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THE POLITICAL BUSINESS CYCLE

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THE POLITICAL BUSINESS CYCLE*

by

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There are many ways in which today's political choices affect future well-being. Future capital stocks, structures and machinery and roads, depend on the extent to which present generations invest instead of consume. Stocks of natural resources depend on past conservation efforts. The level of human skills depends on past education efforts. There are perhaps more subtle ways in which we bequeath our tastes, consumption patterns, and folkways to the future and determine future welfare. Recently, economists have concluded that we also pass on the inflationary (or deflationary) consequences of current policies.

All such aspects of our economic life, and many more, are influenced by government policies. All involve choosing between present welfare and future welfare. In short they are public investment decisions. Although the normative aspects of public investment criteria have been extensively studied, there is very little theory predicing government investment behavior when governments are constrained by political realities.

The present work investigates a simple model of public intertemporal choice where decisions are made within a political framework. The particular

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*This research was supported by the National Science Foundation and the Ford Foundation. I am grateful for the helpful comments of my colleague, Gerald Kramer.

problem analyzed is the choice between inflation and unemployment because this conflict has been very prominent in recent decisions and controversies. The conventional macroeconomic wisdom is that there is a tradeoff between the rate of inflation on the one hand and the level of employment and output obtainable by an economy on the other. (This is the famous "Phillips curve.") Some recent investigations of voter behavior indicate that voters are sensitive to both these variables in their electoral choice. We investigate the policies which would be chosen in a stylized democratic system. The model can also be directly applied to other problems of choice, such as public investment in capital goods or balance of payments policies.

Section A introduces the macroeconomic framework within which economic policy operates. Section B discusses the structure of individual preferences and the method of aggregating individual preferences into aggregate preferences and aggregate voting behavior. Section C analyzes the optimal economic policy in a non-democratic framework. Sections D and E then analyze the way the system functions in a democratic system, while Section F looks at a more general model of the voting process.

The last two sections examine some empirical evidence for the theoretical propositions and consider some remedies for the problems.

A. THE MACROECONOMIC FRAMEWORK

We are concerned with political choice between economic objectives over time. For concreteness, we examine the dynamic relation between inflation and unemployment, but the analysis holds equally well for many kinds of economic systems with time dependence.

It is generally agreed by economists that there is a tradeoff between the level of utilization and employment in the economy and the rate of inflation.[1] The reason for this phenomenon is that in both competitive labor markets and in unionized sectors a low unemployment rate means higher demand relative to the labor force and higher cost of strikes. This leads employers to settle for a higher than usual increase in money wage rates.[2]

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[1] The classical article is W.A. Phillips, "The Relation between Unemployment and the Rate of change of money Wage rates in the United Kingdom 1861-1957," Economica (New Series), Vol. 25, No. 100 (November 1958), p. 1. An excellent study of the relationship for the U.S. is in George Perry, Unemployment Money Wage Rates, and Inflation, M.I.T. Press, 1966.

[2] We are oversimplifying slightly. The usual formulation is that wage inflation is a function of unemployment and price inflation, and that prices are a markup over wages:

(i) $\pi_w = f_0(u) + \lambda v$

(ii) $\pi = \pi_w - a$

(iii) $\frac{dv}{dt} = \gamma[\pi - v]$

where π_w = rate of change of wages $\left(\frac{dw}{dt}\frac{1}{w}\right)$

u = unemployment rate, $f_0'(u) < 0$

v = expected rate of inflation

π = rate of change of prices $\left(\frac{dp}{dt}\frac{1}{p}\right)$

a = rate of productivity growth

Solving we get:

(iv) $\pi = f(u) + \lambda v$

(v) $\frac{dv}{dt} = \gamma(\pi - v)$

where $f(u) = f_0(u) - a$. There is no loss of generality in considering the simpler system (iv) and (v).

A second proposition which is widely accepted is that there is more of a tradeoff in the short-run (a quarter or a year) than in the long-run; a given change in unemployment will cost us less inflation in the short-run than in the long-run. There are two basic reasons for the difference: first, the usual presumption is that unemployment affects money wages and money wages then affect prices. To the extent that there are lags in the relation between unemployment and inflation, the short-run effect will be less than the long-run effect.[1] Second, there is a feedback from prices to wages. Higher inflation leads agents to <u>expect</u> higher inflation in the future. This higher expected rate of inflation leads unions and workers to escalate their wage demands by some fraction (that is, workers consider real wages rather than simply money wages). This also leads to a long-run

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[1] Thus putting lags in our system in footnote 2 on previous page, we have

(i) $\pi_w(t) = \Sigma b_i f[u(t-i)] + \lambda v(t) \qquad b_i \geq 0$

(ii) $\pi(t) = \Sigma c_i \pi_w(t-i) - a \qquad c_i \geq 0$

(iii) $v(t) = \gamma\pi(t-1) + (1-\gamma)v(t-1)$

Solving (i) and (ii) we have

(iv) $\pi(t) = \sum_{i,j} c_i\{\Sigma b_j f[u(t-i)] + \lambda v(t-i)\} - a$

The short-run effect of a change of u on π is

$$\frac{d\pi(t)}{du(t)} = c_0 b_0 f'(u)$$

while the long-run is

$$\frac{d\pi}{du} = \sum_{i,j} c_i b_j f'(u) > c_0 b_0 f'(u)$$

relation which is steeper than the short-run.[1]

In Figure 1 we have drawn a long-run Phillips curve (LL) and a (first-quarter or impact) short-run Phillips curve for points around a four percent unemployment rate (S_4 S_4) . This curve is drawn from econometric estimates prepared for the MIT-FRB model for the United States. The graph indicates the significant difference in slopes of the two trade-offs.[2]

In the analysis which follows we will take this simple description as comprising the political alternatives. It is assumed that unemployment is a control or policy variable of the economic system which the policymakers

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[1] Continuing the system in footnote 1 page 4 , we know that comparing two stationary points, the actual rate of inflation (π) must equal the expected:

(v) $\quad v = \pi$

Substituting this into (i) and (ii) we have

$$(vi) \begin{cases} \pi = \dfrac{f(u)}{1-\lambda} & \text{if } 0 \leq \lambda < 1 \\ u = \bar{u} & \lambda = 1 \end{cases}$$

Thus the long-run curve has a slope $f'(u)/(1-\lambda)$ which is greater than the short-run slope, $f'(u)$.

[2] This is from George de Menil and Jared J. Enzler, "Wages and Prices in the FRB-MIT Econometric Model," in the Econometrics of Price Determination, forthcoming. It should be noted that the ratio of slopes is the fraction of the long-run response which occurs over the period. Estimates of the fraction for different time periods are as follows (from de Menil and Enzler, op.cit., Table 4.1)

Quarters	Average Response as Fraction of Long-Run
1	0.11
4	0.30
8	0.45
12	0.54
16	0.62

The slowness of the response is perhaps surprising.

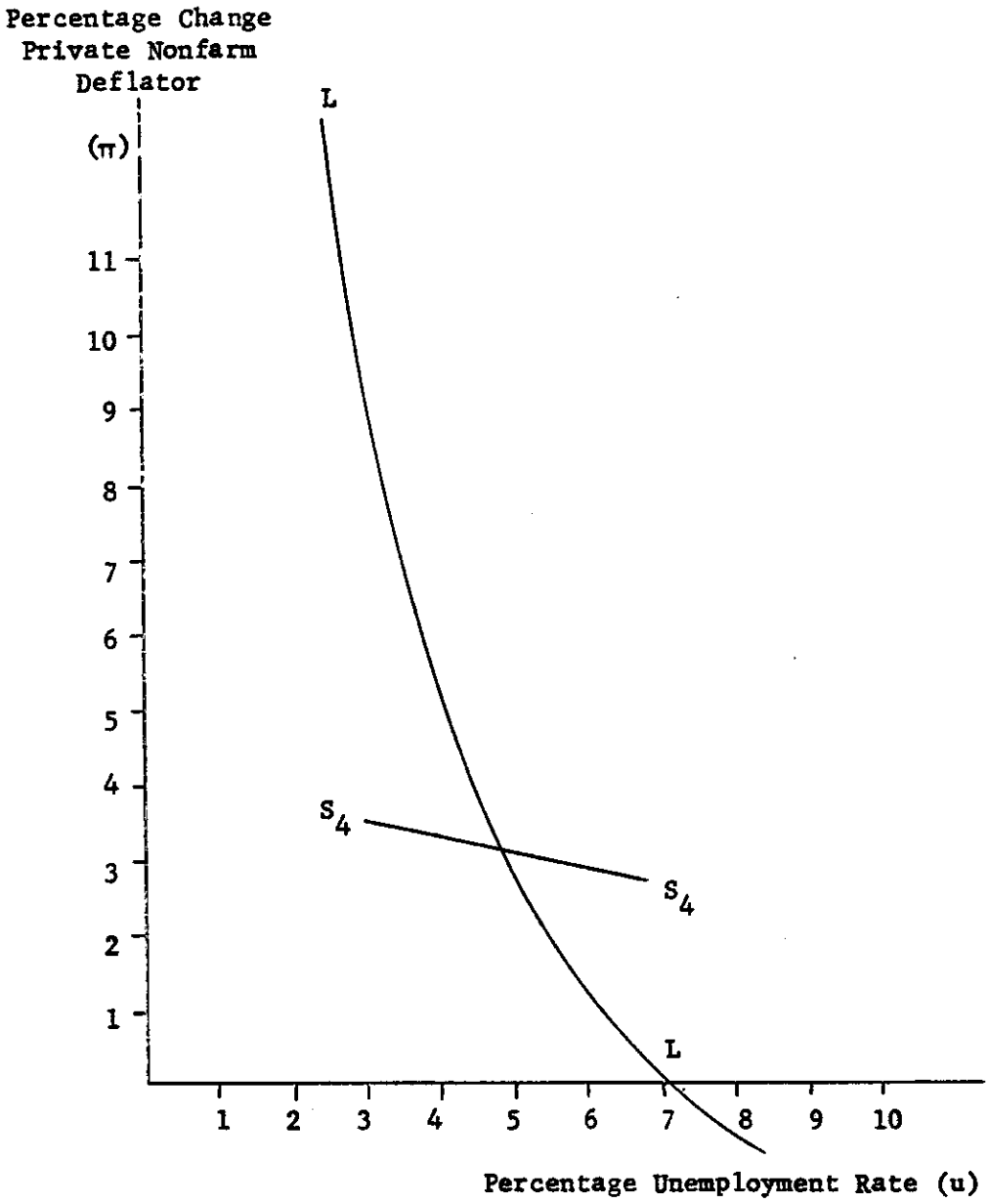

FIGURE 1. Trade-Off Curve for U.S.

can set at any level they wish.[1] The question of what the level will be under different systems, and how this compares with the optimal choice, is the problem we will examine.

