On the Stabilizing Effect of M. Friedman's Proposal

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Introduction

A variant of Friedman's Proposal for fiscal and monetary framework (1948), was discussed by R. E. Lucas from a historical point of view in his recent essay (1980). After reviewing some recent changes in the intellectual environment in the United States surrounding Friedman's Proposal and recognizing little increase in well-founded expertise useful in formulating sophisticated, reactive countercyclical policies since the Proposal was published, he concluded his essay by saying that "the main task of monetary and fiscal policy is to provide a stable, predictable environment for the private sector of the economy (p. 210, 1980)".

The purpose of this paper is to examine effectiveness as a stabilization device of M. Friedman's Proposal in a simple stochastic macro model incorporating rational expectations. The model employed in the paper is the one which B. T. McCallum and J. K. Whitaker (1979) used to analyze the stabilizing effects of policy feedback rules and so-called "built-in-stabilizer". There are two main reasons for choosing this model. First, the model of McCallum and Whitaker (heremafter denoted by MW model) is a fairly standard one in stochastic macroeconomics. Secondly, since McCallum and Whitaker examined the stabilizing effects of the built-in-stabilizer in their paper, their model could provide a proper benchmark to evaluate Friedman's Proposal which contains the built-in-stabilizer component.

Section I summarizes the MW model and its main conclusions.

Section II presents Friedman's Proposal with modifications as minor as possible. These modifications are made to highlight the stabilization aspect of the Proposal. Section III presents our model embodying the Proposal and discusses some implications of the model. Finally, some conclusions (which turn out to be favorable to the Proposal) are drawn from the analysis developed in Section III, together with some qualications of them.

I. MW Model and Its Main Conclusions

The MW model is a modified version of the model originally used by Sargent and Wallace (1975), consisting of three structural equations; aggregate supply relation of Lucas' type (1973), IS and LM functions, together with policy equations. The aggregate supply relation is,

$$y_t=a_0+a_1(p_t-E_{t-1}p_t)+a_2y_{t-1}+u_t, \qquad 0<a_1,\ 0<a_2<1 \tag{1}$$

where y_t and p_t are natural logarithms of aggregate output and the price level for period t. By E_{t-1} we mean taking the conditional expectation of the indicated variable, given information available at the end of period $t-1$. The public are assumed to have information about lagged values of all endogenous variables and policy equations. The stochastic disturbance u_t is taken as white noise process, that is, the following properties are assumed:

$E(u_t)=0$ for all t, and $E(u_tu_s)=\delta_{ts}\sigma_u^2$ for all t and s,

where δ_{ts} is Kroneckr's delta. Inclusion of y_{t-1} in the equation (1) can be interpreted as an implication of real adjustment cost.[1]

The IS and LM functions are written as follows:

$$y_t=b_0+b_1[r_t-E_{t-1}(p_{t+1}-p_t)]+b_2g_t+b_3z_t+v_t, \qquad b_1,\ b_2<0,\ b_2>0. \tag{2}$$

$$m_t=p_t+c_0+c_1y_t+c_2r_t+e_t, \qquad c_1>0,\ c_2<0. \tag{3}$$

Here, g_t, z_t, and m_t are respectively natural logarithms of real government spending on goods and services (excluding all transfers), real tax liabilities (net of all transfers), and the nominal money supply at

period t. All of these are assumed to be policy variables in the sense that the governnment can determine their behaviors. r_t is the nominal interest rate (not its natural logarithm). $E_{t-1}(p_{t+1}-p_t)$ is the expected inflation rate, so that the term, $r_t-E_{t-1}(p_{t+1}-p_t)$, represents the real interest rate. The stochastic disturbances, v_t and e_t, are considered white noise processes like u_t in the equation (1).[2] The model, following Sargent and Wallace, excludes direct effects of financial wealth on consumption, investment and money demand, and also assumes price flexibility.

