.28)	.71	(0.64)
		Σ	−12.43	(−1.74)†	−4.87	(−0.61)
B. Third-Degree PDL	AF_{t-i}	F	6.52	(0.00)**	.22	(0.88)
		Σ	−17.83	(−2.94)**	−6.63	(−0.47)
	UF_{t-i}	F	2.08	(0.11)	1.04	(0.38)
		Σ	−13.14	(−2.42)*	−1.03	(−0.09)
C. No Endpoint Constraint	AF_{t-i}	F	4.34	(0.00)**	.80	(0.56)
		Σ	−18.79	(−2.96)**	1.87	(0.11)
	UF_{t-i}	F	1.29	(0.28)	.79	(0.58)
		Σ	−11.31	(−1.98)*	6.14	(0.52)
D. Unrestricted Lag Structure	AF_{t-i}	F	2.20	(0.02)*	1.13	(0.37)
		Σ	−13.77	(−2.96)**	−6.75	(−0.70)
	UF_{t-i}	F	1.66	(0.09)†	1.65	(0.13)
		Σ	−10.13	(−2.40)*	−6.72	(−1.09)
E. No Anticipated/Unanticipated Policy Distinction	F_{t-i}	F	.96	(0.51)	1.09	(0.39)
		Σ	−11.91	(−2.10)*	−4.41	(−0.79)
F. Generated Regressor Bias Correction	AF_{t-i}	X	2.40	(0.04)*	.45	(0.81)
		Σ	−19.47	(−2.22)*	2.19	(0.08)
	UF_{t-i}	X	.85	(0.51)	.53	(0.75)
		Σ	−11.42	(−1.55)	5.43	(0.32)

NOTES: The F-statistics test the null hypothesis that the coefficients of the contemporaneous and lagged values of noted variable equal zero. The marginal significance levels are in parentheses. The sum of each set of lagged variables (Σ) are also reported, with the corresponding t-statistic in parentheses. Statistics significant at the .10, .05, and .01 levels are denoted by †, *, and **, respectively. Each panel (A–F) represents a different specification of the model or estimation procedure (see text for details). In the case of panel F, chi-statistics (X), rather than F-statistics, are presented.

excluded from the equation. Column 2 reports the results from the "complete" model where monetary variables are included together with the fiscal policy measures.[15] Also reported are the sum of each set of lagged variables (Σ), with the corresponding t-statistics (in parentheses).

Policy Measure Proxies

The method used to drive proxies for policy measures plays an important role in tests of the policy ineffectiveness proposition. Our approach reported in Table 1 is to employ a common lag length structure for all of the variables in the first stage regressions, and to choose an appropriate lag length using the Theil $\bar{R}^2$ (minimum standard error) criteria. Although this provides theoretically unbiased estimation of regressors, the use of some irrelevant variables in the first-step regressions may cause some mismeasurement of anticipated and unanticipated policy and thereby affect the hypothesis tests in the second-step regressions.

To address this issue, we checked the robustness of the fiscal policy ineffectiveness result to an alternative method of first-stage model selection. In particular, we employed Akaike's final prediction error (FPE) method (1973) to pare down the lagged variables in the first-step regressions used to generate the anticipated and unanticipated policy measures. Amemiya (1980) has shown that the FPE procedure may be interpreted as a rule for minimizing the expected (out-of-sample) squared prediction error associated with a forecasting equation.

The FPE criterion indicated that the appropriate lag specification in the money prediction equation is seven lags of money, one lag for the interest rate, and seven lags of unemployment; and in the fiscal prediction equation, one lag of the budget surplus, eight lags of unemployment, six lags of inflation, and two lags of money. This specification of the first-stage regressions accords with the results implied by Table 1 on the basis of those lagged variables with "high" t-statistics.

