

## POLITICALLY OPTIMAL CHOICE OF INFLATION POLICY

BYUNG HEE SOH\*

*The negative effect of welfare loss due to inflation on voting decisions of the electorate is examined. The incumbent politician's politically optimal inflation policy which minimizes the loss in votes attributable to inflation is formulated. The characteristics of the resulting political business cycles under different choices of inflation policy are analyzed. It is found that the political business cycles are less likely to occur in countries where the length of the electoral term is longer or the indexation of inflation is more extensive.*

### I. INTRODUCTION

The general economic conditions are found to affect the outcome of the elections of politicians.<sup>1)</sup> Suppose that a politician who is elected through a popular election also makes the decisions about implementing economic policies. If a politician-policy maker has a political goal of remaining in power by means of a popular election he must check whether a specific economic policy is popular or unpopular with the voting public.

The rate of inflation is found to be a particularly important variable influencing voting decisions in the literature (Fair, 1978; Frey and Schneider, 1978a; 1978b; Fisher and Huizinga, 1982; Hibbs, 1982a; 1982b)<sup>2)</sup>. Also found to be important are the growth of output and unemployment. Given the importance of inflation and unemployment in voting decisions, the policymaker's decision to accommodate inflation to keep unemployment rate down may depend on

---

\* Associate Professor of Economics, Pohang Institute of Science and Technology

<sup>1</sup> The literature on the influence of economic conditions upon the outcome of elections dates as far back as the 1930's (Tibbitts, 1931; Akerman, 1947). For a comprehensive survey of the literature, see Monroe (1984).

<sup>2</sup> Hibbs' (1982a) calculation from opinion polls shows that 1% increase of inflation rate adds about 11 percentage points to public concern about inflation. It is noted also in Fisher and Huizinger (1982) that the expected rate of inflation may have greater impact than the actual rate on public's opinion concerning the economic conditions. They also observe that the public regards inflation as a more serious problem than unemployment.

the "future electoral gains of accommodation weighed against the future electoral losses of resistance" as postulated by Gordon (1975, p. 835).

A typical voter makes his voting decision based on various economic as well as political issues concerning the candidates. The typical voter may examine each issue one by one and decide whether he prefers the incumbent or the opposition candidate on each issue. Each issue may have different importance or weights to each individual voter. The incumbent policymaker's inflation policy is, of course, only one among many political and economic issues. However, we may imagine a situation in which the incumbent and opposition candidates are very closely rated by the voters as far as all the other political and economic issues (except the issue of inflation) are concerned. In this case, the welfare loss or gain from inflation could make the difference in the outcome of an election. From the perspective of the incumbent policymaker, we may imagine another situation in which the incumbent policymaker is uncertain about how he is rated relative to his opponent in all the political and economic issues. Facing this uncertainty, the incumbent may wish to win voters in as many issues as possible and his inflation policy is one of them. In this case, he would try to choose the politically optimal inflation policy which would put him in a favorable light as far as the issue of inflation is concerned.

In order to isolate and analyze the influence of the welfare cost of inflation on the outcome of an election, we may need to make some simplifying assumptions. Voters are assumed to favor the incumbent if their welfare loss from inflation is negative (i.e., a welfare gain). They are assumed to favor the opponent if their welfare loss is positive, and to be indifferent between the two candidates as far as the issue of inflation is concerned if their welfare loss is zero. Voters' realized welfare loss from inflation is a function of the deviation between the actual and expected rate of inflation. The actual rate of inflation is the result of a specific inflation policy. The policymaker can influence voters' expectations regarding inflation by his announcement of a specific policy. Whether his policy announcement would have the full impact on voters' expectations would depend on the credibility of the policymaker. How well he had followed his announced policy rule would determine his credibility. Although the superiority of a set policy rule over a discretionary policy is advocated on the efficiency grounds (Simons, 1936; Friedman, 1948; Kydland and Prescott, 1977), the possibility of implementing a discretionary policy if there are some gains to be made for the policymaker by the deviation from the rule has been analyzed in some studies (Barro and Gordon, 1983; Backus and Driffill, 1985; Cukierman and Meltzer, 1986; Alesina, 1987).

In this paper, the implications of the policymaker's political choice of different inflation-policy options on the resulting patterns of political business cycles as postulated by Nordhaus (1975) are more fully explored in a setting of non-myopic voters. In Section II, voters' welfare loss from inflation is identified and

its functional form is derived. Voters' formulation of expectations regarding inflation and their non-myopic or hyperopic voting mechanism are defined in Section III. The policymaker's options for inflation policy are presented in Section IV. The implications of implementing a specific inflation policy for the resulting political business cycles are analyzed in Section V. In particular, the effects of the length of electoral terms and indexation are analyzed. The conclusion is presented in the final section.

