On the Optimality of Activist Policies with a Less Informed Government

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A B S T R A C T

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" one, with a mixture of "Friedmanian" and "Keynesian" features: average money growth is that prescribed by Milton Friedman (1969). But around this rule the government should conduct an activist countercyclical policy of a Keynesian type.

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Keywords : Optimal policy, policy activism.

La supériorité de politiques activistes quand le gouvernement est moins informé

R E S U M E

Dans cet article, on remet en cause l'idée, dominante depuis l'article classique de Sargent-Wallace (1975), suivant laquelle une politique gouvernementale parfaitement anticipée ne peut être efficace que si le gouvernement est mieux informé que le secteur privé. On construit pour cela un modèle d'une économie monétaire soumise à des chocs d'offre et de demande, et où les salaires sont fixés au début de chaque période. Avec une politique "passive", les chocs se traduisent par des fluctuations inefficaces de l'emploi. Bien qu'on se place dans le cas traditionnel où le gouvernement est "moins informé" que le secteur privé, on montre que la politique optimale est une politique "activiste" contracyclique qui permet même, dans le cas considéré, d'atteindre une situation de "first-best" sans chômage.

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Mots clés : Politique optimale, politiques activistes.

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 countercyclical one. In so doing we shall bring together ideas coming from several lines of thought.

The first line of thought we shall borrow from is that which, following Friedman's (1969) famous "optimal quantity of money" article, investigated the issue of optimal monetary growth. This problem was studied very early in rigorous utility maximizing models, and notably several authors[1] have found the optimal monetary policy to be:

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

where β is the discount coefficient for future utilities. This wellknown rule is a typical example of a "nonactivist" policy, the rate of monetary expansion being in particular independent of the employment level, or other past or contemporary developments.

In a different line of thought the traditional "Keynesian" case for activist countercyclical policies rests on the existence of preset wages or prices: In that case negative demand shocks lead to inefficient underemployment of ressources, which the government should alleviate through countercyclical monetary or fiscal policies. A serious blow was brought to this wiew by the contributions of Lucas (1972, 1976) and Sargent and Wallace (1975, 1976), who showed that under rational expectations Keynesian policies lost most of their alleged effectiveness. It should be noted in particular that the arguments developed by Lucas (1976) and Sargent and Wallace (1975, 1976) are not restricted to market clearing models, but apply as well to models with preset wages or prices.

Subsequent contributions, starting with Fischer (1977) and Phelps and Taylor (1977), found that an activist countercyclical monetary policy can be

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

desirable if: (a) prices or wages are preset for some length of time, and (b) the government can vary the money supply on the basis of new information, while the private sector is not allowed to revise preset prices or wages on the basis of this same information. Thus the case for activist policies is based on the government being more informed and less constrained than the private sector. In these models, however, the scope for stabilization usually disappears if one allows the private sector to react to the same informations as the government (Fischer, 1977).

Subsequently the important idea that a less informed government can nevertheless have stabilizing powers was developed in two insightful papers by Turnovsky (1980) and Weiss (1980). This idea was further developed by King (1982, 1983), Weiss (1982), 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 of whether these important results will carry over in a model where demands, supplies and the objective 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 private sector is never in the situation (b) above.

In spite of these restrictions, we shall show that the optimal policy is nevertheless an activist one, the governement varying countercyclically the money supply around the "average" rule (1), a result which thus integrates nicely the "Friedmanian" and "Keynesian" insights. 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 an optimal 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 a 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 maximize the expected value of their utility U_t, with:

$$U_t = \alpha_t Log\, C_t + (1-\alpha_t) Log\, C'_{t+1} - \gamma L_t \tag{2}$$

where α_t, i.e. the propensity to consume in the first period, is a stochastic variable whose variations represent "demand shocks". Households save under the form of money, which is the sole asset in the economy.

The representative firm in period t has a production function:

$$Y_t = Z_t F(L_t) \tag{3}$$

where Y_t is output, L_t labor input, $F(L_t)$ a concave function 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.

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 household is now endowed with a quantity of money M_t:

$$M_t = M_{t-1} + \tau_t \tag{4}$$

Call I_t the information set 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.

[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.

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 known to the private sector 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.

3 Optimal States

3.1 The Criterion

In order to assess the optimality properties of various government policies, 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) and assume that in period t the government maximizes the function V_t, with:

$$V_t = E_t \sum_{s=t-1}^{\infty} \beta^{s-t} U_s \tag{5}$$

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. Although some readers might have a strong preference for the case $\beta = 1$, we want to keep throughout the more general case $\beta \leq 1$, as this will allow us to make a natural connection with the literature on optimal money growth, where the discount factor β plays a central role.