Using the predicted values from these equations as our proxies for anticipated policies, and the residuals as unanticipated policies, we reestimated the output equation and tested for the fiscal policy ineffectiveness proposition. The summary of results is presented in panel A of Table 6. Consistent with our earlier findings, fiscal policy (anticipated fiscal policy in this instance) appears significant in the restricted model (with monetary variables excluded) shown in column 1, but is insignificant when monetary interactions are taken into account—for either anticipated or unanticipated fiscal policy shifts (column 2).

PDL Restrictions

The second-step estimation results reported in Table 2 embody restrictions on the lag structure for each of the policy measures in order to save degrees of freedom in the estimation and to maintain comparability with previous studies: the restrictions

[15]The complete set of results is quite voluminous, and is therefore summarized in Table 6 for purposes of brevity. Completely detailed results are available from the authors upon request. We find that the basic monetary policy results are generally robust to these tests as well.

included a fifth-order polynomial distributed lag function (PDL) with sixteen lags, and an endpoint constraint. We tested the robustness of our fiscal ineffectiveness result when each of these restrictions is relaxed.

First, the real output equation was estimated with third-degree PDLs. A summary of these results is presented in panel B of Table 6. The original results are not sensitive to this change in model specification. Namely, fiscal policy appears significant when the money measures are excluded from the equation in column 1, but insignificant when the fully specified model is estimated in column 2.

Second, we relaxed the endpoint restriction in the PDL. These results are summarized in panel C of Table 6. The original results are again not sensitive to this change in model specification. With money variables excluded, anticipated fiscal policy is significant and unanticipated fiscal policy is insignificant (in column 1). Both are insignificant in the full model specification when monetary policy variables are included in the estimated equation (column 2).

Third, we estimated the output equation without any PDL restrictions. To ensure adequate degrees of freedom we reduced the number of lags in the estimation from sixteen to twelve. The resulting estimates are reported in panel D of Table 6. Estimated separately, fiscal policy again is significant in the real output equation (column 1)—both anticipated and unanticipated fiscal policy are estimated to have a significant effect on output growth. However, the fiscal ineffectiveness proposition again cannot be rejected for either anticipated or unanticipated fiscal policy when the full model is estimated (column 2).

Generated Regressor Bias

Pagan (1984), Hoffman, Low, and Schlagenhauf (1984), and Murphy and Topel (1985) have demonstrated that the estimates in the output equation will be biased for models in which the regressors for anticipated and unanticipated policy are derived from the two-step procedure that we and others (for example, Barro 1977, 1978, Makin 1982, and Kormendi and McGuire 1984) have employed.

The reason is that the generated regressors themselves are estimated with some error, and not adjusting for this factor will lead to an underestimate of the variance of the coefficients associated with these variables in the output equation. In our case, a downward bias in the estimated standard errors would lead to a *greater* probability of rejecting the null hypothesis that fiscal policy is ineffective in influencing real output growth. That is, the bias in the output equation variance estimates would tend to make it more difficult to reject the ineffectiveness proposition. Hence, our failure to reject the null is a stronger result than the level of statistical confidence indicates.

For completeness, however, we have investigated two alternative approaches for dealing with this issue. Frydman and Rappoport (1987) have shown that the generated regressor bias problem disappears if the anticipated and unanticipated policy measures have the same effects on output growth. In this case consistent estimates of the output effects of the policies are obtainable from normal OLS regressions.

Thus one approach to dealing with the generated regressor bias problem is to jointly test the fiscal policy ineffectiveness proposition together with the null hypothesis that the unanticipated/anticipated distinction is irrelevant.

To test robustness of our results to this change in specification, we estimated an output equation in which only lags of "raw" fiscal policy F_{t-i} $(= AF_{t-i} + UF_{t-i})$ are entered and the effects of anticipated and unanticipated fiscal policy are constrained to be equal. The equation was specified with sixteen lags, but without any additional restrictions on the lag structure (because of the greater degrees of freedom available when no anticipated/unanticipated distinction is drawn). A summary of these results is presented in panel E of Table 6. Without the anticipated/unanticipated distinction, fiscal policy is ineffective when (raw) monetary variables are both excluded or included. Hence, our basic result is robust to relaxation of the maintained hypothesis that a distinction should be drawn between anticipated and unanticipated policies.