## II. WELFARE LOSS FROM INFLATION

Even though inflation is usually regarded to be harmful, it may also bring about windfall gains for some. Let us examine three possible sources of changes in welfare due to inflation. The first source we examine is the real capital loss on real balances caused by inflation. The welfare cost of inflation according to Bailey (1956) is the total value of the convenience services lost due to the expected inflation. The height of the demand curve for real cash balances at any point in time measures the marginal convenience services of one marginal unit of real cash balances. The equilibrium holdings of real cash balances is achieved where the last dollar held provides marginal convenience services equal to the real rate of interest ( $r$ ) when there is no inflation. When inflation is expected at the rate of  $\pi^e$ , then, at the equilibrium, the marginal convenience services equal  $r + \pi^e$ . Moreover, the new equilibrium holding of real cash balances is reduced. In addition, there is a loss in consumer surplus because the positive nominal interest rate induces the holding of less than the optimal quantity of money by the public. The total welfare loss can be calculated as the area under the demand curve to the right of the expected holding of real cash balance at  $\pi^e + r$ :

$$(1) \quad 1/2(Q - m_1)(\pi^e + r),$$

where  $Q$  is the optimal quantity of real cash balances, and  $m_1$  is the amount of real cash balances held at the nominal interest rate of  $\pi^e + r$ .

The Lucas (1973) supply function implies that on the aggregate, unanticipated inflation has a short-run effect of increasing output and reducing unemployment. This increase is the second source of the change in the voters' welfare because they benefit indirectly from the increased output. The aggregate benefit in terms of the increased output can be expressed as:

$$(2) \quad \text{Benefit effect} = b(\pi - \pi^e),$$

where  $b$  is the benefit parameter for the welfare gain from such output-increase effect of an unanticipated inflation. Although the output increase due to the

unanticipated inflation may have some beneficial effects, the outdated market information due to the inflation causes voters to supply more than optimal amount of labor. It becomes more costly to gather market information if relative prices change due to differential lags in response or due to long-term contracts. Thus, inflation generates costs in terms of lost information and efficiency. This is the third source of the change in voters' welfare.

Individual voters may differ in their market activities and asset holdings, but their information costs depend primarily on the magnitude of expectational discrepancy between the actual and expected rates of inflation. Since a discrepancy between the expected rate and actual rate is costly, unexpected deflation as well as unexpected inflation would be costly. This suggests a quadratic form for the information cost:

$$(3) \text{ Information cost} = c(\pi - \pi^e)^2,$$

where  $c$  is voters' welfare loss parameter associated with the information cost.<sup>3)</sup>

For the purpose of the formulation of policies, it is necessary to define the exact length of the period in which above real gains or losses of the voters are calculated. For calculating the losses in (2) and (3), it is assumed that voters evaluate their gains or losses at the end of an economic period. For the positive effects of inflation on output to be possible, we assume (in addition to the Lucas' assumption that suppliers misinterpret general price movements for relative price changes) that all labor supply is bound by contracts which are not indexed and can be rewritten only at the end of the contract period. This is the institutional rigidity that makes the discrepancy between the expected and actual rates of inflation transform itself into real gains or losses even if voters could observe the actual rate of inflation to be different from what they had expected during the period.

Let us assume a very simple demand for real cash balance function of the following form:<sup>4)</sup>

$$(4) \ m = -(1/\alpha)R + Q, \quad \alpha > 0,$$

where  $m$  is real cash balances,  $R$  is nominal rate of interest,  $Q$  is the optimum quantity of real cash balances, and  $\alpha$  is the slope of the demand curve. Thus, in Figure 1,  $m_1 = -(1/\alpha)(\pi + r) + Q$ . Therefore, welfare cost of inflation be-

<sup>3</sup> The symmetry between the information cost of unanticipated inflation and unanticipated deflation is assumed for simplicity. Also for simplicity, the effects of unanticipated price change on net debt and net credit are not incorporated in the welfare loss function.

<sup>4</sup> The Cagan type demand function is not used so that we may avoid the insolvability of  $\pi$  from the utility loss minimization later in this paper.

comes:

$$(5) \quad 1/2(Q - m_1)(\pi^e + r) = [1/(2a)](\pi^e + r)^2.$$

The aggregate utility loss function of the voters in period  $t$  is then the collection of these three terms (2), (3), and (5) with appropriate utility loss parameters.

$$(6) \quad L_t = [a/(2a)](\pi_t^e + r_t)^2 - b(\pi_t - \pi_t^e) + c(\pi_t - \pi_t^e)^2, \quad a, b, c > 0,$$

where  $a$ ,  $b$  and  $c$  can be interpreted as the weights given by the voters to each source of the change in the utility loss.

