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On the Optimality of Activist Policies with a Less Informed Government

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On the Optimality of Activist Policies with a Less Informed Government

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Abstract

We investigate whether a government should lead an activist policy in a rigorous utility maximizing framework under rational expectations. The economy is a monetary one with preset wages, and is subject to both demand and supply shocks. It is assumed that the government can never act on the basis of information superior to that of the private sector. Moreover wages are set after monetary injections have been carried out. We find that the optimal policy is nevertheless an activist countercyclical one. It has the remarkable property that, although the economy is hit each period by stochastic shocks *after* wages have been preset, this optimal policy will nevertheless succeed in keeping the economy on a full employment track.

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1 Introduction

The purpose of this article is to reexamine in a rigorous utility maximizing framework with rational expectations the traditional debate about the desirability of an "activist" monetary policy. We shall construct for that purpose a simple model of a monetary economy with preset wages. This economy is subject to both demand and supply shocks. We shall find out that, eventhough the government is assumed to have never more information than the private sector, his optimal monetary policy will be an activist one.

The reason why this study is cast within the framework of an economy with preset wages is that the existence of rigid wages (or prices) was at the heart of the traditional "Keynesian" case for activist stabilization policies: in such a situation negative demand shocks lead to inefficient underemployment of ressources, which, it was believed, the government should alleviate through countercyclical monetary or fiscal policies.

An almost mortal blow, however, was brought to this wiew by the contributions of Lucas (1972, 1976) and Sargent and Wallace (1975, 1976). In particular Sargent and Wallace (1975) showed that, in a class of models which included the models with preset prices and wages studied at the time, the scope for output and employment stabilization disappeared if the private sector had rational expectations and was allowed to react to the same informations as the government. This critique is a compelling one since, even if the government has more information than the private sector, it could be considered as one of its duties to release this superior information to private agents, and intervene only if this was not sufficient[1].

Subsequently the important idea that a less informed government can nevertheless have stabilizing powers was developed in insightful articles by Turnovsky (1980), Weiss (1980, 1982), King (1982, 1983) and Andersen (1986). All these papers imbed a sophisticated treatment of rational expectations into an otherwise fairly traditional framework, with a priori given demand-supply functions and government objectives. Of course the question naturally arises, as for all models with no explicit microfoundations, of whether these important results will carry over in a model where demands,

[1] We may note that many famous contributions favourable to activism are explicitly based on the assumption that the govenment can take action on the basis of superior information, and are therefore vulnerable to the Sargent-Wallace critique. For example Fischer (1977) himself shows that, in his model, the scope for stabilization disappears if the private sector is allowed to react to the same informations as the government.

supplies and the objectives of the government all derive from explicit maximization.

So the purpose of this article is to reexamine this issue in a rigorous maximizing model with preset wages, where the government is less informed and more constrained than the private sector. More precisely we shall notably assume that: (i) the government takes his policy actions on the basis of information which is never superior to that of the private sector, (ii) the private sector sets wages after the government has decided on policy for the same period, so that the government cannot "surprise" the private sector while the latter is locked into fixed wages agreements.

In spite of these restrictions, we shall show that the optimal policy is nevertheless an activist one. We shall notably obtain the remarkable result that, although the economy is hit in each period by stochastic demand and supply shocks *after* wages have been preset, our optimal policy will nevertheless succeed in keeping the economy on a full employment track.

2 The model

2.1 Markets and agents

We shall consider a monetary overlapping generations model (Samuelson, 1958) with production. The economy includes representative firms and households, and the government.

Households of generation t live for two periods. They work L_t and consume C_t in period t, consume C'_{t+1} in period $t+1$. They save under the form of money, which is the sole asset in the economy, and maximize the expected value of their utility U_t, with:

$$U_t = \alpha_t Log\, C_t + Log\, C'_{t+1} - (1+\alpha_t)\, L_t \tag{1}$$

where the α_t's are positive i.i.d. stochastic variables whose variations represent demand shocks (the propensity to consume in period t is, as we shall see below, $\alpha_t/1+\alpha_t$). The coefficient $1+\alpha_t$ in the disutility of labor has been chosen so as to yield a constant Walrasian labor supply in the absence of government intervention (section 3 below). In that way, variations in α_t have the characteristics of a "pure demand shock".

The representative firm in period t has a production function:

$$Y_t = Z_t L_t \tag{2}$$

where Y_t is output, L_t labor input and Z_t a technology shock common to all firms. We assume that the firms belong to the young households, to which they distribute their profits, if any.