In summary our macroeconomic system is

$$\pi_t = f(u_t) + \lambda v_t \tag{1}$$

$$\dot{v}_t = \gamma(\pi_t - v_t) \, . \tag{2}$$

[1] The assumption that unemployment is a control variable is unrealistic in a decentralized, capitalist economy. It is generally agreed, however, that through judicious choice of fiscal and monetary policy the government can (within a margin of error) set unemployment rates at any desired level.

B. INDIVIDUAL PREFERENCES AND AGGREGATE BEHAVIOR

Having established the macroeconomic framework in which policymakers operate, we now turn to the preferences of individuals among different states of the economy.

In the analysis which follows, we assume individuals have the aggregate unemployment and inflation rates in their preference functions and that individuals prefer stable prices and low unemployment rates to high inflation and unemployment rates. We first discuss the reason for such an assumption.

First, why do individuals care about the aggregate unemployment rate? It is patently more plausible to assume that individuals pay attention to their own experience rather than to the aggregate experience. The main reason for focussing on aggregate indicators is that individual experiences are highly correlated with cyclical movements in the economy. Moreover, the unemployment rate is probably the best single indicator of cyclical conditions. As the unemployment rate rises, some families suffer a drastic decline in income as they lose jobs. Many others are affected as hours and overtime pay decline, as there is more parttime work, and as profits drop off drastically. In short, a movement in the aggregate unemployment rate will be felt, directly or indirectly, by a very large fraction of households.

The reason why households are averse to inflation is less apparent. There can be little doubt that households prefer periods of stable prices (or perhaps, stable inflation rates) to situations of accelerating inflation.

This has been demonstrated in surveys as well as scattered studies on electoral behavior.[1] Three reasons are usually mentioned for aversion to inflation: inflation may cause balance of payments problems, inflation leads to inefficient resource allocation, and inflation introduces an arbitrary redistribution of income. The evidence on these assertions is not conclusive, but we will accept for this analysis the proposition that individuals have a pronounced and rational taste for stable prices.[2]

Finally, we assume that while households are rational in their preferences, they are ignorant of the macroeconomic tradeoff. Given that they do not know how well or badly policymakers are doing relative to objective possibilities, households rely on past experience in their political decisions.

These decisions take the form of periodic voting between alternative political parties. In the usual models of voting between alternatives, citizens are presented with a menu of alternatives, each alternative repre-

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[1] Gerald H. Kramer, "Short-Term Fluctuations in U.S. Voting Behavior, 1896-1964," American Political Science Review, Vol. 65, 1971, pp. 131-43; Albert Rees, H. Kaufman, S.J. Eldersveld and F. Freidel, "The Effects of Economic Conditions on Congressional Elections, 1946-58," Review of Economics and Statistics, Vol. 44, 1962, pp. 458-465.

[2] It is possible that the aversion to inflation is a rational process for individuals, but irrational for society as a whole. An analogy is that individuals think inflation is a "tax" on income while in the aggregate the "tax" nets out to zero. (Indeed, it is difficult to find any effect of inflation of the magnitude experienced in recent years in advanced countries on the level of productivity or the growth of potential output.) For example, the price rises might be visible, while the offsetting effect of price rises on income--flowing through higher wage rates, dividends, and transfer payments--might not be associated with the inflationary process in an individual's perception.

senting the position of a party or candidate.[1] If the citizen can be assured that a party's platform is feasible and sincere, the choice can then be made from among the alternatives presented.

Since an individual's knowledge about the objective or feasible policies is assumed to be negligible, it seems unreasonable to assume that voters take the platforms of parties seriously in their voting behavior. A more reasonable approach would be for households to form a set of expectations of what is the usual behavior of political parties, this expectation based on past behavior. A voter then compares an incumbent party's behavior with usual behavior in order to evaluate the incumbent. If economic conditions have deteriorated relative to expectation, this leads to votes against the incumbent, and vice versa.[2]

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[1] See for example Joseph Schumpeter, Capitalism, Socialism and Democracy, 1945, or Anthony Downs, An Economic Theory of Democracy, 1957. Kramer characterizes this process as follows: "One might picture the voter as a rational, information-processing individual who proceeds by collecting information of various kinds--party platforms and policy pronouncements, legislative voting records, and perhaps expert or authoritative opinions on these matters. Such a voter analyzes this information in light of his own self-interest and decides which party presents the 'best' package of positions. He then votes accordingly. This view of the voting decision appears in classical democratic theory, and has been subjected to empirical tests in various voting studies (where it generally does not fare very well)." Gerald H. Kramer, "Short-Term Fluctuations in U.S. Voting Behavior, 1896-1964," American Political Science Review, Vol. 65, 1971, pp. 133-34. Emphasis added.

[2] This is the behavior postulated by Kramer, ibid., p. 134: "The past performance of the incumbent party in particular gives some indication of what it would do if returned to office...." This kind of model is implicit in the study by F.A. Pearson and W.I. Myers, "Prices and Presidents," Journal of Farm Economics, 1948, pp. 4210-4218.

It should be stressed that ignorance of the structure of the economy is extremely important for the behavior we are about to describe. We will return to evaluating its realism in the conclusions (see Section H below).

We now turn to a formal discussion of individual preferences. The economy is composed of a large number of individuals, say n. Individuals are assumed to have well-behaved ordinal preference orderings over economic variables. Let $z = (z_1, z_2, \ldots, z_m)$ be a vector of aggregate economic variables, where

$z_1 = -\pi$ = -rate of inflation

$z_2 = -u$ = -rate of unemployment

$z_3, \ldots, z_m$ = other economic variables.

We will represent the preference orderings of the i^{th} individual by the (real-valued) function:

$$U^i = U^i(z) \tag{3}$$

U^i is assumed to be quasi-concave (i.e. diminishing marginal rate of substitution) and indexed such that $U^i > 0$, and so that more desirable bundles have higher indexes than less desirable bundles.

We are concerned with individual voting behavior. We will index time so that elections occur at points $(0, 1, 2, \ldots)$, and that economic variables z_t refer to the average value of z over the period from $(t-1)$ to t, where the average is suitably weighted.

The individual voting behavior investigated is as follows: There are two parties. At time t, each voter compares the economic performance of incumbents during the last electoral period (z_t) with the expected

performance for that period $(\hat{z}_t)$. If the incumbent did better than expected, the individual votes for the incumbent; if the incumbent did worse than expected, he votes for the opposition.

Expected performance is determined by adaptive expectations. Thus

$$\hat{z}_t = \delta z_{t-1} + (I-\delta)\hat{z}_{t-1} \tag{4}$$

where δ is a (mxm) nonnegative square matrix of adjustment coefficients and I the (mxm) identity matrix. (Normally δ is diagonal with diagonal elements $0 \leq \delta_{ii} \leq 1$.) We assume δ is the same for all voters.[1]

Voting behavior can be succintly described as follows. The voting function for the i^{th} individual is V^i :

$$V_t^i = \varphi^i(z_t, \hat{z}_t) = \left\{ \begin{array}{lll} 1 & \text{if} & U^i(z_t)/U^i(\hat{z}_t) > 1 \\ 0 & \text{if} & U^i(z_t)/U^i(\hat{z}_t) = 1 \\ -1 & \text{if} & U^i(z_t)/U^i(\hat{z}_t) < 1 \end{array} \right\} . \tag{5}$$

Thus a vote for the incumbent registers as $+1$ and a vote for the opposition as -1 .

The aggregate vote function is then

$$V_t = V(z_t, \hat{z}_t) = \sum_{i=1}^{n} V_t^i = \sum_{i=1}^{n} \varphi^i(z_t, \hat{z}_t) . \tag{6}$$

We will call V the aggregate voting function. This function is positive

[1] This allows aggregation in (6) below.

if the incumbents win, negative if opposition wins, zero if a tie.

The role of political parties is thus easily outlined. Parties are assumed to be interested only in election outcomes. They want to win elections. It is assumed they know voters preferences (as represented in V) perfectly. The government therefore chooses economic policies during its incumbency which maximize its plurality at the next election.[1] Since $\hat{z}_t$ is given, the policy is simply to maximize V with respect to z_t:

$$\max_{\{z_t\}} V(z_t, \hat{z}_t) . \tag{7}$$

The general function $V(z, \hat{z})$ is quite difficult to solve analytically. We postpone the general treatment to Section F below. For the next three sections (C through E) we simplify the problem by making two assumptions. First,

$$\delta = 0 . \tag{8}$$

This means that there is no change in the expected level and we can therefore rewrite our aggregate voting function as:

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[1] The assumptions are slightly inconsistent. If political parties know completely the voting function, then the incumbents can pick a policy which yields $(50 + \epsilon)$ percent of the vote. Unless further goals enter into the party's preference function, there is an indeterminacy. The slack may allow a public-spirited party to move toward the social optimum and still win, or a selfish party to do some nasty business on the side. One obvious further goal is to win the election after the next.