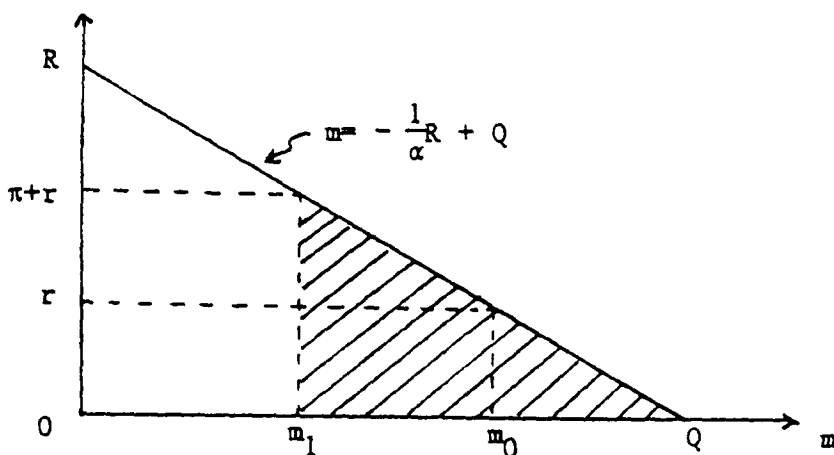


Figure 1. WELFARE COST OF INFLATION

### III. EXPECTATIONS FORMULATIONS AND VOTING DECISIONS

#### 3.1 Expectations Formulations

In formulating the expectations of inflation, rational and well informed voters have the following information. Voters know the policymaker's most important criterion for policy choice is minimizing vote loss. This is equivalent to minimizing voters' utility loss. They also know that the policymaker may deviate from his announced rule if that can enhance his chance for reelection.

Suppose that each individual voter has a utility loss function in exactly the same form as the aggregate function (6) with identical individual utility parameters. Among the components of his utility loss function, a voter is not likely to

exert any personal influence on the first two components. The first component, which is the actual level of inflation, is determined by the policymaker's policy action. The expectation of inflation in the second component, which is the short-run Phillips curve relationship, is determined by the average level of all voters' expectations of inflation. One voter's contribution to the economy-wide average level of expectations is negligible.

However, a voter can reduce his utility loss from the third component if he can predict actual rate of inflation accurately. Since he considers the first two components in his utility loss function as exogenously determined, minimizing his utility loss with respect to  $\pi^e$  would yield the first order condition of  $-2c(\pi - \pi^e) = 0$ . Thus, the utility loss minimizing individual voter who perceives the general *ex post* level of  $\pi$  to be exogenously determined and selects the best *ex ante*  $\pi^e$  for himself would try to set his expectations to be equal to  $\pi$ . Rational voters with all this information would be able to predict the exact  $\pi$ . In this case, the rational voters' expectations formulation would become perfect:

$$(7) \pi_t^e = \pi_t$$

Since the perfect foresight is unobtainable in the real world, the following expectations formulation is assumed for the voters' expectations regarding the policy rule and the deviation from the rule:

$$(8) \begin{cases} \pi_t^e = (\pi_t \text{ under policy rule}) & \text{if } \pi_{t-1} = \pi_{t-1}^e \text{ under policy rule and,} \\ \pi_t^e = (\pi_t \text{ under deviation from the rule}) & \text{if } \pi_{t-1} \neq \pi_{t-1}^e \text{ under policy rule.} \end{cases}$$

Let us call (8) as the policy rule expectations formulation. This expectations formulation amounts to a special case of the static expectations formulation. Under the static expectations formulations, voters believe whatever prevailed in the last period would last until this period. That is,

$$(9) \pi_t^e = \pi_{t-1}.$$

The policy rule expectations formulation will be utilized in analyzing the implications of the political choice of the inflation policies in section IV.

### 3.2 Length of Electoral Period

Let us assume that the electoral term is for the period of length  $T$ . At the end of  $T$ , there is an election and whoever is elected will hold the office until the next election at  $2T$  and so on. Suppose that economic decisions such as policy implementation for the policymaker, wage contracts, and determination of nominal interest on debts, all occur at the beginning of an economic period whose length  $\tau$  is institutionally given. Then there are  $T/\tau$  economic periods in a given electoral term in which voters' utility loss can be calculated.

### 3.3 Aggregate Voting Function

How the voters arrive at their voting decisions becomes a rather important factor for the political policymaker's policy decision making. In addition to the economic factors that affect voters' utility, there are political factors, for example, the personality of the candidate, ideology, political party, etc., which would also affect the voting decisions. The voting function considered in this paper should be interpreted as the voting function for the marginal votes affected by the welfare cost of inflation only as postulated in Section I. Then, the proportion of votes ( $V_t$ ) for the incumbent in period  $t$  can be thought of as a function of the voters' utility loss. That is,

$$(10) V_t = f(L_t), \quad f' < 0.$$

Even if the exact functional form of the voting function is not known, as long as  $f' < 0$  holds, the vote maximizing policymaker would try to minimize  $L_t$ . If there is no utility loss, i.e.,  $L=0$ , the marginal votes attributable to inflation are zero. That is, the outcome of an election is unaffected by changes in inflation. If the utility loss is negative, that is, if there is utility gain, then there will be an increase in the marginal votes. If the utility loss is positive, then there will be a decrease in the marginal votes. Thus, *ex post* vote maximization of the policymaker is equivalent to the *ex ante* utility loss minimization of voters.<sup>5)</sup>

### 3.4 Voting Mechanisms and Discount Factors

---

<sup>5</sup> Under a majority rule, it is not always necessary to maximize the votes so long as the incumbent can obtain more than 51% of the votes. In the present framework, there is no other policy objective but winning the reelection as in Nordhaus' (1975) model in which the discounted value of the aggregate votes is maximized. Besides, the policymaker may want to win with a greatest possible margin so that later on he can have more political leverage by claiming the big margin to be the mandate of the people.