To investigate the possible effects of policy feedback rules and built-in-stabilizer, McCallum and Whitaker adopt the following policy equations:

$$z_t=\tau_0+\tau_1 y_t, \qquad \tau_1>0, \tag{4}$$

$$g_t=\gamma_0+\gamma_1 g_{t-1}+\gamma_2 y_{t-1}, \qquad 0<\gamma_1<1,\ \gamma_2<0, \tag{5}$$

$$m_t=\mu_0+\mu_1 m_{t-1}+\mu_2 y_{t-1}, \qquad 0<\mu_1<1,\ \mu_2<0. \tag{6}$$

These policy equations are all deterministic.[3] (5) and (6) represent fiscal and monetary feedback rules relating current policy variables to past values of endogenous and policy variables.[4] McCallum and Whitaker define the built-in-stabilizer as "features of the tax structure that make tax liabilities respond automatically to current economic condition (p. 172, 1979)". z_t indicates that real tax liabilities depend on current output so as to represent the automatic stabilizer component in the set of policy equations. τ_1 represents the ratio of marginal to average tax rates, that is, a degree of progressiveness of tax rate.[6]

Focussing on the effects of the policies defined as (4)—(6) on real aggregate output y_t, McCallum and Whitaker derive the reduced form of y_t from the model, assuming the existence of meaningful solution for the model and its dynamic stability. The reduced form of y_t becomes,

$$y_t=a_0+a_2 y_{t-1}+\frac{b_1 u_t+a_1 c_2 v_t-a_1 b_1 e_t}{b_1+a_1 b_1 c_1+a_1 c_2(1-b_3\tau_1)}. \tag{7}$$

Using (7), McCallum and Whitaker examine the efficacy as stabilization policy of their policy equations. First, it is clear from (7) that y_t is independent of the feedback rules represented by g_t and m_t. This is a familiar result implied by rational expectation hypothesis on the efficacy of fiscal and monetary policy. Secondly, (7) shows that y_t is not independent of τ_1 (automatic stabilizer), and that it has stabilizing effect on y_t in the sense that the (conditional) variance of y_t will be smaller the larger is τ_1 over some relevent range of its rate.

Then, McCallum and Whitaker employ an alternative criterion for stabilization policy, that is, to minimize the mean-squared expectational error of suppliers, i, e., $E(p_t-E_{t-1}p_t)^2$.[6] In the MW model, this criterion amounts to minimization of the mean-square discrepancy between actual and "full-information" output which equals $y_t^*=a_0+a_2y_{t-1}+u_t$. Then, the expectational error becomes,

$$1/a_1(y_t-y_t^*)=p_t-E_{t-1}p_t=\frac{-[b_1c_1+c_2(1-b_3\tau_1)]u_t+c_2v_t-b_1e_t}{b_1+a_1b_1c_1+a_1c_2(1-b_3\tau_1)}. \quad (8)$$

Under the alternative criterion, the stabilizing effect of τ_1 is not so clear-cut as under the first criterion (minimization of the (conditional) variance of y_t). Although the absolute values of coefficients of v_t and e_t decrease as τ_1 increases as before, that of u_t increases with τ_1. Therefore, in the general case where none of these stochastic disturbances degenerates, there might be some optimal value of τ_1 at which the automatic stabilizer exerts the maximum stabilizing effect.

McCallum and Whitaker draw the final conclusions from their analysis that any deterministic feedback rule for fiscal or monetary policy has no influence on the behavior of real aggregate output, and that the built-in-stabilizer may be effective in the sense that it tends to reduce the variability of real aggregate output.

II. Friedman's Proposal

In his paper published in 1948, M. Friedman proposed a fiscal and monetary framework which was alleged to be consistent with long-

term objectives such as political freedom and economic efficiency.[1] He claimed that this framework was stable in the sense that it had a stabilizing effect on short-run fluctuations in economic activity, and eliminated the undesirable political implications of discretionary governmental actions. Also, it was claimed to be "robust" in the sense that it involved minimum reliance on uncertain and untested knowledge. Friedman's Proposal for the stable fiscal and monetary framework could be itemized as follows:

(1) Monetary and banking system.