To be realistic, however, we should realize that there is uncertainty about the voting function. The objective of maximizing the expected number of votes retains its appeal if there is additive uncertainty. Moreover, political parties appear to be quite myopic.

$$V_t = g(z_t) = V(z_t, \hat{z}_t)\Big|_{\hat{z}_t = \hat{z}} \cdot \tag{9}$$

Thus the aggregate voting function is a function only of current policies.

The second assumption is that our voting function is well behaved:[1]

$$g(z_t) \text{ is quasi concave.} \tag{10}$$

This assumption is further discussed in Section F below.

[1]Susan Lepper has shown that regularity of the individual preference functions does not lead to regularity of the aggregate vote function. (See Susan J. Lepper, "Voting Behavior and Aggregate Policy Targets," Paper Delivered at the December 1968 meeting of the American Political Science Association). We discuss this problem in Section F below.

C. OPTIMAL INFLATION AND UNEMPLOYMENT

The first problem we consider is the question, In the absence of political constraints what is the optimal level of unemployment and inflation?[1]

Let us view the problem as that of a planning agency constructing a medium-term plan for a mixed economy. The only constraint on the planners is to conform to the macroeconomic system described above [see equations (1) and (2)]. The important question we must consider is what to use as an appropriate criterion, or social welfare function. Aside from using the planners' preferences, a reasonable alternative would be to use the observed aggregate voting function described in equation (9) as the appropriate social welfare function:[2]

$$V_t = g(u_t, \pi_t) \cdot \tag{11}$$

We take this approach because the observed voting function is a way of using individual (and presumed rational) preferences to help make policy decisions. There may be other ways of gaining similar information--such as using survey data--but it is not clear whether these will give significantly different preferences. At the same time, it must be recognized that the derivation of social welfare functions from observed data is an especially trecherous problem. We discuss some of the problem in Section F below.

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[1] For a more complete discussion of the macroeconomic problems involved, see Edmund S. Phelps, "Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time," Economica (New Series), Vol. 34, No. 135, August 1967, pp. 254-281.

[2] For reservations to using this as a social welfare function, see Section D.3 below.

The easiest way to understand the objective function is to examine Figure 2. This shows the contours of the aggregate voting function. Each contour represents the line along which a constant fraction of the electorate would vote for a given policy. Thus our criterion function is indifferent between points A and B, as they lie on the same contour (51 percent agreement) of the aggregate voting function. Both points A and B are preferred to point C, which lies on a lower contour (49 percent agreement). By our assumption of regularity in statement (10) above, the curves have the general shape in Figure 2.

We thus construct as our social welfare function the discounted value of our aggregate voting function:

$$W = \int_0^\infty g(u_t, \pi_t)e^{-\rho t}dt \ . \tag{12}$$

Thus a plan is evaluated by the fraction of the electorate voting for it, discounted over time at rate ρ.

The macroeconomic constraints are

$$\pi_t = f(u_t) + \lambda v_t \tag{13}$$

$$\dot{v}_t = \gamma(\pi_t - v_t) \ . \tag{14}$$

The problem is to construct a plan $\{u^*(t)\}$ which maximizes the welfare function (12) subject to the constraints (13) and (14). We set out the problem formally here, for it will be very useful in later sections.

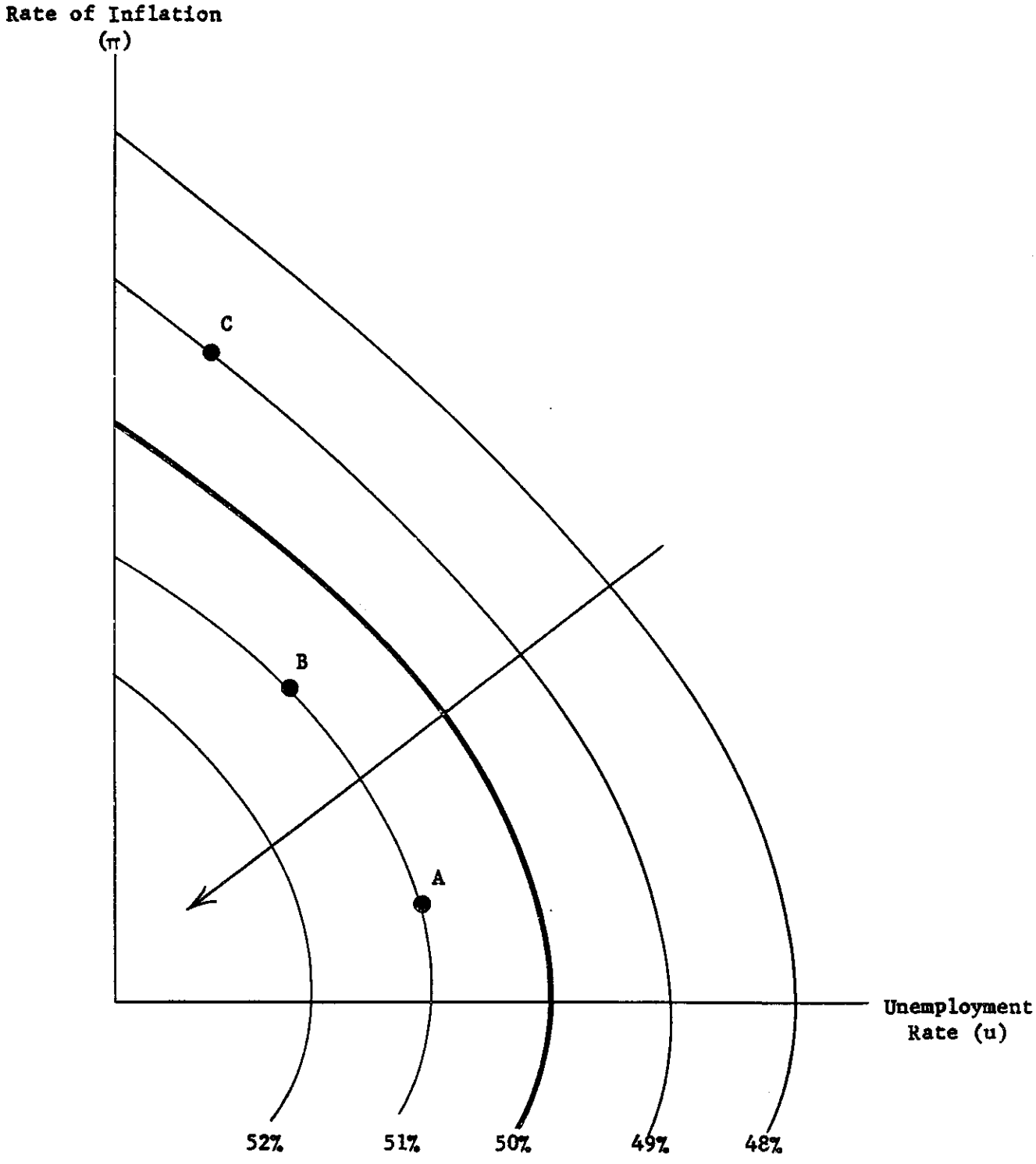

FIGURE 2. Contours of Aggregate Voting Function

Using standard techniques of optimal control,[1] we can construct a Hamiltonian expression:

$$H(u,v) = e^{-\rho t}\{g[u,\ f(u) + \lambda v] + \psi\gamma[f(u) + \lambda v - v]\} \tag{15}$$

where we have substituted (13) into (12). ψ is the shadow price on v_t (or the cost imputed to the expected rate of inflation). An optimal plan $\{u^*(t)\}$ is one which maximizes $H(u,v)$ at every point of time:

$$H[u^*(t),\ v(t)] \geq H[u,\ v(t)] \quad \text{all} \quad 0 \leq u \leq 1 \tag{16}$$

and which satisfies the differential equation[2]

$$\dot{\psi}(t) = [\rho + \gamma(1-\lambda)]\psi(t) - g_2\lambda\ . \tag{17}$$

Simple differentiation shows that H is maximized when

$$g_1 + g_2 f'(u) + \psi\gamma f' = 0\ . \tag{18}$$

We are concerned only with stationary solutions. When $\dot{\psi} = 0$, we have

$$\psi = \frac{g_2\lambda}{\rho + \gamma(1-\lambda)}\ . \tag{19}$$

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[1] For a detailed discussion of these techniques, see Chapter II, in Kenneth J. Arrow and Mordecai Kurz, Public Investment, the Rate of Return, and Optimal Fiscal Policy, Johns Hopkins Press: Baltimore, 1970.

[2] For a function $y = f(x_1, \ldots, x_n)$, we use the convention $\partial y/\partial x_j = f_j$.

Substituting (19) into (18) gives

$$g_1 + g_2 f' + \frac{\gamma g_2 \lambda f'}{\rho + \gamma(1-\lambda)} = 0$$

or

$$\frac{f'(u)}{1-\lambda} = -\frac{g_1}{g_2}\left(\frac{\rho + \gamma(1-\lambda)}{(\rho+\gamma)(1-\lambda)}\right) \qquad 0 \leq \lambda < 1 \tag{20}$$

$$f'(u) = -\frac{g_1}{g_2}\left(\frac{\rho}{\rho+\gamma}\right) \qquad \lambda = 1 \,. \tag{20F}$$

We can best interpret the nature of the long-run optimal solution geometrically. In Figure 2 we have drawn the aggregate voting function, which is also assumed to be the criterion function. We have superimposed the long-run Phillips curve on the preference structure in Figure 3, where the heavy black line is the long-run Phillips curve.