Voting function (10) is based on voters' actual utility loss. If voters are myopic and have a short memory, their votes at the election time would depend only on  $L$  in that period alone.

**DEFINITION 1:** The myopic voting mechanism is defined as the following voting mechanism where  $T/\tau$  denotes the period in which the reelection takes place:  $V_{T/\tau} = f(L_{T/\tau})$ .

If voters have neither myopic nor short memory, they would look at the past as well as the future utility losses. The past performance is important as an indicator of the future performance. Future performance beyond the next electoral period is irrelevant because the policymaker can be voted out of office if the next period turns out to be unsatisfactory. Thus, a voting mechanism of this type would be based on the average of the discounted past performance as the indicator of the expected future performance of the incumbent policymaker if he is reelected as in (11) below:

$$(11) \quad V_{T/\tau} = f\left[\frac{1}{T/\tau} \cdot \sum_{t=1}^{T/\tau} \delta_t L_t\right],$$

where  $\delta_t$  is a discount factor.

Since the  $L$  term is a proxy for the future, the discount rate is in an increasing order from period  $t = 1$  to period  $t = T/\tau$ . The discounted future  $L$  during the next electoral term would have the following form.

$$(12) \quad \delta_t L_t = \frac{1}{(1+r)^t} \left\{ \frac{a}{2\alpha} (\pi+r)^2 - b(\pi-\pi^e) + c(\pi-\pi^e)^2 \right\}$$

where the suppressed time subscript for  $\pi$ ,  $\pi^e$  and  $r$  is  $t$ .

**DEFINITION 2:** The voting mechanism (11) with  $L$  discounted according to (12) is defined as the hyperopic voting mechanism.

**REMARK 1:** The hyperopic voting mechanism is based on a weighted cumulative evaluation of the past performance of the incumbent candidate.

**REMARK 2:** The expected utility loss in the last period of the next electoral term is simply  $L_{T/\tau}$  in the current electoral term discounted by  $1/(1+r)^{T/\tau}$ . This loss in the last period of the next electoral term is most heavily discounted according to (12), which shows that in the case of the hyperopic voters in contrast to the myopic voters, a temporary boom immediately preceding an elec-

tion would be far less favorable for the reelection of the incumbent.

#### IV. CHOICE OF INFLATION POLICY

The variables in  $L_t$  function which the policymaker can influence are  $\pi_t$  and  $\pi_t^e$ . The former, he can affect through monetary policy. He can influence the latter by his announcement of the future policies as long as his announcement is credible. The policymaker has three options. He may use discretionary policy to minimize voters' welfare loss. He may abide by a fixed policy rule. He may choose to deviate from an announced policy rule.

##### 4.1 Discretionary Policy

In fact  $\pi^e$  is not a policy variable but a variable determined by the voters. Thus, in the absence of any announcement of future policies and the record of past performance (i.e., a newly elected policymaker), the policymaker takes voters' current and future expectations as given and minimizes his objective function which is  $L_t$  of the voters. From the first order condition of this minimization, optimal  $\pi$  is obtained as:

$$(13) \quad \pi = \frac{ab - ar + 2ac\pi^e}{a + 2ac}$$

Equation (13) is the inflation supply function of the policymaker. The subscript  $t$  is dropped for convenience.

Voters with rational expectations would solve for the above minimization of the policymaker so that their expected rate would equal the actual rate. Substituting  $\pi^e = \pi$  into (13) and solving, the following values for  $\pi$  and  $\pi^e$  are obtained:

$$(14) \quad \pi^e = \pi = ab/a - r$$

Since  $\pi^e = \pi$ , there would be no expectational discrepancy, and the utility loss would be:<sup>6)</sup>

$$(15) \quad L = ab^2/2a$$

---

<sup>6</sup> Once voters' expectations of inflation are known, the policymaker would minimize  $L$  with respect  $\pi$  to substituting  $\pi^e$  with the value obtained in (14). The optimal rate of inflation obtained is, however, the same, and so  $L$  should be also the same as in (15). Thus, policy (14) is indeed the best the policymaker can do.

## 4.2 Policy Rule

By announcing a specific policy rule in advance, the policymaker is committing himself to the policy rule, thereby effectively determining  $\pi^e$  to be equal to  $\pi$  when his credibility is not in doubt. This means that the minimization problem is now reduced to the minimization of only the first term in  $L$ . The optimal policy rule is obtained as:<sup>7)</sup>

$$(16) \pi = -r.$$

The utility loss associated with the policy rule is:<sup>8)</sup>

$$(17) L = 0.$$

## 4.3 Deviation from the Rule

Suppose the policymaker has announced the policy rule of disinflation at the rate of real interest. Then the policymaker can rely on the fact that  $\pi^e = -r$ . Suppose that the policymaker wants to minimize  $L$  by making his actual policy different from his announced rule of  $-r$ . The optimal inflation rate is obtained by substituting  $\pi^e$  by  $-r$  in his supply of inflation function (13):

$$(18) \pi = \frac{ab}{a+2ac} - r$$

**REMARK 3:** Inflation policy of deviation from the rule is more inflationary than that under the fixed rule, but less inflationary than that under discretionary policy.

