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THE MODELING OF THE ECONOMIC FLUCTUATIONS FROM THE POLITICAL BUSINESS CYCLE PERSPECTIVE

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Abstract: The whole history shows that the force of a government and its capacity to keep the electorate's confidence in a certain period of time depends on the success of its economic policy. These words of Harrod Wilson, prime minister of Great Britain are the essence of the political business cycle. The idea is that the government will try to manipulate the evolution of the business cycle so that the maximum efficiency is achieved exactly before the general elections. This way, the government has all the chances to be reelected. The purpose of this paper is to analyze the effects of such a behavior of the government.

1. THE MODEL

We suppose that the economy is characterized by a complementarity between the inflation rate and unemployment rate at a moment t. The Phillips curve in continuous time is:

$$\pi(t) = f(u(t)) + \lambda \pi^{e}(t) \quad (1)$$

π(t) – inflation rate
u(t) – unemployment rate
λ>0

with $f'(t) < 0$ and $\pi^{e}(t)$ - expected inflation rate. The expected inflation rate is anticipated with rational anticipations, that is:

$$\dot{\pi}^{e}(t) = \gamma(\pi(t) - \pi^{e}(t)), \quad \gamma > 0 \quad (2)$$

In this model we don't make supplementary hypothesis on the economy's structure. This is described with the help of the inflation rate and unemployment rate, which varies endogenously.

The problem is whether the political parties can exploit this exogenous complementarity. Let's suppose that the government is able to modify the economy's position on the Phillips curve, by using an adequate set of policies. If the re-election of the party is exclusively determined by its ability of manipulating the public, than it will have the interest to choose that policy that will assure the re-election. This means that it is useful that the governing party would have an idea about the electors' preferences, on different situations, on the Phillips curve.

Let's suppose that the preferences of an elector are described with the help of the utility function $U = U(z_1, ..., z_n)$, which has all the continuity and convexity properties. Let $z_1 = -\pi$ and $z_1 = -u$ be the inflation rate and the unemployment rate, z_i ($i \neq 1,2$) are the consumption goods. We suppose that the electors aren't conscious about the complemenarity between the inflation and unemployment, but they consider that the government party is responsible for the economy's situation. In the same time they have a certain standard regarding the evaluation of the government party. Let $\bar{\pi}(t)$ and $\hat{u}(t)$ be

these standards that we suppose to be constant in time. The individuals are satisfied with the party's results if the utility of the inflation and unemployment rate is superior to the standard one. The elector's voting function is:

$$V^i(t) = g_i\left(\pi(t),\, u(t)\right) = \begin{cases} 1 & dacă \quad \dfrac{U^i\left(\pi(t),u(t)\right)}{U^i\left(\hat{\pi}(t),\hat{u}(t)\right)} > 1 \\ 0 & dacă \quad \dfrac{U^i\left(\pi(t),u(t)\right)}{U^i\left(\hat{\pi}(t),\hat{u}(t)\right)} = 1 \\ -1 & dacă \quad \dfrac{U^i\left(\pi(t),u(t)\right)}{U^i\left(\hat{\pi}(t),\hat{u}(t)\right)} < 1 \end{cases} \tag{3}$$

This means that the elector votes for the government party if $V^i(t) = 1$. By aggregating the function at the whole economy level, we obtain:

$$V(t) = g = \sum_i V^i(t) \tag{4}$$

We can say that the government party will be re-elected if V(t)>0. The elections take place once at every four years. The individuals evaluate the government past performance by an average function that takes into account the results between two elections. If the electors have a decreasing memory of the past events, they will assign a greater importance to the more recent events. The voting function will be:

$$\hat{V}(\theta) = \int_0^{\theta} g\left(\pi(t),u(t)\right) e^{\mu t} dt \tag{5}$$

μ>0
θ – the elections date
μ – the memory delay rate

The government party is perfectly informed on the voting function. The maximisation problem is:

$$max\hat{V}(\theta) = \int_0^{\theta} g\left(\pi(t),u(t)\right) e^{\mu t} dt \tag{6}$$

under the following restrictions:

$$\pi(t) = f\left(u(t)\right) + \lambda \pi^e(t) \tag{7}$$

$$\hat{\pi}^e(t) = \gamma\left(\pi(t) - \pi^e(t)\right), \quad \gamma > 0 \tag{8}$$

Formally, the maximizing problem has a control variable, u(t). Nordhauss proposes algebraic forms for the functions that are used to obtain a solution. Let's suppose:

$$g(\pi, u) = -u^2 - \beta\pi, \quad \pi>0$$
$$f(u) = \alpha_0 - \alpha_1 u \tag{9}$$

The maximising problem is now:

$$\max V(\theta)=\int_0^{\theta}\left(-\beta\alpha_0 - u^2 + \beta\alpha_1 u - \beta\lambda\pi^e\right)e^{\mu t}dt \tag{10}$$

under the restriction

$$\max V(\theta)=\int_0^{\theta}\left(-\beta\alpha_0 - u^2 + \beta\alpha_1 u - \beta\lambda\pi^e\right)e^{\mu t}dt \tag{11}$$