We can now show the different possibilities. Consider the case where $0 \leq \lambda < 1$.

(1) First assume that the planners do not use discounting in allocating resources between future and present generations.[1] In this case $\rho = 0$ and:

$$\frac{f'(u)}{1-\lambda} = -\frac{g_1}{g_2} \,. \tag{21G}$$

This solution will be labelled the golden-rule policy (U^G, π^G) for there

[1] For a discussion of some of the normative and positive issues, see Arrow and Kurz, op.cit., Chapters I and V.

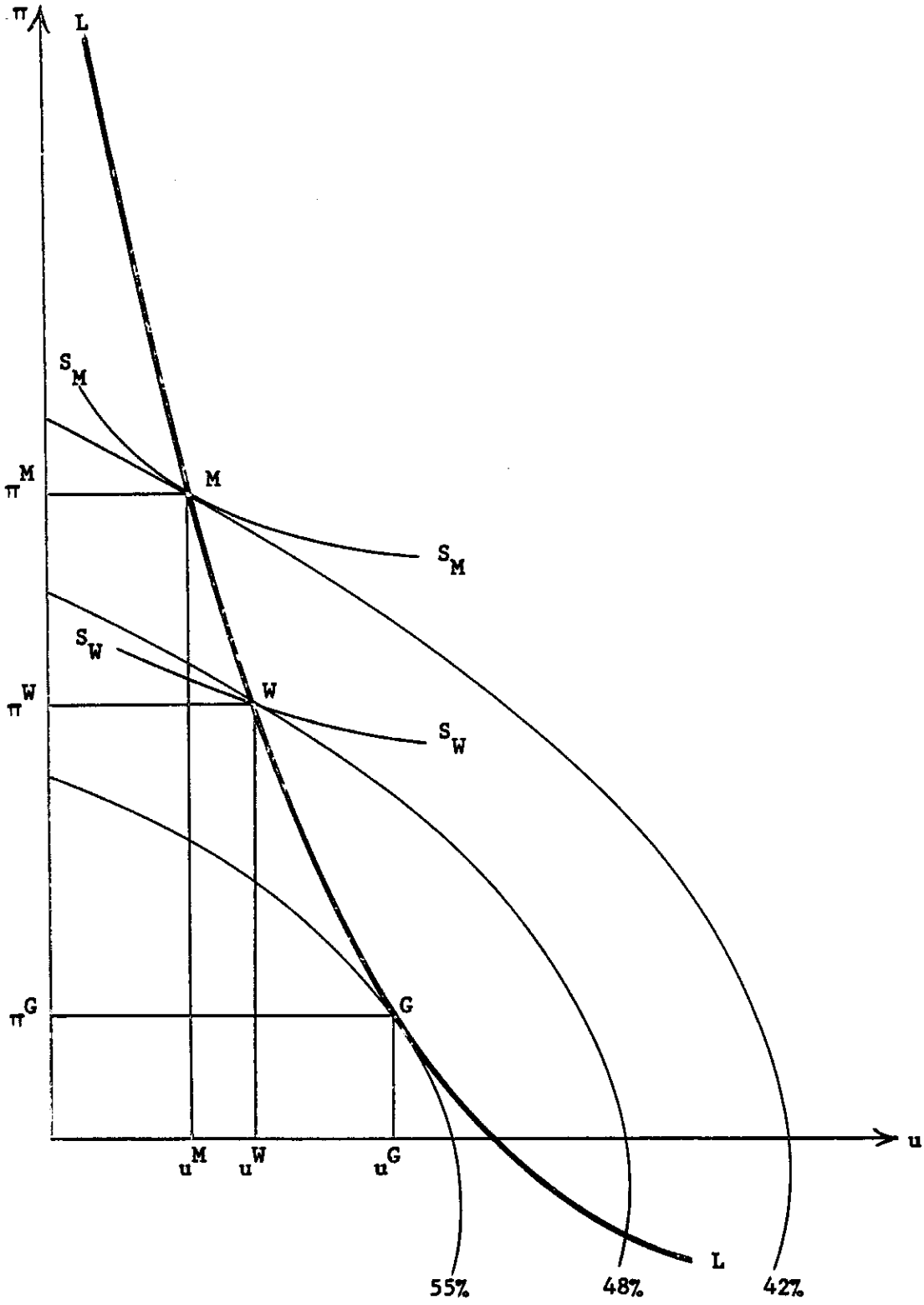

FIGURE 3. Long-Run Policies

is no differentiation between generations. The outcome is where the long-run Phillips curve is tangent to the aggregate voting function. This is shown as point G in Figure 3.

(2) The opposite extreme is where planners apply infinite discount rates in evaluating policy. Manipulating (20) we see that

$$f'(u) = -\frac{g_1}{g_2}\left(1 - \frac{\lambda\gamma}{\rho+\gamma}\right) .$$

Thus as ρ becomes large, we have

$$f'(u) = -\frac{g_1}{g_2} . \tag{21M}$$

This is the purely myopic policy, where future generations are ignored. This comes at point M where the short-run Phillips curve ($S_M S_M$ in Figure 3) is tangent to the aggregate voting function. It is easily seen (and is verified algebraically in Section D.2 below) that the point M lies to the northwest of W : that is, myopic policies have higher inflation and lower unemployment than golden rule policies.

(3) The general welfare optimum (W) is easily seen to lie between M and G , for example at point W in Figure 3. As can be verified by equation (20), the optimum comes at a point where the slope of the aggregate voting function is intermediate between the long-run trade-off (LL) and the short-run trade-off.

Consider the case where $\lambda = 1$ shown in Figure 4 (for which Milton

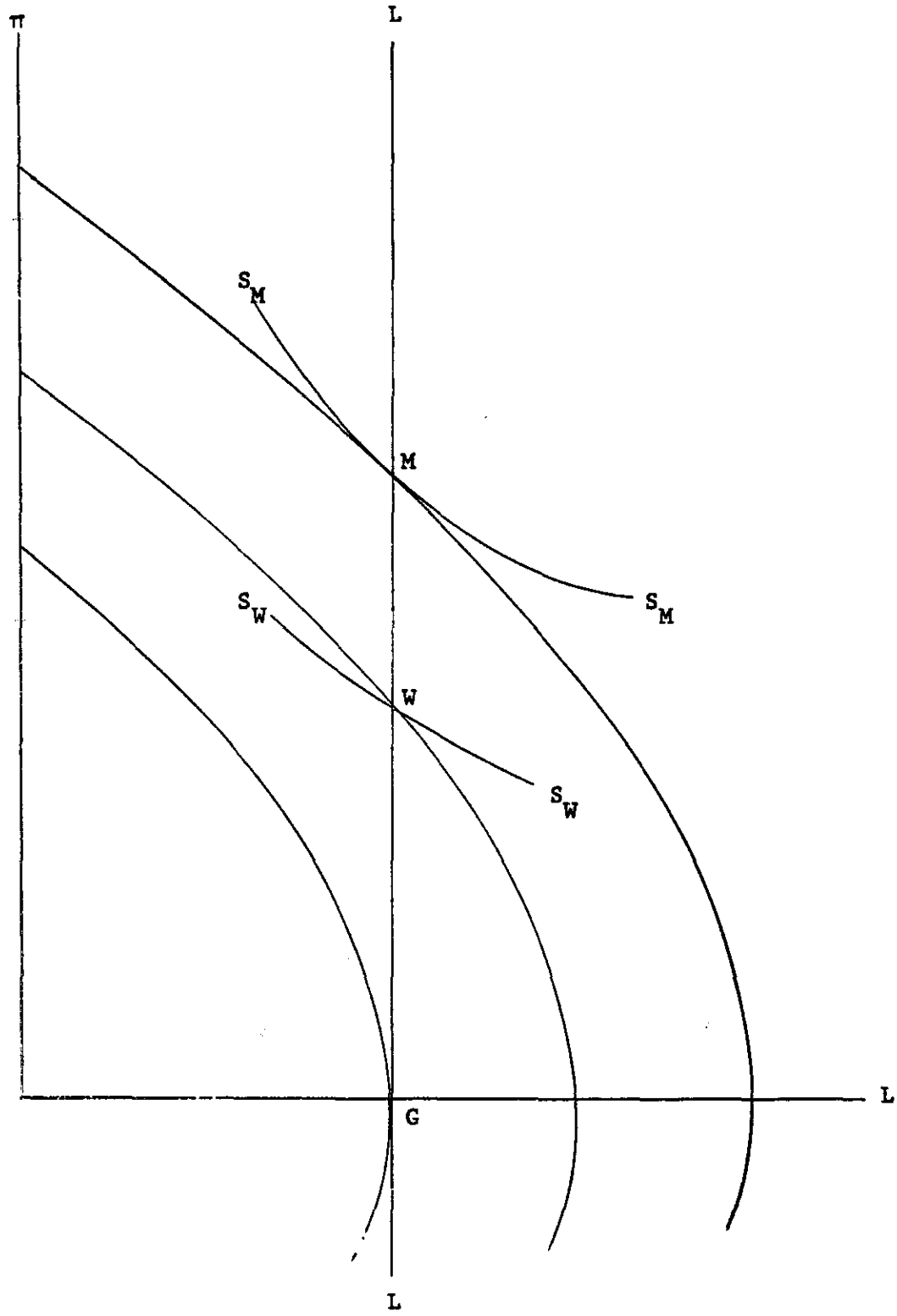

FIGURE 4. Policies with Vertical Long-Run Phillips Curve

Friedman and Edmund Phelps among others have argued).[1] This is the case where the long-run trade-off is vertical. If the rate of social discount is zero (the golden-rule policy) the optimal policy is to have stable prices. No other set of assumptions leads to stable prices. The general welfare optimum occurs when the short-run trade-off curve has a slope less than the aggregate voting curve by the fraction $\rho/(\rho+\gamma)$.