The loss associated with the policy (18) is:

$$(19) L = -\frac{ab^2}{2(a+2ac)}$$

The policymaker would choose the policy option which would yield the minimum  $L$  depending on voters' expectations formulation and voting mechanism.

<sup>7</sup>  $L$  minimization under policy rule entails deflation at the rate of real interest, which is consistent with Milton Friedman's optimal quantity of money.

<sup>8</sup> If the policy rule of zero inflation is used, there still remains the deadweight loss due to the fact that the nominal interest rate is greater than zero. Specifically, the deadweight loss is  $L = ar^2/2a$ .

## V. IMPLICATIONS FOR THE POLITICAL BUSINESS CYCLE

### 5.1 Under Policy Rule Expectations Formulation

The policy rule expectations formulation (8) entails that only one period will be needed to restore credibility after the policymaker has deviated from the announced policy.<sup>9)</sup>

**DEFINITION 3:** Within the framework of the present model, the business cycle with the following characteristics of economic fluctuations is defined to be the political business cycle.

- (i) In the period in which the reelection of the incumbent occurs or in the periods preceding it, the output increases and unemployment drops.
- (ii) The above boom is only temporary in the sense that it is achieved through a surprise inflation, and its repercussion in the form of a temporary recession occurs in the periods immediately following the temporary boom.

**PROPOSITION 1:** If voters have the policy rule expectations formulation and the hyperopic voting mechanism, the policymaker will be compelled to generate the political business cycle once the policy rule is violated when there are two or more economic periods in an electoral term.

#### PROOF

We will first prove for the case  $T=2\tau$ , and then generalize for  $T > 2\tau$ . If the deviation policy is used in the second half of the first electoral term, the average loss expected at the end of the first electoral term is:

$$\delta_{11}L_{11} + \delta_{12}L_{12} = -\frac{ab^2}{4(1+r)^2(a+2ac)} < 0,$$

since  $\alpha, a, c > 0$  and  $L_{11} = 0$ . The first subscript denotes the electoral term and the second subscript denotes the economic period. For the second electoral term, the average loss expected at the end of the second electoral term with no deviation policy during the second electoral term is:

---

<sup>9</sup> Before we go on further, let us examine why it would be necessary for the policymaker to deviate from the rule when keeping the rule would yield  $L=0$ . As was mentioned briefly when voting function (10) was explained, if the policymaker wants to win with a great margin, he would want to minimize  $L$  such that  $L < 0$ . One other intuitive reason would be that if the noneconomic factors such as the ideology, party loyalty, personality, etc. are not flexible enough to make favorable changes for the incumbent, then he may wish to bring about as much favorable effects as possible from his economic performance.

$$\delta_{21}L_{21} + \delta_{22}L_{22} = \delta_{21}L_{21} \quad (1A)$$

The average loss expected at the end of the second electoral term with a deviation policy again in the second half of the second electoral term is:

$$\delta_{21}L_{21} + \delta_{22}L_{22} = \delta_{21}L_{21} - \frac{ab^2}{4(1+r)^2(a+2ac)} \quad (1B)$$

Since a positive term is subtracted from  $\delta_{21}L_{21}$ , the whole term will be less than the total loss without the deviation (i.e.,  $(1B) < (1A)$ ). Hence, the total loss minimizing policymaker would deviate from the rule in his second elected term. The policy decision making process in the ensuing terms if the policymaker is reelected, will be exactly the same.

If  $T > 2\tau$ , the same reasoning applies. The result would be that the policy rule would be followed during the remaining economic periods except the last period so that the sum of the losses during the ensuing electoral terms can be minimized. Hence, the policymaker would be compelled to generate the political business cycle once he had started it. Q.E.D.

**PROPOSITION 2:** The policymaker cannot be reelected for the third term even if he generates a political business cycle in his second term once he has generated a political business cycle in his first term if voters have the policy rule expectations formulation and the hyperopic voting mechanism.<sup>10)</sup>

#### PROOF

The policymaker can be reelected if the average loss expected at the end of the second electoral term is negative. If the policymaker deviates from the policy rule in the last half of his first term and goes back to the policy rule in the first half of his second term,  $\pi = -r$  and  $\pi^e = \{ab/(a+2ac)\} - r$  for the calculation of  $L_{21}$ . Hence,

$$L_{21} = \frac{ab^2(a+3ac)}{(a+2ac)^2}$$

If he deviates from the policy rule again in the last half of his second term,

$$\delta_{21}L_{21} + \delta_{22}L_{22} = \frac{ab^2[2r(a+3ac) + a + 4ac]}{4(1+r)^2(a+2ac)^2} > 0$$

<sup>10</sup> Fellner(1976) stresses that a period of sustained high inflation and high unemployment could result if the policymaker lost his credibility thereby perpetuating higher price expectations of the public. Backus and Driffill(1985) suggest that the incentive to preserve reputation in the face of re-election would actually suppress pre-election inflationary boom.