Another approach we have investigated is to leave the effects of the anticipated and unanticipated policy measures unconstrained and to correct the variance/covariance estimates for the generated regressor bias implicit in the variance estimates of the model. The summary of these results is reported in panel F or Table 6. The statistical procedure for the correction process follows that of Hoffman, Low, and Schlagenhauf (1984), but is modified to take account of the PDL restrictions. The correction process is described in the appendix to this paper, available from the authors upon request.

Consistent with our earlier finding, fiscal policy appears to have a significant effect on output when monetary interactions are excluded, even when correction is made for the generated regressors bias (column 1). But this result is again reversed when monetary interactions are taken into account: the policy ineffectiveness proposition cannot be rejected in the full model specification (column 2).

6. CONCLUSION

Our paper argues that interactive effects between monetary and fiscal policies are likely to be important, and that ignoring these effects can lead to significant omitted variables bias in tests of the policy ineffectiveness proposition. In contrast to previous research, we jointly test the fiscal and monetary ineffectiveness propositions. Similar to Mishkin (1982a, b), Makin (1982), and others we reject short-run monetary policy ineffectiveness—either anticipated or unanticipated. In contrast to these studies, however, we cannot reject long-term neutrality associated with monetary polices.

It is rather striking that the fiscal policy ineffectiveness proposition, as well as fiscal neutrality generally (that is, both anticipated and unanticipated policy), cannot be rejected in our joint tests for either the short run or long run. Moreover, this result proves robust to a wide variety of empirical model specifications and estimation procedures. This result sheds doubt on Laumas and McMillin's finding that both anticipated and unanticipated fiscal policy have significant output effects. Furthermore, our results suggest that the cause of the omitted variables bias in earlier studies is attributable to interaction effects between monetary and fiscal policies.

It is perhaps most surprising that unanticipated fiscal policy actions do not seem to play a significant role in influencing output in either the short run or long run. It is noteworthy, however, that this result is entirely consistent with theoretical arguments posited by Barro (1974) and others, as well as empirical evidence by Evans (1985), the U.S. Treasury (1984), and others, which suggests that fiscal deficits may be neutral (anticipated or unanticipated) if the tax consequences are appropriately discounted by the market. A cautionary note is in order, however. Fiscal policy may be neutral in its effect on overall economic activity, but may nonetheless have significant effects on the composition of output. Exploring this issue is on our agenda for future research.

LITERATURE CITED

Akaike, H. "Information Theory and an Extension of the Maximum Likelihood Principle." In *Second International Symposium in Information Theory,* edited by B. Petrov and F. Csaki, pp. 267–81. Budapest: Akademia; Kiado, 1973.

Allen, Stuart D., and Murray D. Smith. "Government Borrowing and Monetary Accommodation." *Journal of Monetary Economics* 9 (1983), 605–16.

Amemiya, T. "Selection of Regressors." *International Economic Review* 21 (June 1980), 331–54.

Barro, Robert J. "Are Government Bonds Net Worth?" *Journal of Political Economy* 82 (November 1974), 1095–1117.

______. "Unanticipated Money Growth and Unemployment in the United States." *American Economic Review* 67 (March 1977), 101–15.

______. "Unanticipated Money, Output and the Price Level in the United States." *Journal of Political Economy* 86 (August 1978), 549–80.

______. "On the Determination of the Public Debt." *Journal of Political Economy* 87 (October 1979), 940–71.

Barro, Robert J., and M. Rush. "Unanticipated Money and Economic Activity." In *Rational Expectations and Economic Policy,* edited by S. Fischer. Chicago: The University of Chicago Press, 1980.

Cecchetti, Stephen G. "Testing Short-Run Neutrality." *Journal of Monetary Economics* 17 (May 1986), 409–23.

Dwyer, Gerald P. "Inflation and Government Deficits." *Economic Inquiry* 20 (July 1982), 315–29.