This completes our discussion of optimal policies in the simple economic system analyzed here. We now turn to the functioning of the political system.

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[1] See Milton Friedman, "The Role of Monetary Policy," American Economic Review, March 1968, pp. 1-15 and Phelps, op.cit.

D. LONG-RUN CHOICE IN DEMOCRATIC SYSTEMS

This section analyzes the general trend and asymptotic behavior of the system over the course of many electoral regimes. The next section discusses optimal policy for a political party when in power.

The fundamental long-run result is the following:[1]

> Under conditions where voting is an appropriate mechanism for social choice, democratic systems will choose a policy on the long-run trade-off that has lower unemployment and higher inflation than is optimal.

Referring back to Figure 3, we show that the actual choice in democratic systems will be further up the tradeoff curve than the optimal point, W .

1. Geometric Analysis

To show the basic proposition, we call upon the concepts introduced above. Figure 1 above shows short-run and long-run trade-off curves, while Figure 2 shows the aggregate voting function. Recall that we are concerned with democratic policy determination, where the choices are induced by periodic voting on the performance of incumbent parties. In a two-party system the incumbent party chooses economic policies consistent with the current short-run tradeoff, but it cannot move the short-run tradeoff substantially in its incumbency. At the end of its term in office voters

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[1] This proposition holds only for situations when use of the aggregate voting function is appropriate. Sufficient conditions for this are very stringent. Reservations on the proposition are given in Section D.3 below.

evaluate the performance of the incumbent party. Incumbents are assumed to maximize the number of votes in the next election and to know the preference of voters.[1] The percentage of votes is a decreasing function of both the unemployment and inflation rates. Figure 2 shows the iso-vote lines for the incumbents, where all combinations of inflation and unemployment rates along a given line will obtain the same percentage for the votes for the incumbent party. The heavy black line divides the region of incumbent victory (lying to the northeast) from the region of incumbent defeat (lying to the southwest).

By combining these two figures we can show both the policy outcome and the election outcome. First superimpose the iso-vote lines (or political structure) on the trade-off curves (or economic structure), as in Figure 5. At a given time, the policies open to a party in power are described by the relevant short-run curve, for example S_1S_1 in Figure 5. Maximizing votes, the incumbent will choose the point on the short-run trade-off curve tangent to the highest iso-vote line. In this case, the point E_1 is the outcome, and it obtains 53 percent of the votes. Thus in this situation the outcome has led to victory.

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[1] Although we assume parties are "myopic" and do not look beyond the next election, it might be argued that a more realistic assumption would have parties maximize the discounted expected value of the number of years in power. This presents some interesting paradoxes. If they are sure of losing, they will sabotage the opposition party by leaving it with a high inflationary "inheritance." This means they will do as badly as they can from the point of view of future inflation. On the other hand, if they are sure of victory, they may have a policy which is deflationary so that their chances at the next election are favorable.

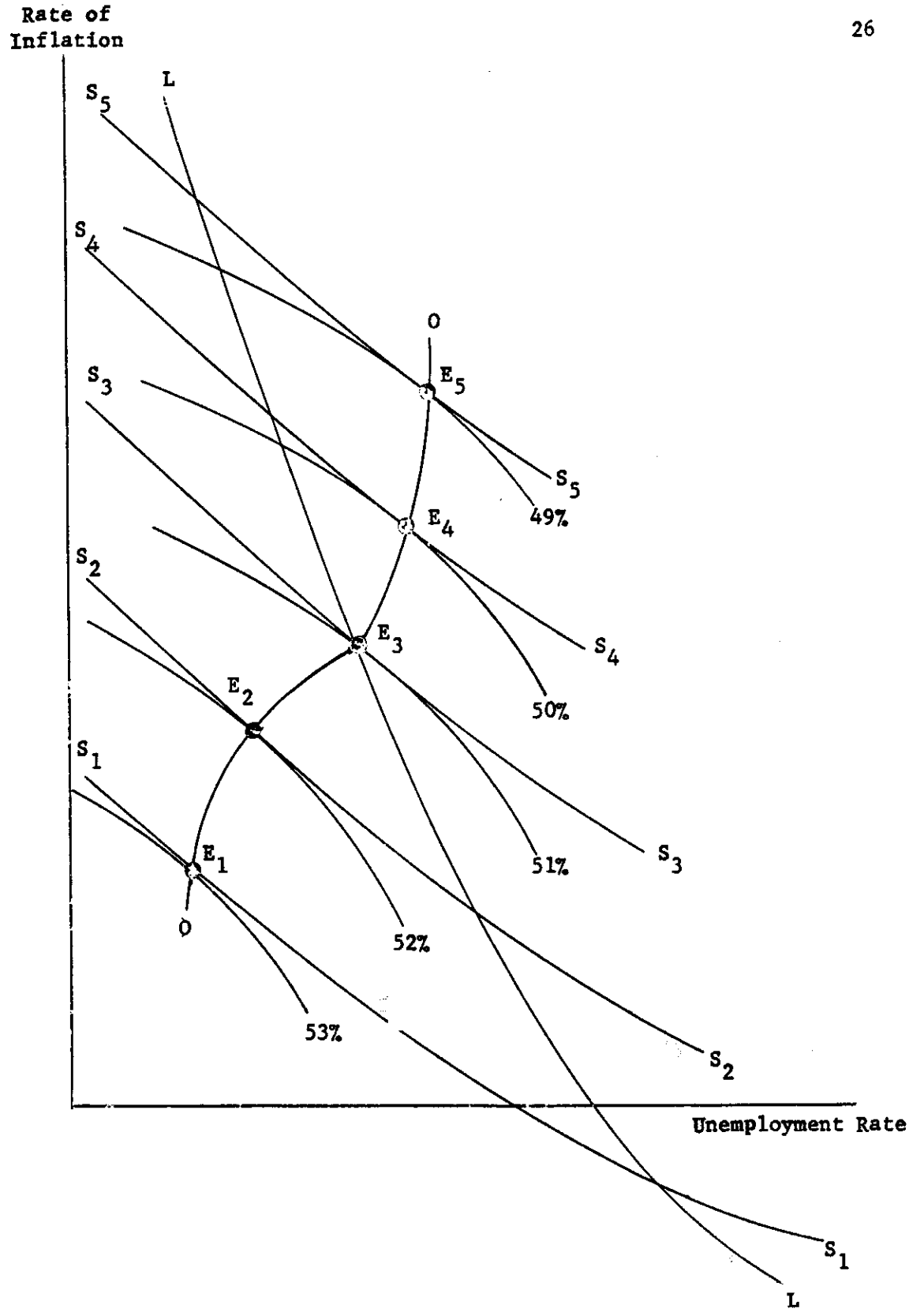

FIGURE 5. The Short-Run Election Outcome

By performing this experiment for all the different short-run curves (S_1S_1, S_2S_2, etc.), and joining all the outcomes, we get the election outcome line, 00 in Figure 5.[1]

To get the flavor of the dynamics of the system, let us consider what happens after E_1 has been chosen. Because the point chosen (E_1) is to the southwest of the long run curve, the short-run curve must move up. Thus by the time the next election comes around, the short-run curve will have moved up, say to S_2S_2 in Figure 5. The new election outcome will inevitably be less popular, and probably have higher unemployment and inflation.

Similarly, if the outcome is to the northeast of the long-run curve, say at E_5, the next election would lead to a policy choice somewhere below E_5 and this choice would be more popular.

The important propositions about the dynamics can be shown in Figure 6. Here 00 is the election outcome line derived in Figure 5 and LL is the long-run trade-off curve. First consider our initial equilibrium at E_1.

---

[1] We have assumed that the election outcome line slopes generally from southwest to northeast. The reason for this is as follows: It is fairly clear that the choice line will hit the vertical axis not far from the origin: this is a result of the general preference for roughly stable price levels (we have drawn the vote functions as if preferences are for exactly stable prices). Moreover, we assume that at a given unemployment rate, the slope of the vote function becomes flatter as the rate of inflation increases, indicating that, for given unemployment, inflation becomes more important as its magnitude increases. Under the conventional assumptions about the relation between long-run and short-run Phillips curves, this set of assumptions will guarantee that the choice line slopes in the appropriate way.

If the choice line did not intersect the long-run curve in Figure 6 the system would head off for an inflationary or deflationary spiral. With suitable reinterpretation we can explain the political motivation for hyperinflation.