Since the whole term is positive, the incumbent policymaker cannot be re-elected for the third term. For  $T > 2\tau$ , the same argument applies. Q.E.D.

**PROPOSITION 3:** If voters have the policy rule expectations formulation and the hyperopic voting mechanism, as the electoral term becomes longer, or as the economic period becomes shorter, the political business cycle becomes less likely to be generated.

**PROOF**

If  $T$  with fixed  $\tau$ ,  $T/\tau \rightarrow \infty$  as  $T \rightarrow \infty$ . If  $\tau \rightarrow 0$  with fixed  $T$ ,  $T/\tau \rightarrow \infty$ . The expected present value of the utility losses generated by a political business cycle in the first electoral term is:

$$\begin{aligned} & \delta_{11}L_{11} + \delta_{12}L_{12} + \dots + \delta_{1(T/\tau-1)}L_{1(T/\tau-1)} + \delta_{1(T/\tau)}L_{1(T/\tau)} \\ &= 0 + 0 + \dots + \frac{1}{(T/\tau)(1+r)^{T/\tau}}[\dots] \\ &\Rightarrow 0 \text{ (since } 1/(T/\tau)(1+r)^{T/\tau} \rightarrow 0 \text{ as } T/\tau \rightarrow \infty) \end{aligned} \quad (3A)$$

The comparable expected present value in the second electoral term is:

$$\begin{aligned} & \delta_{21}L_{21} + \delta_{22}L_{22} + \dots + \delta_{2(T/\tau)}L_{2(T/\tau)} \\ &= \delta_{21}L_{21} + 0 + \dots + 1/(T/\tau)(1+r)^{T/\tau}[\dots] \\ &= \delta_{21}L_{21} = \frac{ab^2(a+3ac)}{T/\tau(1+r)(a+2ac)^2} \Rightarrow 0 \end{aligned} \quad (3B)$$

Due to the presence of  $(1+r)$ , the positive loss in the second term (3B) approaches zero less rapidly than the negative loss in the first term (3A). Since in any two consecutive electoral terms the above results hold, as  $T/\tau \rightarrow \infty$ , deviation from the rule becomes increasingly costly. Q.E.D.

**COROLLARY 1:** If the voters' decision is based on a cumulative evaluation of the incumbent policymaker, the longer the period for the cumulative evaluation, the more incentive the policymaker has for maintaining the policy rule (as a result of Propositions 2 and 3).

**COROLLARY 2:** There will be no incentives for the poicymaker to generate the political business cycle under cumulative evaluation by the voters (i.e., the hyperopic voting mechanism) and the complete indexation.

**PROOF**

Complete indexation is equivalent to renewing contracts at all times with instantaneous price adjustments. Since the length of the economic period  $\tau$  represents the contract period, this amounts to the extreme case in which the

length of the economic period tends to zero; i.e.,  $\tau \rightarrow 0$ . This implies that  $T/\tau \rightarrow \infty$ . Therefore, the proof is identical to the proof for Proposition 3.

## 5.2 Under Static Expectations Formulation

The static expectations formulation (9) implies that voters expect the present rate of inflation to prevail in the next period. When the policymaker announces a certain policy rule, voters would trust it unless they have been deceived by that particular policymaker before. However, once the policymaker deceives voters by deviating from the announced rule, the voters would not trust any subsequent announcement of rules. Thus, the only way the policymaker can make the voters lower their expectations is actually to implement zero inflation policy, while the voters are still expecting the positive inflation rate, and suffer a great vote loss through the increased utility loss. Facing this kind of expectations formulation, two alternative policy actions are available for the policymaker to restore his credibility. One option is simply to suffer a one-time loss by implementing the policy rule whose result is equivalent to that of the policy rule expectations formulation. The other option is to implement a new optimal policy contingent upon the voters' expectations.

**DEFINITION 4:** The contingent policy under the static expectations formulation at time  $t$  is defined to be the inflation policy obtained by minimizing the utility loss at  $t$  with respect to  $\pi_t$  taking  $\pi_t^e = \pi_{t-1}$  as given.

For example, the contingent policy for the immediate post deviation period is obtained by minimizing  $L$  with respect to  $\pi$  given  $\pi^e = ab/(a + 2ac) - r$  or alternatively by substituting the value of  $\pi^e$  into the supply function of inflation (13). The optimal contingent policy in the post deviation period is:

$$(20) \quad \pi = \frac{ab(a + 4ac)}{(a + 2ac)^2} - r$$

**REMARK 4:** Contingent policy (20) is more inflationary than deviation policy (18) by  $2a^2bc/(a + 2ac)^2$ .

**PROPOSITION 4:** The use of contingent policies will generate a pattern of inflation policy that will converge to the discretionary policy equilibrium as long as the absolute value of the slope of the supply function of inflation is less than 1.