Evans, Paul D. "Do Large Deficits Produce High Interest Rates?" *American Economic Review* 75 (March 1985), 68–87.

Friedman, Milton. "The Role of Monetary Policy." *American Economic Review* 58 (March 1968), 1–17.

Frydman, Roman, and Peter Rappoport. "Is the Distinction between Anticipated and Unanticipated Money Growth Relevant in Explaining Aggregate Output?" *American Economic Review* 77 (September 1987), 693–703.

Gordon, Robert J. "Price Inertia and Policy Ineffectiveness in the United States, 1890–1980." *Journal of Political Economy* 90 (December 1982), 1087–1117.

Grier, K., and H. Neiman. "Deficits, Politics, and Money Growth." *Economic Inquiry* 2 (1987), 201–14.

Hall, Robert E., and John B. Taylor. *Macroeconomics*. New York: W. W. Norton, 1986.

Hamburger, M. J., and Burton Zwick. "Deficits, Money, and Inflation." *Journal of Monetary Economics* 7 (1981), 141–50.

Hoffman, Dennis, L., Stuart A. Low, and Donald E. Schlagenhauf. "Tests of Rationality, Neutrality, and Market Efficiency: A Monte Carlo Analysis of Alternative Test Statistics." *Journal of Monetary Economics* 14 (November 1984), 339–63.

Kormendi, Roger C., and Philip Meguire. "Cross-Regime Evidence of Macroeconomic Rationality." *Journal of Political Economy* 92 (October 1984), 875–908.

Laumas, G. S., and W. Douglas McMillin. "Anticipated Fiscal Policy and Real Output." *Review of Economics and Statistics* 66 (August 1984), 468–71.

Levy, Mickey. "Factors Affecting Monetary Policy in an Era of Inflation." *Journal of Monetary Economics* 7 (1981), 351–73.

Lucas, Robert E. "Expectations and the Neutrality of Money." *Journal of Economic Theory* 4 (1972), 103–24.

McCallum, Bennett J., and J. K. Whitaker. "The Effectiveness of Fiscal Feedback Rules and Automatic Stabilizers under Rational Expectations." *Journal of Monetary Economics* 5 (April 1979), 171–86.

McElhattan, Rose. "On Federal Deficits and Their Economic Impact." Federal Reserve Bank of San Francisco, *Economic Review* (1982), 6–17.

Makin, J. H. "Anticipated Money, Inflation Uncertainty, and Real Economic Activity." *Review of Economics and Statistics* 64 (February 1982), 126–34.

Mishkin, Frederic S. "Does Anticipated Aggregate Demand Policy Matter? An Econometric Investigation." *Journal of Political Economy* 90 (January 1982), 22–51. (a)

———. "Does Anticipated Aggregate Demand Policy Matter? Further Econometric Results." *American Economic Review* 72 (September 1982), 788–802. (b)

Murphy, Kevin M., and Robert H. Topel. "Estimation and Inference in Two-Step Econometric Models." *Journal of Business and Economic Statistics* 3 (October 1985), 370–79.

Pagan, Adrian R. "Econometric Issues in the Analysis of Regressions with Generated Regressors." *International Economic Review* 25 (February 1984), 221–47.

Parkin, Michael. *Macroeconomics*. Englewood Cliffs, N.J.: Prentice-Hall, 1984.

Sargent, Thomas J., and Neil Wallace. "Rational Expectations, the Optimal Monetary Instruments and Optimal Money Supply Rule." *Journal of Political Economy* 83 (April 1975), 241–54.

———. "Some Unpleasant Monetarist Arithmetic." Federal Reserve Bank of Minneapolis, *Quarterly Review* (Fall 1981), 1–17.

Sims, Christopher A. "Money, Income, and Causality." *American Economic Review* 62 (September 1972), 540–52.

U.S. Treasury Department, Office of the Assistant Secretary for Economic Policy. "The Effects of Deficits on Prices of Financial Assets: Theory and Evidence." Monograph, 1984.