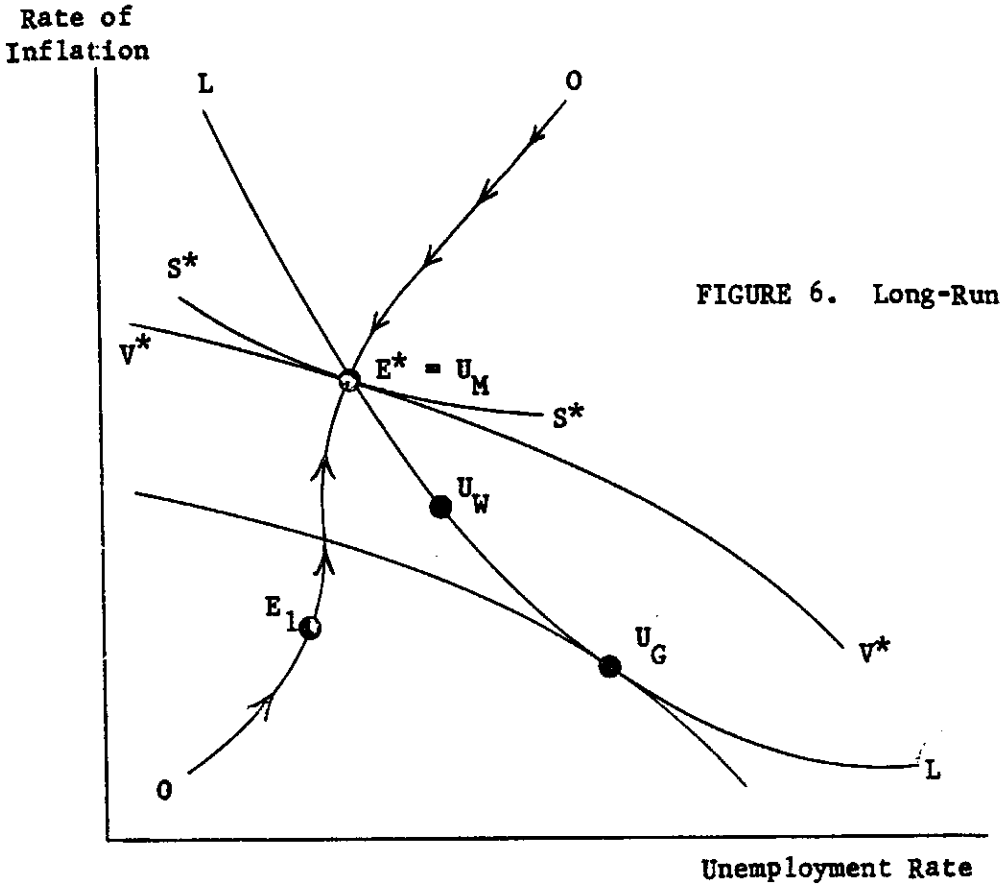

FIGURE 6. Long-Run Solution

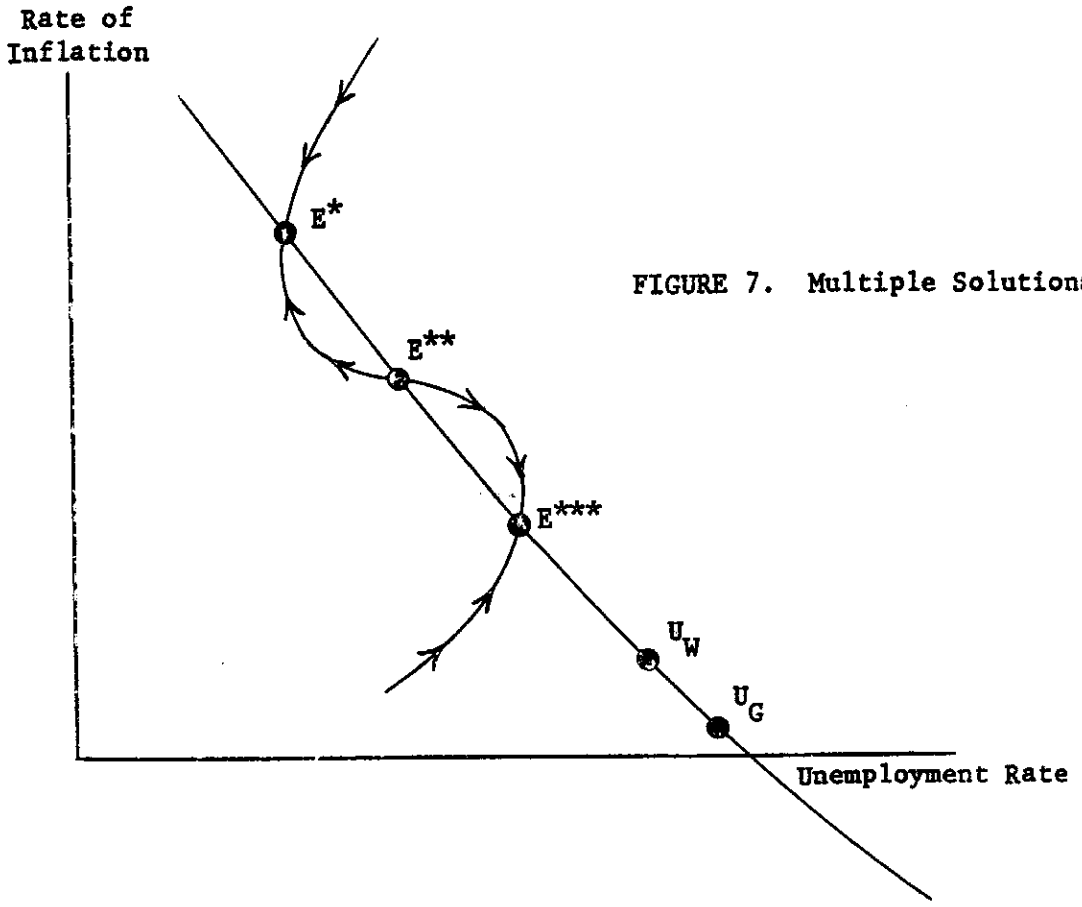

FIGURE 7. Multiple Solutions

Because inflation at E_1 is lower than that which would in the long-run be consistent with that level of unemployment, the short-run curve will move up. This means that the system will move up the election outcome line 00 as shown by the arrows. Where the election outcome line intersects the long-run trade-off (at E^* in Figure 6) the system is in equilibrium. At E^* the iso-vote line is tangent to the short-run Phillips curve and is on the long-run Phillips curve. This implies that the incumbent party cannot improve its performance by moving along the short-run trade-off curve and that the system is at rest at E^*.

We can now show the central proposition we stated at the beginning of this section. We have shown the following:

> The democratic outcome corresponds to the policy which was found in Section C to be purely myopic. That is, it comes at the point where the implicit rate of time preference is infinite.

Thus the point E^* in Figure 6 is the myopic point U_M. Glancing back at Figure 3, we see that the myopic point lies higher up the tradeoff curve than the optimal point U_W. Thus we have established that the democratic outcome has lower unemployment and higher inflation than the optimum.

The outcome in Figure 6 is not the only possible situation, although it may be the most likely. Figure 7 shows the case of multiple solutions. In this case it can be shown that E^* and E^{***} are stable, while E^{**} is unstable. That is, if the system is displaced from E^{**} by a slight amount, it will not return to E^{**} but will move to E^* or E^{***} depending on initial conditions. It is easily seen by referring to Figure 6 that the welfare optimum must lie to the right of any, and therefore all, equilibria (as is shown in Figure 7).

Note that the long-run solution may come with either a stable or an unstable political system, since E^* may lie above or below the 50 percent locus depicted in Figure 2.[1]

It is inessential whether the long-run trade-off is vertical. In this case the LL line is vertical and the proposition is simple that political system chooses a point on the long-run curve with a higher than optimal rate of inflation.

We stress that the procedure outlined here relies on the assumption that the election outcome line corresponds to the relevant social welfare function.

2. Formal Analysis

We now turn to a formal proof of the propositions discussed above. The economic system is described as follows. Let π_t be inflation during (electoral) period t, similarly for other variables. A conventional way of writing the trade-off would be:

$$(22) \quad \pi_t = f(u_t) + \lambda[(1-\gamma)\sum_{i=0}^{\infty}\pi_{t-i-1}\gamma^i] \quad , \quad 0 \leq \lambda \leq 1 \, , \quad 0 < \gamma < 1 \, .$$

where $f'(\cdot) < 0$, $f''(\cdot) > 0$, $f(0) = \infty$, $f(1) = a$. The term in brackets

[1] The theory proposed here suggests that empirical work on election outcomes should use the difference between the incumbent's performance and "accustomed" performance rather than simply the actual performance.

is conveniently interpreted as the "expected rate of inflation," v_t, so

$$\pi_t = f(u_t) + \lambda v_t \quad . \tag{23}$$

Similarly the voting function representing the percentage of the electorate voting for the incumbents would be represented as:

$$V_t = g(u_t, \pi_t) \quad . \tag{24}$$

Where g is a continuous quasi-concave function. Also $g_1 < 0$ and g_2 has sign $(-\pi_t)$. Moreover we need:

$$\lim_{\pi \to \infty} (g_1/g_2) = 0 \quad , \quad \text{all} \quad 0 \leq u < 1 \quad .$$

The short-run political choice for an incumbent party is to maximize (24) subject to (22). By substitution:

$$V_t = g[u_t, \; f(u_t) + \lambda(1-\gamma)\Sigma \, \pi_{t-i-1}\gamma^i] \quad .$$

The only variable under government control is u_t. Maximizing, we have:

$$g_1 + g_2 f'(u_t) = 0 \quad .$$

This gives us the Election Outcome Line:

$$\left(\frac{d\pi_t}{du_t}\right)_{G=\bar{G}} = \frac{g_1}{g_2} = -f'(u_t) = \left(\frac{d\pi_t}{du_t}\right)_{v=\bar{v}} \quad . \tag{25}$$

This simply states that votes are maximized when the short-run Phillips

tradeoff $[(d\pi/du)_{v=\bar{v}}]$ is tangent to the election outcome function $[(d\pi/du)_{G=\bar{G}}]$. This is exactly the myopic equilibrium described in equation (21M) above.