The current Hamiltonian is:

$$H = \left(-\beta\alpha_0 - u^2 + \beta\alpha_1 u - \beta\lambda\pi^e\right) + \psi\gamma\left(\alpha_0 - \alpha_1 u - (1-\lambda)\pi^e\right) \tag{12}$$

with ψ state variable, the inflation rate "from the shadow"
The optimum conditions are:

$$\frac{\partial H}{\partial u} = 0$$
$$\dot{\psi} = -\mu\psi - \frac{\partial H}{\partial \pi^e} \tag{13}$$
$$\dot{\pi}_e = \frac{\partial H}{\partial \psi}$$

so

$$\frac{\partial H}{\partial u} = 0 = \beta\alpha_1 - 2u - \psi\gamma\alpha_1 \Rightarrow u = \frac{\alpha_1(\beta - \psi\gamma)}{2} \tag{14}$$

and

$$\dot{\psi} = \left(\gamma(1-\lambda) - \mu\right)\psi + \beta\lambda \tag{15}$$

Combining equation (14) and (15) we obtain:

$$\dot{u} = Au + B, \quad A = \gamma(1-\lambda) - \mu, \quad B = -\frac{1}{2\alpha_1\beta(\gamma - \mu)} \tag{16}$$

On the election day t = θ, the shadow unemployment rate becomes zero, because the individuals are supposed to ignore future events. From equation (14) results $u_\theta = \frac{\alpha_1 \beta}{2}$. Substituting μ_θ in (15) we obtain:

$$\dot{u}_\theta = -\gamma \lambda u_\theta < 0 \qquad (17)$$

As (17) is a linear differential equation defined for a single electoral period, u(t) moves monotonously. So $\dot{u}(t) < 0$ and $u(t) > 0$, $\forall t \in (0, \theta]$ implies the fact that A and B must satisfy the condition B < - Au.

2. Possible evolutions

As the optimal unemployment rate from the optimization program has a monotonous behavior, the parties optimal policy is defined in this way: as the unemployment rate cannot decrease infinitely, and it has to attain its minimum level exactly at the end of the 4 years of government, that is $u_\theta = \frac{\alpha_1 \beta}{2}$, the political party maximizes the number of votes if the unemployment rate is high at the beginning of the 4 years, an it becomes smaller and smaller.

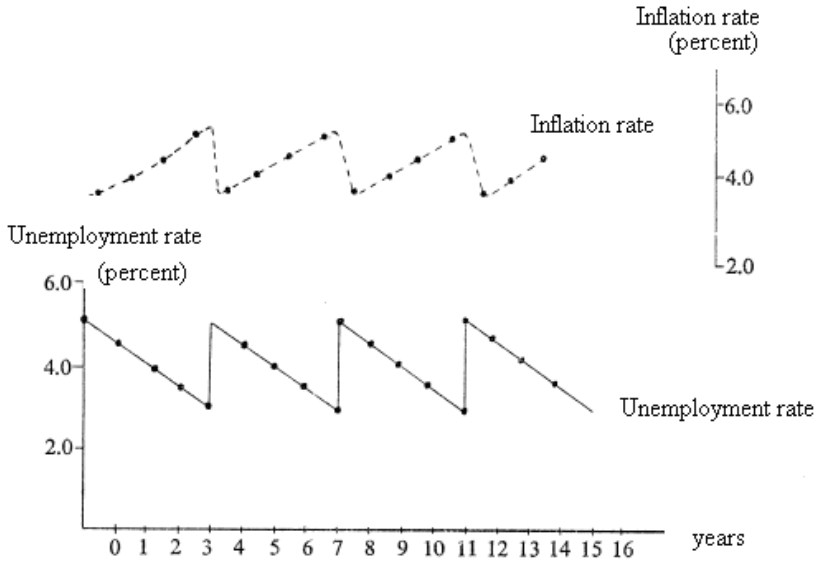

Fig. 1. The evolution of inflation and unemployment in the political business cycle
Source: Nordhaus, W., *The Political Business Cycle*, Review of Economic Studies, 42, 1975, p. 185

This scenery is shown in *figure 1*. While the unemployment rate has an optimal evolution that can be represented with the saw function, the inflation rate dynamics is a little smoothened, due to the inflation expectations. If we accept the hypothesis that the governments are truly able to manipulate the unemployment rate, than we can say that it can generate the cyclical moves of the economy.

CONCLUSIONS

There are two major objections against the political business cycle. First, the political business cycle has the hypothesis that the economy can be manipulated by the government. Moreover, the model postulates that the interventions have immediate economic effect. The rational expectations hypothesis puts under the question mark the government ability to manipulate the economy. Second, we can say that the endogenous dynamics of the economy has been neglected. The political business cycle makes another hypothesis, that there is Phillips curve that characterizes the economy, and, without the government intervention, the economy will find itself on this curve (on the condition that there are no other endogenous forces). Even though the economy has no complete employment, the economy is stationary. This point of view is not satisfying from the business cycle view.

On the other hand, the political business cycle can be used to explain external shocks. This theory starts from the hypothesis that the governments have the interest to manipulate the economy in order to be re-elected, and the government's behavior can provide the exogenous shocks necessary to explain the appearance of the fluctuations in some linear models.

Even though the political business cycle explains the appearance of some political induced shocks, the economy can be also affected by a variety of other exogenous shocks, at different moments in time.

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