Government has one policy instrument: It can increase or decrease the money stock through transfers to the old household. As we shall see next, we shall constrain government transfers to be conditional only on variables already known to the private sector.

2.2 The timing of events

As in all such models, the timing of actions and information is important, so we shall now spell things precisely.

Old households enter period t holding a quantity of money M_{t-1} carried from the previous period. The government gives them in a first step a lump sum monetary transfer τ_t, so that the old households are now endowed with a quantity of money M_t:

$$M_t = M_{t-1} + \tau_t \tag{3}$$

Call I_t the information set in period t, which includes the values of all observable macroeconomic variables up to t included. In order to reflect the fact that government policy in period t can only react to past developments, we shall assume that the government's policy variable τ_t is a function[2] only of variables belonging to I_{t-1}, which the private sector already knows.

In a second step the wage is set by the private sector at its expected market clearing value, without knowing the values of period t shocks α_t and Z_t.

Finally the shocks become public knowledge and transactions are carried out.

We may note that, as indicated in the introduction, the government does not have the opportunity to "surprise" the private sector with monetary shocks while he is locked into binding nominal contracts, since the contracts are signed *after* the government has made its monetary injection. Also the monetary injection in period t is based on information up to $t-1$, so that the government is no more informed than private agents.

[2] We shall thus consider only deterministic policy rules in this paper. As we shall see below, deterministic policies are sufficient to reach optimal allocations, and stochastic policies would only add unwanted noise. Although this will not be the case for the optimal policy found below, these policies could be time dependent.

3 Walrasian equilibrium

In order to contrast the results with the preset wage economy, we shall study first the Walrasian equilibria of this economy.

Call P_t and W_t the price and nominal wage. The real wage is equal to the marginal productivity of labor:

$$\frac{W_t}{P_t} = Z_t \tag{4}$$

Now let us write the maximization program of the young household born in t. He receives profits $\Pi_t = P_t Y_t - W_t L_t$ when young, and a monetary transfer τ_{t+1} from the government when old. He transfers a quantity of money m_t to the second period. So his program is:

$$\text{Maximize} \quad E_t \left[\alpha_t Log C_t + Log C'_{t+1} - (1 + \alpha_t) L_t \right] \quad s.t.$$

$$P_t C_t + m_t = W_t L_t + \Pi_t$$

$$P_{t+1} C'_{t+1} = m_t + \tau_{t+1}$$

Note that, since τ_{t+1} is a function of variables up to period t, it is known to the household when deciding on quantities supplied and demanded. The first order conditions for this program yield:

$$P_t C_t = \frac{\alpha_t}{1 + \alpha_t} (W_t L_t + \Pi_t + \tau_{t+1}) = \frac{\alpha_t}{1 + \alpha_t} (P_t Y_t + \tau_{t+1}) \tag{5}$$

$$L_t^s = \frac{W_t - \Pi_t - \tau_{t+1}}{W_t} \tag{6}$$

Equation (5) is the usual consumption function, while equation (6) gives the Walrasian supply of labor.

The equilibrium condition on the goods market is:

$$C_t + C'_t = Y_t = Z_t L_t \tag{7}$$

where C'_t, consumption demand by old consumers, is simply:

$$C'_t = \frac{M_t}{P_t} \tag{8}$$

Equations (4)-(8) determine all equilibrium values, which depend on M_t and $M_{t+1} = M_t + \tau_{t+1}$. They are computed as:

$$C_t = \frac{\alpha_t Z_t}{1 + \alpha_t} \qquad C'_t = \frac{Z_t M_t}{(1 + \alpha_t) M_{t+1}} \tag{9}$$

$$L_t = \frac{1}{1+\alpha_t}\left(\alpha_t + \frac{M_t}{M_{t+1}}\right) \tag{10}$$

$$W_t^* = (1+\alpha_t)\, M_{t+1} \qquad P_t^* = \frac{(1+\alpha_t)\, M_{t+1}}{Z_t} \tag{11}$$

We see from equation (10) that, as we indicated in section 2 above, if there are no transfers, i.e. if $M_{t+1} = M_t$, then the Walrasian quantity of labor is constant and equal to one.

4 Optimality

4.1 The criterion

In order to assess the optimality properties of various government policies, both in the Walrasian and the non Walrasian case, we need to have a criterion. Clearly with an infinity of generations the Pareto optimality criterion would not be demanding enough. We shall thus use the criterion proposed by Samuelson for the overlapping generations model (Samuelson, 1967, 1968, Abel 1987) and assume that in period t the government maximizes the function V_t, with:

$$V_t = E_t \sum_{s=t-1}^{\infty} \beta^{s-t} U_s \tag{12}$$

Note that the sum starts at $s = t-1$ because the household born in $t-1$ is still alive in t. The limit case $\beta = 1$ corresponds to maximizing the representative household's expected utility.