Next we show that the long-run political equilibrium is at the intersection of the locus described by (25) and the long-run trade-off. First, solve (25) for the election outcome line

$$\varphi(\pi_t, u_t) = 0 . \tag{26}$$

We know $\varphi(0,0) = 0$ and $\varphi(\infty, 1) = 0$. Finally note that if π has been constant over the past, $v = \pi$. Consider n solutions, (π_i^*, u_i^*) , $i = 1, \ldots, n$, with equations:

$$\pi_i^* = f(u_i^*) + \lambda\pi_i^* \quad \text{or} \quad \pi_i^* = f(u_i^*)/(1-\lambda) , \quad i = 1, \ldots, n \tag{22*}$$

$$\varphi(\pi_i^*, u_i^*) = 0 . \tag{26*}$$

We know there is at least one solution (so $n \geq 1$) . First show the local stability of the solution with the highest unemployment rate. Let $u^* = \max_i (u_i^*)$ and $\pi^* = f(u^*)/(1-\lambda)$, $v^* = \pi^*$. Define $\bar{u}_t = u_t - u^*$, $\bar{\pi}_t = \pi_t - \pi^*$, $\bar{v}_t = v_t - v^*$. Locally, φ can be solved so that $\pi_t = h(u_t)$. Solving for the linearized equation set around (u^*, π^*, v^*) , we have from (22*), (26*) and the definition of v_t :

$$\bar{\pi}_t = f'(u^*)\bar{u}_t + \lambda\bar{v}_t \tag{27}$$

$$\bar{\pi}_t = h'\bar{u}_t \tag{28}$$

$$\bar{v}_t = \gamma\bar{\pi}_{t-1} + (1-\gamma)\bar{v}_{t-1} . \tag{29}$$

Solving (27) and (28) for $\bar{\pi}_t$ we get:

$$\bar{\pi}_t = \left(\frac{h'\lambda}{h' - f'} \right) \bar{v}_t \qquad h' \neq f' .$$

So from (29) the basic difference equation is

$$\bar{v}_t = \left[\gamma \left(\frac{h'\lambda}{h' - f'} \right) + (1-\gamma) \right] \bar{v}_{t-1} . \tag{30}$$

Whether the equilibrium (u^*, π^*, v^*) is stable depends on whether the term in brackets is less than one in absolute value. The following argument indicates that the equilibrium furthest to the right is stable and shows whether an equilibrium is unstable. If $h' > 0$, the term in brackets is positive and the relevant stability condition is that:

$$\left[\gamma \frac{h'\lambda}{h' - f'} + (1-\gamma) \right] < 1$$

or

$$\frac{f'}{1-\lambda} < h'$$

which always holds since f' is negative. If $h' < 0$, then the stability conditions are:

$$\frac{h'\lambda}{h' - f'} < 1 \tag{31}$$

and

$$\frac{h'\lambda}{h' - f'} > \frac{-2 + \gamma}{\gamma} = 1 - \frac{2}{\gamma} > -1 . \tag{32}$$

Note that (31) is relevant if $h' - f' < 0$ and (32) if $h' - f' > 0$. Thus if $h' - f' < 0$, it can be seen that $f'/(1-\lambda) > h'$. But if $h' - f' < 0$, this condition holds only when h is above the shaded region in Figure 8. While if $h' - f' > 0$, (32) becomes $f' < f'/(1+\lambda) < h'$. This holds only when h is below the shaded region in Figure 8, i.e. when $f' < h'$.

In summary, we find that an election outcome line that crosses the long-run Phillips curve in the unshaded region of Figure 8 (such as the function h^2) will be locally stable; while those that cross in the shaded region (as the function h^1) will be unstable.

For the crossing point (u^*, π^*), we know that the curve $\omega(\pi_t, u_t)$ must come from the southwest (or lower left) of the shaded area. It has not crossed the long-run curve, so it is bounded to the left of the $f(u)/(1-\lambda)$ function. It is an election outcome, so it must come from a higher iso-vote line than $f(u)$. Finally, it must lie in the half planes $\pi \geq 0$, $u \geq 0$. Therefore, it must lie in the closed region OABC. By differentiability it cannot touch any of the shaded region, so the point (u^*, π^*) is stable.

Thus the end crossing points are stable and intermediate crossing points are stable or unstable, depending on whether they fall into the shaded region.

To summarize the results on stability, there may be <u>political</u> stability or instability depending on whether the long-run equilibrium lies below or above the 50 percent iso-vote locus. There will generally be at least one equilibrium for economic stability, and the system will tend toward one of these points.

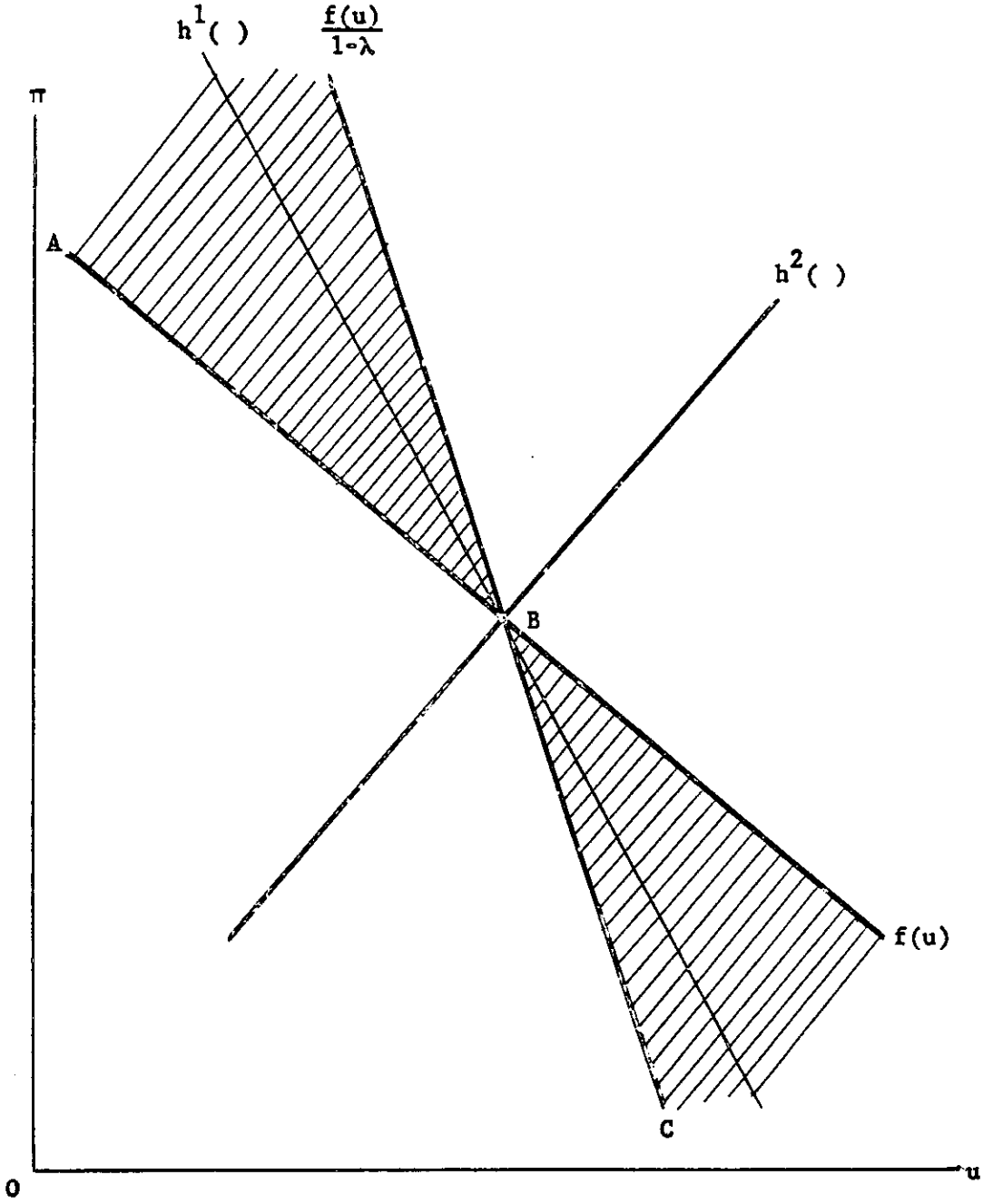

FIGURE 8. Stability Condition

3. Reservations

The conclusion about the long-run choice in democratic systems outlined above may not be acceptable if either of the following conditions hold:

(1) If individuals have an "irrational" aversion to inflation, the use of individual preferences as revealed in the aggregate voting function is not proper for social policy. Thus if individuals think of inflation as a "tax," while in fact that there is no real social loss to inflation, the optimum will have lower unemployment and higher inflation than the optimum described in Section C.

(2) If income is more unequally distributed than is optimal and if a lower unemployment rate redistributes income to poor families, then choice on the basis of an aggregate voting function will bias the choice toward a higher unemployment rate than is optimal.

It is the author's feeling that both these reservations are likely to hold for recent events in the United States. The most compelling reason for thinking that unemployment rates in the United States have been too high rather than too low is that most evidence indicates that a clear majority of households would have benefitted from tighter labor markets than those experienced over most of the postwar period.[1] European countries, on the

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[1] See Thad W. Mirer, "The Effects of Macroeconomic Fluctuations on the Distribution of Income," Institute for Research on Poverty Discussion Paper, University of Wisconsin, Madison, January 1972; C.E. Metcalf, "The Size Distribution of Personal Income During the Business Cycle," American Economic Review, September 1969; William D. Nordhaus, "The Effect of Inflation on the Distribution of Economic Welfare," Cowles Foundation Discussion Paper No. 329, February 1972.

other hand, customarily have had considerable lower unemployment rates and higher inflation rates, so the theoretical predictions may be applicable for these countries.