In fact criterion (5) was already used to derive optimal monetary policy in an overlapping generations model without stochastic shocks by Abel (1987), who found the optimal monetary policy to obey rule (1) above.

3.2 A Characterization of Optimal States

The resource constraint in each period is :

$$C_t + C'_t = Z_t F(L_t) \tag{6}$$

In order to find the optimal allocation, a social planner will maximize the expected value of discounted utilities:

$$E \sum \beta^t \left[\alpha_t Log\, C_t + (1 - \alpha_t) Log\, C'_{t+1} - \gamma L_t \right]$$

subject to the constraint (6) holding for any value of the shocks α_t and Z_t. Simple calculations show that the unique first-best allocation will be fully characterized by equation (6) and the following two conditions:

$$\gamma C_t = \alpha_t Z_t F'(L_t) \tag{7}$$

$$\frac{C_t}{C'_t} = \frac{\beta \alpha_t}{1 - \alpha_{t-1}} \tag{8}$$

The first condition (7), which is independent of the relative weight β between generations, will be called the intragenerational optimality condition. Condition (8), which depends on the relative weight β, will be called the intergenerational optimality condition.

4 Walrasian Equilibrium

Since the contract wage will be equal to the expected Walrasian wage, it will be useful for what follows to 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:

$$\frac{W_t}{P_t} = Z_t F'(L_t) \tag{9}$$

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:

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

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

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

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

$$P_t C_t = \alpha_t(W_t L_t + \Pi_t + \tau_{t+1}) = \alpha_t(P_t Y_t + \tau_{t+1}) \tag{10}$$

$$\alpha_t W_t = \gamma P_t C_t \tag{11}$$

The equilibrium condition on the goods market is:

$$C_t + C'_t = Y_t = Z_t F(L_t) \tag{12}$$

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

$$C'_t = \frac{M_t}{P_t} \tag{13}$$

Equations (9)-(13) will determine all equilibrium values, which depend on M_t and the future money transfer τ_{t+1}. All we will need in what follows is actually the value of the Walrasian wage W_t^*, which is easily computed as:

$$W_t^* = \frac{\gamma(M_t + \tau_{t+1})}{1 - \alpha_t} = \frac{\gamma M_{t+1}}{1 - \alpha_t} \tag{14}$$

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.:

$$W_t = E_{t-1} W_t^* = E(W_t^* \mid I_{t-1}) \tag{15}$$

5.1 Computing the Equilibrium

We may note that all equilibrium equations (9) to (13) still hold, with the only exception of equation (11), expressing that the household is on his labor supply curve, which is replaced by equation (15). Combining these equations, we find that the preset wage equilibrium is characterized by the following equations:

$$\frac{F(L_t)}{F'(L_t)} = \frac{\alpha_t M_{t+1} + (1-\alpha_t)M_t}{(1-\alpha_t)W_t} \tag{16}$$

$$Y_t = Z_t F(L_t) \tag{17}$$

$$P_t = \frac{W_t}{Z_t F'(L_t)} \tag{18}$$

$$C_t = \frac{\alpha_t M_{t+1}}{(1-\alpha_t)P_t} \tag{19}$$

$$C'_t = \frac{M_t}{P_t} \tag{20}$$

5.2 Example: a Non Activist Policy

In order to show the suboptimality of usual nonactivist policies like (1), let us take $\beta = 1$ so that policy (1) amounts to $M_{t+1} = M_t$, or $\tau_{t+1} = 0$. Let us further assume that α_t and Z_t are i.i.d.. Under these assumptions, the preset wage W_t will be the same in all periods and can be written, in view of (14) and (15):

$$W_t = \frac{\gamma M_t}{1-\alpha_a} \tag{21}$$

where α_a (the subscript a meaning average) is defined by:

$$\frac{1}{1-\alpha_a} = E_{t-1}\left(\frac{1}{1-\alpha_t}\right)$$

Equations (16)-(21) yield the following values:

$$\frac{F(L_t)}{F'(L_t)} = \frac{1-\alpha_a}{\gamma(1-\alpha_t)} \tag{22}$$

$$C_t = \alpha_t Z_t F(L_t) \tag{23}$$

$$C'_t = (1-\alpha_t) Z_t F(L_t) \tag{24}$$

Comparison of (22)-(24) with (7) and (8) shows that condition (7) is satisfied only when $\alpha_t = \alpha_a$, condition (8) only when $\alpha_t = \alpha_{t-1}$. The equilibrium with constant money supply will thus in general satisfy neither intragenerational nor intergenerational efficiency. Looking now at the labor market, we see, comparing (14) and (21), that the economy will display either unemployment (when $\alpha_t < \alpha_a$) or overemployment (when $\alpha_t > \alpha_a$).