One hundred percent reserves should be employed along with the elimination of discretionary weapons of monetary authorities (like open market operations). This reform would eliminate the private creation or distruction of money, so that the chief function of the banking system would become the depository one. The principal funcition of the monetary authorities, after the elimination of their major weapons of discretionary stabilization policy, is to create money to meet government deficits or to retire money when the government has a surplus.

(2) Government expenditures.

Government spending on goods and services (excluding transfers) should be determined on the basis of the community's desire and willingness to pay for the public services. It may vary secularly but should not in response to cyclical changes in economic activity. It should be financed as a rule by tax receipts, not by issuing government bonds and the like.

(3) Tax system and budget principle.

Tax revenues should rely primarily on progressive income tax on the considerations of minimizing possible distortions of taxes on resource allocation. The way to levy taxes should also be the one which minimizes the distortional effects of taxes. Tax rates may vary secularly but should not in response to cyclical fluctuations in economic activity. Rates should be determined

in the light of reasonably full-employment income (or desired income level) and of a government spending plan associated with that level of income. The budget principle should be either the one which makes tax revenues balance government expenditures at the hypothetical income level or the one which leads to some deficits sufficient to meet secular increase in demand for money caused by economic growth.

Friedman's Proposal as explained above may not seem realistic. His intention for the Proposal, however, was "to set forth the ultimate ideal as clearly as possible before beginning to compromise (p. 135, 1953)". We will observe his intention in our following analysis of his Proposal. How can those recommendations be formalized within the framework of the MW model to get ours? Our approach to this problem is to accept the basic part of the MW model and to reformulate policy equations in line with Friedman's Proposal with minor modifica tions. In doing so, we have to keep in mind that the formalization and possible modifications of the Proposal never lose its essential features concerning stabilization aspect in any significant way. With much care on this point, we now set four assumptions relating to the Proposal in our ensuing discussion:

1. Policy equations under consideration are all deterministic.
2. We do not pay any special attention to transfer items.(2)
3. Taxes and government expenditures are determined in real terms, not in nominal terms.(3)
4. 100% reserves proporal is assumed to be effective in our model.(4)

III. Our Model Incorporating The Proposal and Analysis

Our model comprises the equations of (1)—(3), together with new policy equations which embody the Proposal. We will write our model below:

$$y_t=a_0+a_1(p_t-E_{t-1}p_t)+a_2y_{t-1}+u_t, \qquad 0<a_1,\ 0<a_2<1 \tag{1}$$

$$y_t=b_0+b_1[r_t-E_{t-1}(p_{t+1}-p_t)]+b_2g_t+b_3z_t+v_t \quad b_1,\ b_3<0,\ b_2>0 \tag{2}$$

$$m_t=p_t+c_0+c_1y_t+c_2r_t+e_t, \qquad c_1>0,\ c_2<0 \tag{3}$$

$$z_t=\tau_0+\tau_1y_t, \qquad \tau_1>0 \tag{4'}$$

$$g_t=\bar{g} \tag{5'}$$

$$m_t-m_{t-1}=\bar{g}-z_t \tag{6'}$$

Here, (1)—(3) are the same as before both in form and in characteristic. The (4′) is identical in its form with (4) in the MW model, bht the parameters of (4′) are now determined in relation to government spending g_t under the budget principle described in the previous section. The (5′) specifies government expenditures for period t. For the present, we assume that g_t is fixed as some constant proportion to a particular desired income. We will discuss later determinations of g_t and desired income more indetail. The (6′) shows the money supply process in which changes in money supply depend on government budget conditions. These specifications of policy equations are based on the Proposal presented in the previous section. As mentioned before, these are all deterministic. The reduced forms of endogenous variables in our model, i, e., y_t, p_t, and r_t, can be written as linear functions of the predetermined variables and stochastic disturbances as follows:

$$y_t=\pi_{10}+\pi_{11}y_{t-1}+\pi_{12}m_{t-1}+\pi_{13}\bar{g}+\pi_{14}u_t+\pi_{15}v_t+\pi_{16}e_t \tag{9}$$

$$p_t=\pi_{20}+\pi_{21}y_{t-1}+\pi_{22}m_{t-1}+\pi_{23}\bar{g}+\pi_{24}u_t+\pi_{25}v_t+\pi_{26}e_t \tag{10}$$

$$r_t=\pi_{30}+\pi_{31}z_{t-1}+\pi_{32}m_{t-1}+\pi_{33}\bar{g}+\pi_{34}u_t+\pi_{35}v_t+\pi_{36}e_t \tag{11}$$

We want to know the reduced form coefficients in terms of the structural parameters. First, we compute $E_{t-1}p_t$ and $E_{t-1}p_{t+1}$ using the reduced form of p_t,

$$E_{t-1}p_t=\tau_{20}+\pi_{21}y_{t-1}+\pi_{22}m_{t-1}+\pi_{23}\bar{g}, \tag{12}$$

$$\begin{aligned}E_{t-1}p_{t+1}&=E_{t-1}(\pi_{20}+\pi_{21}y_t+\pi_{22}m_t+\pi_{23}\bar{g}+\pi_{24}u_t+\pi_{25}v_t+\pi_{26}e_t)\\&=\pi_{20}+(\pi_{21}-\pi_{22}\tau_1)\pi_{10}-\pi_{22}\tau_0+(\pi_{21}-\pi_{22}\tau_1)\pi_{11}y_{t-1}\\&\quad+[(\pi_{21}-\pi_{22}\tau_1)\pi_{12}+\pi_{22}]\,m_{t-1}+[(\pi_{21}-\pi_{22}\tau_1)\pi_{13}\\&\quad+\pi_{22}+\pi_{23}]\bar{g}.\end{aligned} \tag{13}$$

Now, let us focus on the equation (2), and try to solve for the reduced form coefficients in terms of the structural parameters using Lucas' method (1972). After appropriate substitutions, we obtain the follow-

ing relation;

$$\begin{aligned}(1-b_3\tau_1)[&\pi_{10}+\pi_{11}y_{t-1}+\pi_{12}m_{t-1}+\pi_{13}\bar{g}+\pi_{14}u_t+\pi_{15}v_t+\pi_{16}e_t]\\&=b_0+b_1[\pi_{30}-(\pi_{21}-\pi_{22}\tau_1)\pi_{10}+\pi_{22}\tau_0]+b_3\tau_0+b_1[\pi_{31}-\\&\quad(\pi_{11}\pi_{21}-\pi_{11}\pi_{22}\tau_1-\pi_{21})]y_{t-1}+b_1[\pi_{32}-(\pi_{12}\pi_{21}\\&\quad-\pi_{22}\pi_{12}\tau_1)]m_{t-1}+b_1[\pi_{33}-(\pi_{13}\pi_{21}-\pi_{13}\pi_{22}\tau_1+\pi_{22})]\bar{g}\\&\quad+b_2\bar{g}+b_1\pi_{34}u_t+(b_1\pi_{35}+1)v_t+b_1\pi_{36}e_t.\end{aligned}\tag{14}$$

Since (14) is an identity, we can derive the following relationships between the reduced form coefficients and structural parameters:

$$\begin{aligned}(1-b_3\tau_1)\pi_{10}&=b_0+b_1[\pi_{30}-\pi_{22}\tau_1)\pi_{10}+\pi_{22}\tau_0]+b_3\tau_0\\(1-b_3\tau_1)\pi_{11}&=b_1[\pi_{31}-(\pi_{11}\pi_{21}-\pi_{11}\pi_{22}\tau_1-\pi_{21})]\\(1-b_3\tau_1)\pi_{12}&=b_1[\pi_{32}-(\pi_{12}\pi_{21}-\pi_{22}\pi_{12}\tau_1)]\\(1-b_3\tau_1)\pi_{13}&=b_1[\pi_{33}-(\pi_{13}\pi_{21}-\pi_{13}\pi_{22}\tau_1+\pi_{22})]+b_2\\(1-b_3\tau_1)\pi_{14}&=b_1\pi_{34}\\(1-b_3\tau_1)\pi_{15}&=b_1\pi_{35}+1\\(1-b_3\tau_1)\pi_{16}&=b_1\pi_{36}\end{aligned}\tag{15}$$