Rearranging a little the terms in the infinite sum (12), we find that, up to a constant, the criterion V_t can be rewritten under the more convenient form:

$$V_t = E_t \sum_{s=t}^{\infty} \beta^{s-t} \Delta_s \tag{13}$$

$$\Delta_t = \alpha_t Log C_t + \frac{Log C_t'}{\beta} - (1+\alpha_t)\, L_t \tag{14}$$

4.2 Optimal policy in the Walrasian case

Let us begin our investigation of optimal policies with the Walrasian case. In order to find the best policy, we simply insert the equilibrium values found in

(9) and (10) into the criterion (13)-(14). The term corresponding to period t is equal to:

$$\Delta_t = \alpha_t Log\left[\frac{\alpha_t Z_t}{1+\alpha_t}\right] + \frac{1}{\beta} Log\left[\frac{Z_t M_t}{(1+\alpha_t) M_{t+1}}\right] - \left(\alpha_t + \frac{M_t}{M_{t+1}}\right) \tag{15}$$

Maximizing this with respect to M_{t+1}, we immediately find the optimal policy under the Walrasian regime:

$$M_{t+1} = \beta M_t \tag{16}$$

Looking at this optimal policy we may note two things:

- The first is that the optimal policy (16) is identical to that found, following Friedman's (1969) famous "optimal quantity of money" article, by numerous authors[3] working with infinitely lived representative agents with a discount rate β.

- Secondly this optimal policy is a typical nonactivist one, since money increases given by (16) do not depend on any event, past or present.

We shall now see that the introduction of preset wages changes things quite drastically.

5 Preset wages

We shall now assume that firms and workers sign wage contracts at the beginning of period t, based on information available then (which does *not* include the values of α_t and Z_t) and that at this wage households will supply the quantity of labor demanded by firms. It will be assumed here, in order not to add any further distorsion, that the preset wage is equal to the expected value of the Walrasian wage, i.e. using formula (11):

$$W_t = E_{t-1} W_t^* = E_{t-1}\left[(1+\alpha_t) M_{t+1}\right] \tag{17}$$

5.1 Computing the equilibrium

We may note that all equilibrium equations (4) to (8) still hold, with the only exception of equation (6), expressing that the household is on his labor supply curve, which is replaced by equation (17). Combining these equations, we find that the preset wage equilibrium is characterized by the following relations:

[3] See Dornbusch and Frenkel (1973), Grandmont and Younès (1973), Brock (1975), and many others since

$$L_t = \frac{\alpha_t M_{t+1} + M_t}{W_t} \tag{18}$$

$$Y_t = Z_t L_t \tag{19}$$

$$P_t = \frac{W_t}{Z_t} \tag{20}$$

$$C_t = \frac{\alpha_t M_{t+1} Z_t}{W_t} \tag{21}$$

$$C'_t = \frac{M_t Z_t}{W_t} \tag{22}$$

5.2 The suboptimality of non activist policies

In order to show the suboptimality of nonactivist policies, we shall now study what will happen if the government follows policy (16), which was optimal under Walrasian market clearing. In view of (16) and (17), the preset wage W_t is equal to:

$$W_t = \beta\left(1 + \alpha_a\right) M_t \tag{23}$$

where $\alpha_a = E_{t-1}\alpha_t$ (the subscript a meaning average). Equations (18)-(22) yield the following values:

$$L_t = \frac{1 + \beta\alpha_t}{\beta\left(1 + \alpha_a\right)} \tag{24}$$

$$C_t = \frac{\alpha_t Z_t}{1 + \alpha_a} \qquad C'_t = \frac{Z_t}{\beta\left(1 + \alpha_a\right)} \tag{25}$$

It is easy to check that the allocations defined by (24)-(25) are not even a Pareto optimum. Looking now at the labor market, we see, combining (6), (16) and (23), that the supply of labor L_t^s is equal to:

$$L_t^s = \frac{1 + \beta\alpha_a}{\beta\left(1 + \alpha_a\right)} \tag{26}$$

Comparing (24) and (26), we see that the economy will display either unemployment (when $\alpha_t < \alpha_a$) or overemployment (when $\alpha_t > \alpha_a$), both creating inefficiencies.

We shall now show that an activist policy allows to do much better.