### PROOF

The use of the contingent policy implies that the voters have the static expectations formulation and the hyperopic voting mechanism if  $T \geq 2\tau$ , or the myopic voting mechanism if  $T = \tau$ . For  $T = \tau$ , if the policymaker did not use

the contingent policy in his second term, then he would definitely be voted out of office by the end of his second term. Thus, he has nothing to lose by implementing the contingent policy in his second term regardless of the size of the resulting loss. The contingent policy is obtained by substituting the value of  $\pi^e$  into the supply function of inflation (13) which is drawn in Figure 2. The first deviation policy where  $\pi^e = -r$  is indicated by 1. After the first policy, the contingent policy will be at 2.  $\pi^e$  at 2 equals  $\pi$  at 1.  $\pi^e$  at the third policy 3 equals  $\pi$  at 2 and so on. This convergence of  $\pi$  to  $\pi^e$  continues until  $\pi = \pi^e$ ; that is, until the supply function intersects with  $\pi = \pi^e$  line. This point of intersection is the discretionary policy equilibrium. Q.E.D.

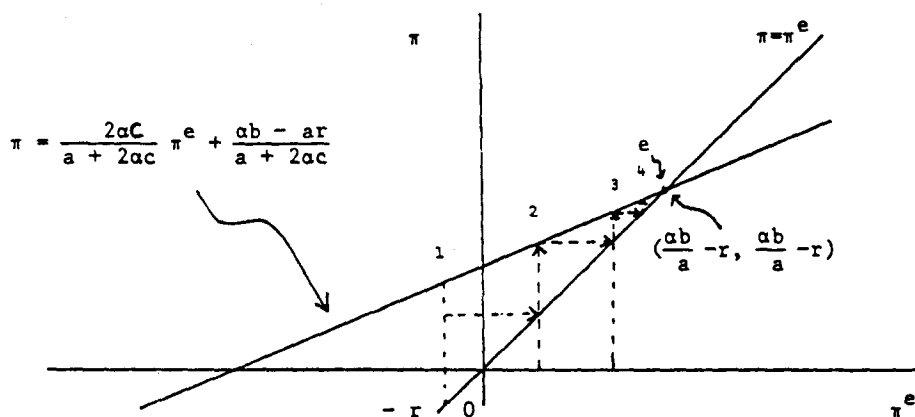


Figure 2. A PATTERN OF LOSS MINIMIZING CONTINGENT POLICIES

**REMARK 5:** Depending on the magnitude of the slope of the supply function of inflation, the path of inflation can be nonoscillatorily convergent or explosive.

**COROLLARY 3:** The static expectations formulation is equivalent to the perfect foresight in the equilibrium.

**PROOF**

According to Proposition 4, given the static expectations formulation, the discretionary policy equilibrium is reached while the policymaker is trying to implement the policy which will minimize the loss at each instant in time. At the discretionary policy equilibrium,  $\pi_t^e = \pi_t = \pi_{t-1} = \pi_{t-2} = \dots$  and so on. Hence, the expectation is always correct. Therefore, the static expectations formulation is the perfect foresight in the equilibrium. Q.E.D.

## VI. DISCUSSIONS OF THE PROPOSITIONS AND CONCLUDING REMARKS

The usual and necessary assumptions for the generation of the political business cycle in the literature are that: (i) the politician has the ability to control economic policies; (ii) there are lagged adjustments of inflation expectations; (iii) the voters are myopic as well as have short-memory. In the present study, assumption (iii) is found to be not always necessary in generating a political business cycle. (See Proposition 1.)

In the light of Proposition 2, by inducing a political business cycle during the first electoral term, the policymaker could jeopardize his chances for reelection to the third term. The question is whether the policymaker would want to induce the political business cycle knowing that by doing so, he would have to be out of office at the end of his second term. We can think of a situation in which a less drastic policy (i.e., a less than a full deviation policy) could secure him his second term, improve his chance for the third term, and generate a political business cycle with less amplitude. If such a policy is available, a policymaker who wants to reduce the undesirable effects of the cycle on his third term reelectability will use less drastic policy measures. On the other hand, if the reelection for the third term is constitutionally prohibited as in the case of the Presidency of the U.S.A., the policymaker has nothing to lose by implementing drastic policy measures which will bring about a great temporary boom followed by a rather severe recession in his second term as long as the pre-election boom helps him to get reelected.

In general, in a country where there is no constitutional limit on the number of the reelectable terms, the political business cycle would be less pronounced. Most of the European countries which have the parliamentary democracy, have no constitutional limit on the electability of the prime minister. If the party in power could not call the reelection on its discretion, one should expect to see less pronounced political business cycle in those countries. However, the fact that elections can be called complicates the observation because the elections can be timed to coincide with favorable economic conditions instead of manipulating the economy to achieve a boom near an election date.