Likewise, we have the similar relationships from the equation (1),

$$\begin{aligned}\pi_{10}&=a_0\\\pi_{11}&=a_2\\\pi_{12}&=0\\\pi_{13}&=0\\\pi_{14}&=a_1\pi_{24}+1\\\pi_{15}&=a_1\pi_{25}\\\pi_{16}&=a_1\pi_{26},\end{aligned}\tag{16}$$

and from the equation (3),

$$\begin{aligned}1&=\pi_{22}+(c_1+\tau_1)\pi_{12}+c_2\pi_{32}\\1&=\pi_{23}+(c_1+\tau_1)\pi_{13}+c_2\pi_{33}\\-\tau_0&=\pi_{20}+(c_1+\tau_1)\pi_{10}+c_2\pi_{30}+c_0\\0&=\pi_{21}+(c_1+\tau_1)\pi_{11}+c_2\pi_{31}\\0&=\pi_{24}+(c_1+\tau_1)\pi_{14}+c_2\pi_{34}\\0&=\pi_{25}+(c_1+\tau_1)\pi_{15}+c_2\pi_{35}\\0&=\pi_{26}+(c_1+\tau_1)\pi_{16}+c_2\pi_{36}\end{aligned}\tag{17}$$

Now, we are going to find coefficients of the reduced form of y_t which

is our main concern in this paper utilizing (15)—(17). We have:

$$\begin{aligned}
\pi_{10} &= a_0 \\
\pi_{11} &= a_2 \\
\pi_{12} &= 0 \\
\pi_{13} &= 0 \\
\pi_{14} &= \frac{b_1}{b_1+a_1b_1(c_1+\tau_1)+a_1c_2(1-b_3\tau_1)} \\
\pi_{15} &= \frac{a_1c_2}{b_1+a_1b_1(c_1+\tau_1)+a_1c_2(1-b_3\tau_1)} \\
\pi_{16} &= \frac{-a_1b_1}{b_1+a_1b_1(c_1+\tau_1)+a_1c_2(1-b_3\tau_1)}
\end{aligned} \tag{18}$$

Therefore, we finally get the following reduced form of y_t in terms of the structural parameters:

$$y_t = a_0+a_2y_{t-1}+\frac{b_1u_t+a_1c_2v_t-a_1b_1e_t}{b_1+a_1b_1(c_1+\tau_1)+a_1c_2(1-b_3\tau_1)} \tag{19}$$

The first and second terms of the equation (19) are respectively identical with the corresponding terms in the equation (7). The third term which represnts a combined stochastic component, however, is different from its counterpart in (7) in its denominator. Since τ_1 enters twice in the denominator with same sign, it is clear that our model specification reinforces the stabilizing effect of the built-in-stabilizer expressed in τ_1. This implication of our model implicitly assumes a criterion for stabilizing effect of minimizing the (conditional) variance of y_t.