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

6 The Optimality of Activist Policies

6.1 Optimal Policies

We see from equations (14)-(20) that all variables in period t can be deduced once the monetary policy is known. 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 (5) for this class of policies.

Although finding an explicit optimal policy in the most general setting can be a difficult task, we shall be able to demonstrate very simply the optimality of activist policies in our economy, since a particular policy will actually enable us to reach the first best, as described in section 3.

6.2 A First-best Activist Policy

Let us start with equations (19) and (20), and compute the ratio of young to old consumption in period t:

$$\frac{C_t}{C_t'} = \frac{\alpha_t M_{t+1}}{(1-\alpha_t)M_t}$$

Comparing with the "intergenerational efficiency" condition (8), we see that a necessary condition to reach a first-best optimum is:

$$\frac{M_{t+1}}{M_t} = \frac{\beta(1-\alpha_t)}{1-\alpha_{t-1}} \tag{25}$$

Equation (25) is at this stage only a necessary condition to reach the first best, since the "intragenerational efficiency" condition (7) is not automatically satisfied. Let us for the moment assume that the government follows (25). We can compute the Walrasian wage in period t by combining equations (14) and (25):

$$W_t^* = \frac{\gamma M_{t+1}}{1-\alpha_t} = \frac{\beta\gamma M_t}{1-\alpha_{t-1}} \tag{26}$$

We first note that under policy rule (25) 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^*, will be equal to the above nonstochastic value:

$$W_t = \frac{\beta\gamma M_t}{1-\alpha_{t-1}} \tag{27}$$

Since the wage is always at its market clearing value, we expect that the economy will always be at full employment under policy (25). This is indeed easy to check by combining equations (19), (25) and (27), which yields:

$$\alpha_t W_t = \gamma P_t C_t$$

where we recognize equation (11), expressing the condition for the household to be on his labor supply curve. We may also note in passing, combining (25) and (27), that wages evolve according to the fully predictable equation:

$$W_t = \beta W_{t-1} \tag{28}$$

Now let us combine (18), (19), (25) and (27). We find :

$$C_t = \frac{\alpha_t Z_t F'(L_t)}{\gamma}$$

where we recognize equation (7), the intragenerational efficiency condition.

So, to summarize, both efficiency conditions (7) and (8), which characterize the first-best situation, will be satisfied, and full employment maintained, if the government follows the unique "first-best" policy rule (25), i.e. if:

$$\frac{M_{t+1}}{M_t} = \frac{\beta(1-\alpha_t)}{1-\alpha_{t-1}}$$

We see that this rule combines in a nutshell both the Friedmanian and Keynesian insights given in the introduction. Indeed we can note first that if there were no demand shocks, i.e. if α_t was constant, equation (25) would yield $M_{t+1} = \beta M_t$, the "traditional" rule (1). 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.

6.3 Informational Feasibility

In our derivation of optimal policy, we carried out the computations as if the government knew the value of α_t at the beginning of period $t+1$, i.e. when it makes the transfer τ_{t+1}. The parameter α_t, however, is not public knowledge, being only in the minds of young households in t, and so we must check whether the government has enough information to infer it through the observation of macroeconomic aggregates available in t. To obtain the

desired relation, let us eliminate M_{t+1} and α_{t-1} between equations (16), (25) and (27). We obtain:

$$\alpha_t = \gamma \left[\frac{F(L_t)}{F'(L_t)} - \frac{M_t}{W_t} \right] = \psi \left(L_t, \frac{M_t}{W_t} \right) \quad \psi_L > 0 \tag{29}$$

Since L_t and M_t/W_t are observable, the policy can be actually implemented. Combining (25) and (29), we obtain the final form of government's optimal monetary policy:

$$\frac{M_{t+1}}{M_t} = \beta \frac{1 - \psi(L_t, M_t/W_t)}{1 - \psi(L_{t-1}, M_{t-1}/W_{t-1})} \tag{30}$$

Written under this form, the policy looks also countercyclical, since the government increases M_{t+1} when L_t is low[3]

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 the "first-best" 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 (10):

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

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 (25) or (30), then the private sector will know in advance that the future lump sum transfer τ_{t+1} will be

[3]Note that we implicitly define here pro and countercyclicality with respect to employment, not output.

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 (25) or (30) 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 of this paper. In fact we even found (equation 28) that wages follow a deterministic nonincreasing trend, so that the traditional opposition between employment stabilization and inflation does not hold here.

Finally the fact that the optimal policy allows to reach the first best full employment allocation in the model presented here is clearly not a feature that should be thought of as a general one. But what should be expected in general is that a well designed and understood activist policy can bring substantial improvements over a nonactivist one. Now that this possibility has been established in a rigorous model, a next step in the research agenda could be to identify various rigidities and coordination problems relevant in actual economies, and investigate the nature of potential corrective policies associated to them.

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