Proposition 3 and Corollary 1 imply that the political business cycle should be harder to observe in a country where the electoral term of the head of the state (presumably also the policymaker) is longer compared to a country where it is shorter (e.g., France vs. U.S.A.). In particular, in a country where the tenure of the office is virtually for the lifetime of the policymaker, the political business cycle should not be observable. Corollary 2 states that if everything is indexed and voting is based on a cumulative evaluation of the incumbent candidate, there will be no political business cycle. Thus, the country with less indexation will exhibit more pronounced political business cycle compared to a

country with more indexation and with a similar political system.<sup>11)</sup>

Although the derived results in the present study may be interesting, one must always keep the usual limitation of a theoretical model in mind. In the present case, much of the derived results and propositions are dependent upon the particular specification of the utility loss function, the expectations formulation, and the voting mechanism. Yet, what it represents is simply the fact that inflation is usually viewed as having some undesirable effects as well as some beneficial effects on an individual voters' utility. Starting from such a simple proposition of the relationship between inflation and voters' utility, and the assumed dependence of their voting decision on their utility from the economic conditions, we have shown the politically optimal policy choice of the reelection constrained policymaker and their implications for the resulting political business cycles. The present study has also suggested some reasons why we may fail to observe the same pattern of the political business cycles when we cross the national boundaries.

---

<sup>11</sup> Soh (1986) has found some empirical evidence in support of this point.

## REFERENCES

- AKERMAN, J.(1947) "Political Economic Cycles," *Kyklos* 1, 107-117.
- ALESINA, A.(1987) "Macroeconomic Policy in a Two-Party System as a Repeated Game," *Quarterly Journal of Economics*, August, 651-678.
- BAILEY, M.J.(1956) "The Welfare Cost of Inflationary Finance," *Journal of Political Economy* 64, April, 93-110.
- BARRO, R.J., and GORDON, D.B.(1983) "Rules, Discretion, and Reputation in a Model of Monetary Policy," *Journal of Monetary Economics*, July, 101-121.
- BACKUS, D., and DRIFILL, J.(1985) "Rational Expectations and Policy Credibility Following a Change in Regime," *Review of Economic Studies* 52(2), April, 211-221.
- CUCKIERMAN, A., and MELTZER, A.H.(1986) "A Positive Theory of Discretionary Policy, the Cost of Democratic Government and the Benefits of A Constitution," *Economic Inquiry* July, 367-388.
- FAIR, R.C.(1978) "The Effects of Economic Events on Votes for President," *Review of Economics and Statistics* 60, May, 159-173.
- FELLNEAR, W.J.(1976) *Towards a Reconstruction of Macroeconomics: Problems of Theory and Policy* (Washington, D.C.: American Enterprise Institute)
- FISCHER, S., and HUIZINGA, J.(1982) "Inflation, Unemployment, and Public Opinion Polls," *Journal of Money, Credit and Banking* 14(1), Feb., 1-19.
- FREY, B.S., and SCHNEIDER, F.(1978a) "An Empirical study of Politico-Economic Interaction in the United States," *Review of Economics and Statistics* 60, May, 174-183.
- \_\_\_\_\_, and \_\_\_\_\_.(1978b) "A Politico-Economic Model of the United Kingdom," *Economic Journal* 88, 243-253.
- FRIEDMAN, M.(1948) "A Monetary and Fiscal Framework for Economic Stability," *American Economic Review* 38, 245-264.
- GORDON, R.J.(1975) "The Demand for and Supply of Inflation," *Journal of Law and Economics*, December, 807-836.
- HIBBS, D.A., Jr.(1982a) "Public Concern about Inflation and Unemployment in the United States: Trends, Correlates, and Political Implications," in R.E. Hall (ed.) *Inflation: Causes and Effects* (Chicago: University of Chicago Press) 211-231.
- \_\_\_\_\_.(1982b) "On the Demand for Economic Outcomes: Macroeconomic Performance and Mass Political Support in the United States, Great Britain and Germany," *Journal of Politics* 44, May, 426-462.
- KYDLAND, F., and PRESCOTT, E.(1977) "Rules Rather Than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy* 85, June, 473-493.
- LUCAS, R.C.(1973) "Some International Evidence on Output-Inflation Tradeoffs," *American Economic Review* 63, June 326-334.
- MONROE, K.(1984) *Presidential Popularity and the Economy* (New York: Praeger)
- NORDHAUS, W.(1975) "The Political Business Cycle," *Review of Economic Studies*, April, 169-190.

- SIMONS, H.(1936) "Rules vs. Authorities in Monetary Policy," *Journal of Political Economy* 44, 1-30.
- SOH, B.H.(1986) "Political Business Cycles in Industrialized Democratic Countries," *Kyklos* 39, 31-46.
- TIBBITTS, C.(1931) "Majority Votes and the Business Cycle," *American Journal of Sociology* 36, 596-606.
- TUFTE, E.(1978) *Political Control of the Economy* (Princeton: Princeton University Press)