6 The optimality of activist policies

Finding an optimal policy consists in finding a strategy where: (i) τ_t, or M_t, are function only of variables in I_{t-1}; (ii) the resulting equilibrium values maximize the utility function V_t in (12)-(14) for this class of policies.

In order to find the optimal policy in a simple manner, we insert into the criterion (14) the "fixwage equilibrium" values of C_t, C_t', and L_t found above (equations 18 to 22). In period t the government will thus maximize the expected value of the following quantity:

$$\alpha_t Log\left[\frac{\alpha_t M_{t+1} Z_t}{W_t}\right] + \frac{1}{\beta} Log\left[\frac{M_t Z_t}{W_t}\right] - (1+\alpha_t)\left[\frac{\alpha_t M_{t+1}}{W_t} + \frac{M_t}{W_t}\right] \tag{27}$$

In this maximization M_t is inherited from the previous period, M_{t+1} can be chosen conditional on the value of all shocks, while W_t is predetermined according to equation (17). Maximizing the expected value of (27) subject to constraint (17) is a bit clumsy, but it turns out that constraint (17) is actually not binding at the optimum, and consequently that one obtains exactly the same solution maximizing the expected value of (27) with respect to M_{t+1} and W_t. We shall work out this maximization in two steps. Let us first maximize (27) in M_{t+1}. This yields:

$$M_{t+1} = \frac{W_t}{1+\alpha_t} \tag{28}$$

We may immediately note that, by combining (11) and (28), we obtain:

$$W_t^* = (1+\alpha_t)\, M_{t+1} = W_t \tag{29}$$

Under policy rule (28) the Walrasian wage in period t is *independent* of period t shocks, α_t and Z_t, and thus fully predetermined. As a result the contract wage W_t, which is equal to the expected value of W_t^*, is always at its market clearing value, and therefore under policy (28) the economy will always be at full employment!

Now inserting the value of M_{t+1} so obtained into the expression of the expected value of Δ_t, we obtain, up to a constant term:

$$\frac{1}{\beta} Log\left[\frac{M_t}{W_t}\right] - \frac{(1+\alpha_a)\, M_t}{W_t}$$

Maximization of this term in W_t yields:

$$W_t = \beta\,(1+\alpha_a)\, M_t \tag{30}$$

Combining (28) and (30), we finally obtain the formula for the optimal monetary policy:

$$\frac{M_{t+1}}{M_t} = \frac{\beta\,(1+\alpha_a)}{1+\alpha_t} \tag{31}$$

We see that rule (31) combines in a nutshell both some Friedmanian and Keynesian insights. Indeed we can note first that if there were no demand shocks, i.e. if α_t was constant, equation (31) would yield $M_{t+1} = \beta M_t$, the traditional "Friedmanian" rule (16), which we found to be optimal in the Walrasian case. However we see also that, as soon as demand shocks are present, optimal policy will call for the government to respond countercyclically to these shocks, since a negative demand shock today (low α_t) will trigger a monetary expansion tomorrow (high M_{t+1}) and conversely for a positive demand shock. Optimal policy is thus an activist one.

7 Conclusions

We constructed in this article a model of a monetary economy with preset wages where agents maximize under rational expectations, and showed that it was optimal for a "less informed" government to lead nevertheless an activist countercyclical policy. This policy actually allows the government to maintain the economy at all times on a full employment trajectory.

The fact that a government with no more information than the private sector can nevertheless succeed in maintaining the economy in perpetual full employment, eventhough wages are set in advance without knowledge of the shocks, may be a little surprising, so we shall give here a quick intuition for the cause of that remarkable result. Let us rewrite the household's consumption function (5):

$$P_t C_t = \frac{\alpha_t}{1+\alpha_t}(P_t Y_t + \tau_{t+1})$$

Now consider the situation where the wage has been already set and assume that a negative demand shock (a low α_t) hits the economy. If the government led no systematic policy this shock would clearly lead, in view of the above consumption function, to a *decrease* in the demand for goods and labor, and therefore to an underemployment of labor. But if the government is known to lead the countercyclical policy (31), then the private sector will know in advance that the future lump sum transfer τ_{t+1} will be high, and from the above formula this will tend in the contrary to *increase* the demand for goods and labor. When the policy is calibrated to be (31) these two conflicting effects exactly cancel out, and the economy remains at full employment.

An issue often raised against traditional activist policies is that they might impart an inflationary bias to the economy. So we should note that this is not at all the case with the optimal policy in this paper, since all nominal values will increase on average at the rate β, thus following a nonincreasing trend. The traditional opposition between employment stabilization and price stability therefore does not hold here.

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