Now, we are going to find and try an alternative criterion. The basic idea for the alternative is almost the same as the second criterion used by McCallum and Whitaker, that is, to minimize some value associated with discrepancy between actual and some sort of desired income.[1] To find an appropriate criterion for evaluating the Proposal along this line, we have to go back to the Proposal and to define correctly a desired income. Determination of the desired income requires modifications of the previous policy equations in our model, because, in Fried-

man's Proposal, g_t is related to the desired income however it is defined, and if the desired income is difined differently, so is g_t. Then, z_t needs to be adjusted to the possible modifications of g_t, and so does m_t. We have three candidates for defining the desired income in our model: first, we can simply employ "full-information" output as McCallum and Whitaker did, secondly, we can choose some fixed level of income arbitrarily within some relevent range as in our preceding analysis, and thirdly, we can choose $y_t^{**}=a_0+a_2y_{t-1}$ as the desired income. Here, we will choose the third approach for the reasons stated in what follows. Although the first candidate is theoretically attractive, it amounts to containing a stochastic component in the desired income as we assume that current values of stochastic disturbances are not known. This is what Friedman tried to avoid in formulating the proposal for determination of government expenditures. Friedman emphasized that government expenditures should be constant over a relevent period of time or change only slowly. To derive stable government expenditures, Friedman argued that the government spending should be determined on the basis of the community's preferences on the public services which were reasonably assumed to be stable. If we assume that, in the short-run, the relative price effect on the demand for the public services is small, then it can be expressed as a stable function of income y, that is, $g=f(y)$. Our present problem amounts to choosing an appropriate independent variable of the function so as to get a stable g. Having assumed that the public as well as the government do not know the values of current stochastic diturbances, the best supply decision is the one when the public correctly forcast p_t, that is, when $E_{t-1}p_t=p_t$.[2] In this case, the public can produce what they want to produce, aside from the unpredictable, uncontrollable stochastic disturbance u_t. This implies that y_t^{**} defined according to the third approach can be used with sufficient accuracy as a proxy of the desired income. Furthermore, the third approach meets a kind of constancy qualification imposed by Friedman concerning the level of government spending

in the sense that it is predetermined, so that, although the level of g_t itself may change period by period, how to change is deterministic.

Now, what will happen to our previous analysis if we employ the alternative criterion of minimizing the mean-square discrepancy between actual and the desired income when the latter is defined as $y_t^{**}=a_0+a_2y_{t-1}$? The discrepancy is,

$$y_t-y_t^{**}=\frac{b_1u_t+a_1c_2v_t-a_1b_1e_t}{b_1+a_1b_1(c_1+\tau_1)+a_1c_2(1-b_3\tau_1)}$$

which is identical with the stochastic component in the equation (19). This implies that the first and second criteria give the same answer.

IV. Conclusions

The main result of our analysis is that policy equations (Friedman's Proposal) are really effective in terms of both criteria, that is, the framework proposed by Friedman tends to minimize or reduce short-run fluctuations of real aggregate output. Our built-in-stabilizer is ever stronger than that in the MW model. We can see why it is so by looking at the differences in policy specification between the two models. Our policy specification has no feedback rules determined independently by the government. Instead, τ_1 (built-in-stabilizer) enters twice in our policy equations, so that our built-in-stabilizer exerts its effect through not only z_t, but also m_t. Considering that the government spending in the Proposal is basically determined by the public, the fiscal and monetary framework proposed by Friedman is the one which accommodates free behavior of the private sector. And yet, it has the stabilizing effect as our analysis has shown, and it does so not by interfering in the private sector with discretionary governmental actions, but by providing a stable framework in which free behavior of the private sector could be assured or even enhanced.

Finally, we will discuss briefly some possible qualifications of our conclusions which come from the assumptions and specifications of our model. Presumptions for Friedman's Proposal to work well are that

prices are flexible and that the response lag and other kinds of lags are minor. In our as well as MW models, price flexibility is simply assumed, and lag structures are just postulated. Does the violation of these presumptions reverse our conclusions in favor of discretionary, countercyclical policies? We admit that, as for price flexibility, there is no quick and clear-cut answer to the relative efficacy of Friedman's Proposal.(1) We just note here that, on the recognition of the fact that governmental interventions in details of private price and wage negotiations are now prevailing, Lucas (1980) recommended another propsal to be added to Friedman's Proposal, i. e., "a clearly announced policy that wage and price agreements privately arrived at will not trigger governmental reaction of any kind (p. 200)". As for lag structures, it is not likely that our conclusions would be reversed. Discretionary, countercyclical policies are effective only to the extent that we have correct knowledge about the behavioral structure of economy including lag structures. Therefore, discretionary, countercyclical policies will be stabilizing less or destabilizing more the more they depend on uncertain and untested knowledge.

Then, we will take some aspects of our model specification which might limit the validity of our conclusions. Is b_2 always positive? Is there any possibility that b_2 might be zero so that there is no multiplier effect of g_t on aggregate demand?(2) Moreover, is it always theoretically reasonable that z_t is included in the equation (2) with non-zero (negative) coefficient? Because it turns out to imply that the switch in financing government spending from levying taxes to issuing government bonds (if possible) will affect aggregate demand. These difficulties in our model specification are related to the problem of the so-called "burden of public debt" or "Ricardian Theorem on public debt". We will not discuss here these problems in detail.(3) We only note that these problems indicate limitations of ad-hoc models like the one of Sargent and Wallace (1975), and that it is necessary to construct well-founded models in place of ad-hoc ones if we want

to resolve these problems.

Notes

I

(1) See Sargent (1979), pp. 330–331 and Chapter XVI.

(2) These white noise processes might be contemporaneously correlated with one another.

(3) McCallum and Whitaker analyzed the case where policy equations involved stochastic terms, and found that the essential results were the same whether or not stochastic terms were included in the policy equations. See McCallum and Whitaker (1979), pp. 180–183.

(4) Negative sign of γ_2 and μ_2 in (5) and (6) could imply countercyclical policies.

(5) Since z_t and y_{t-1} are natural logarithms, τ_1 represents elasticity of tax liabilities with respect to income.

(6) This is the criterion which Barro (1976) used.

II

(1) Friedman mentioned substantial equality of economic power as another long-term objective (p. 134, 1953). But, in this paper, we do not pay special attention to transfer items to which this objective is deeply related.

(2) The original Proposal of Friedman includes another recommendation concerning transfer items besides (1)—(3). Since our main concern in this paper is the stabilization aspect of the Proposal, we set aside the recommendation about transfer items. Furthermore, considering that transfer items may contribute to the stabilizing effect of the Proposal (p. 137, 1953), the omission of the recommendation will not alter our analysis in any significant way.

(3) This assumption may limit the validity of our analysis. See McCallum and Whitaker (1979), pp. 180–183. But there is no sufficiently persuasive reason for employing nominal tax revenues and government expenditures instead of real ones.

(4) This assumption could be incorporated into our simple model without any modification. Furthermore, Friedman argued that objectives of 100% reserves could be achieved even under a fractional reserve system (p. 136, footnote. 3, 1953). Therefore, this assumption is not so restrictive as it might be thought.

III

(1) This is the usual criterion for optimal stabilization policy and the desired income means a policy goal. See Sargent (1979), chapter XV.

(2) Mathematically, this amounts to taking the conditional expectation of both sides of the equation (1), that is,

$$E_{t-1}(y_t)=y_t^{**}=E_{t-1}[a_0+a_1(p_t-E_{t-1}p_t)+a_2y_{t-1}+u_t]=a_0+a_2y_{t-1}.$$

IV

(1) Relating to this problem, there exists an approach which treats price rigidity as a result of people's optimizing behavior under uncertainty, not simply of institutional conditions. See Sargent (1979), chapter VIII.

(2) In our as well as MW models, the coefficient of g_t has no effect on y_t as (7) and (19) have shown. Therefore, this is exclusively the problem of model specification, although related to some extent to the problem of the so-called "burden of public debt".

(3) As for the problem of burden of public debt, some of the useful references recently published are Barro (1974) and (1978), and Sjaastad and Wisecarver (1977). Even if b_2 and b_3 are zero in our model, our model specification will demonstrate some degree of stabilizing effect through the money supply process expressed by the equation (6′).

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