E. SHORT-RUN BEHAVIOR: THE POLITICAL BUSINESS CYCLE

We have considered the behavior of our simple political economy as it moves from one electoral regime (or term in office) to another and as it eventually settles into a stable outcome. Up to now a single electoral regime was considered to be a homogeneous period, posing no complicated policy choices for the incumbent. We now examine the possibility of politically induced cycles.

Although economists have from time to time made some casual remarks about political causes of the business cycle, the only serious theory is that of M. Kalecki.[1] At the dawn of the era of The New Economics, Kalecki argued that the rentier interests and business leaders would collude to sabotage the Keynesian revolution:[2]

> ...lasting full employment is not at all to their [the business leaders'] liking. The workers would "get out of hand" and the "captains of industry" would be anxious to "teach them a lesson." Moreover the price increase in the upswing is to the disadvantage of the small and big rentiers and makes them "boom tired."

As a result of the fatigue, political pressure would be applied, "orthodox" (i.e. deflationary) policies would be revived, and a slump would follow.

Kalecki's model assumes, implicitly, that business leaders and capitalists have a disproportionate control of the political mechanism. It is the unrepresentative nature of the political system which causes Kalecki's political trade cycle.

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[1] M. Kalecki, "Political Aspects of Full Employment," Political Quarterly, October/December 1943, pp. 322-331.

[2] Ibid., p. 329.

The suggestion in the present paper is that vesting decisionmaking in a representative government will lead to a similar phenomenon, although the timing and causes are quite different.[1] The theory examined below extends the model of political and economic choice to include differing economic policies during the term of office of an incumbent (call this the "electoral period").

There are two added dimensions in short-term policy choice: First, we have assumed up to now that within an electral period there is a fixed economic tradeoff and therefore a fixed policy. We now employ the more realistic continuous model introduced in equations (1) and (2) above. Second, we introduce the possibility that voters do not take simple averages of economic variables over the last electoral period, but have a decaying "memory" of past events. On election day, the memory of recent events is probably more poignant than that of ancient ills. If this is the case, then the vote function can be described as:

$$V_\theta = \int_0^\theta g(u_t, \pi_t) e^{\mu t} dt \ . \tag{33}$$

Where $g(u,\pi)$ is the vote function used in the static case, μ is the rate of decay of voters' memories, and θ is the length of the electoral period. Note two important features of the vote function in (33). First, the decay rate, μ, functions exactly like a discount rate except that

[1] It should be stressed that Kalecki's theory relies on the predominance of capitalists' interests in the political mechanism. The model outlined here would hold in any democratic system where intertemporal choice is involved. See Section I below.

it is backward-looking rather than forward-looking. In this sense it is like Pigou's "defective telescopic faculty." Second, the implicit weighting of outcomes extends only for the length of the electoral period and might therefore be called "myopic."[1] The result of this kind of decisionmaking is that the implicit weights for political choices are very different from the conventional weights for economic decisions. This difference is shown graphically in Figure 8a. Looking <u>forward</u> from the beginning of an electoral period, the standard set of weights on an economic decision, using discount rate ρ, will have a time profile $\exp(-\rho t)$ shown as DE. The weights on a political decision (FABC) will have a weight $\exp(\mu t)$ up to the next election and zero thereafter.[2]

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[1] The voting function described in (33) is "myopic" in the sense that voters evaluate policies only over the electoral period $[0,\theta]$. More sophisticated and perhaps more satisfactory behavior would also include expected future performance. If expectations are sticky--and voters expect the future to replicate the present--then sophistication will not affect the outcome. On the other hand, if voters can predict future events perfectly and discount the future at the social discount rate, ρ, the system will tend toward the social optimum discussed above.

[2] The effect on decisionmaking can be easily compared for investment projects with perpetual income streams. An investment (replacing unit consumption) at time t (where $0 < t < \theta$) yielding an annual return of r per unit will be accepted by the economic system if $r > \rho$. It will be accepted by the political system if $\int_t^\theta r \exp[\mu(\theta-v)]dv = -r\{1 - \exp[\mu(\theta-t)]\}/\mu > 1$. For $\theta-t = 2$ and $\mu = .01$, the condition is that r be greater than <u>fifty</u> percent. This mechanism would certainly lead to a "social imbalance" between public and private investment.

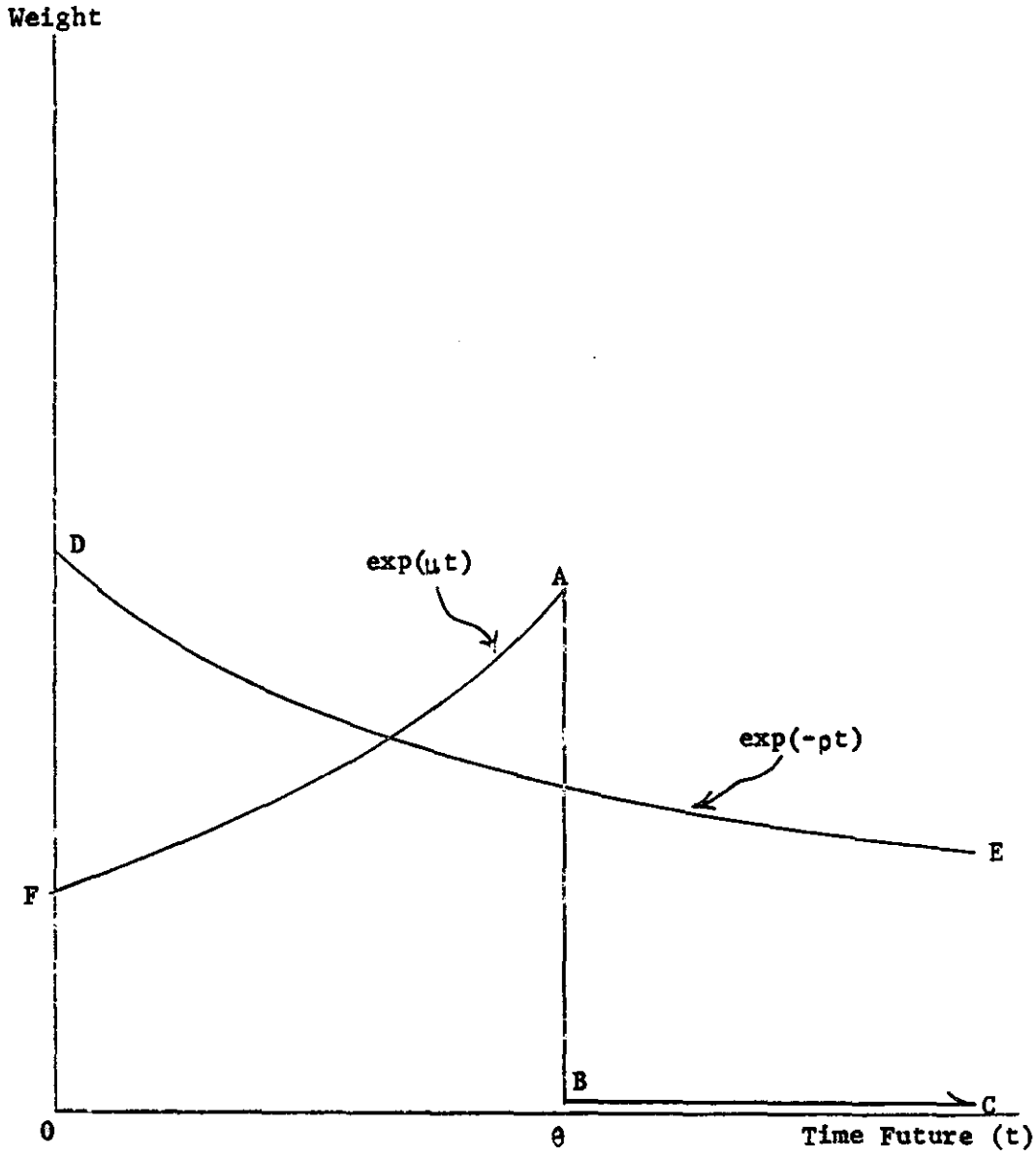

FIGURE 8a. POLITICAL WEIGHTING (FABC)
AND ECONOMIC WEIGHTING (DE)

We now consider the policymaker's problem formally. A <u>politically optimal program</u> for the party in power is one which maximizes the vote function in (33) subject to the economic constraints:

$$\pi_t = f(u_t) + \lambda v_t$$

$$\dot{v}_t = \gamma(\pi_t - v_t) \ .$$

The solution is relatively simple if we simplify the system as follows. Let the preference function be[1]

$$g(u,\pi) = -u^2 - \beta\pi \ , \quad \pi \geq 0 \ , \quad \beta > 0$$

and let $f(u)$ be

$$f(u) = \alpha_0 - \alpha_1 u$$

so

$$\pi = \alpha_0 - \alpha_1 u + \lambda v \ .$$

We can then rewrite the incumbent's vote function from (33) as

$$V_\theta = \int_0^\theta [-\beta\alpha_0 - u^2 + \beta\alpha_1 u - \beta\lambda v] e^{\mu t} dt$$

with the constraint

$$\dot{v} = \gamma[\alpha_0 - \alpha_1 u - (1-\lambda)v] \ .$$

---

[1] We restrict the function to the domain $\pi \geq 0$ as this is obviously where the solution lies.

The problem is now exactly the same as that set up in Section C. Using standard techniques, we have the Hamiltonian

$$H = e^{\mu t}\{\beta\alpha_1 u - \beta\alpha_0 - u^2 - \beta\lambda v + \psi\gamma[\alpha_0 - \alpha_1 u - (1-\lambda)v]\}$$

where

(34) $$\dot{\psi} = [\gamma(1-\lambda) - \mu]\psi + \beta\lambda$$

(35) $$\dot{v} = \gamma[\alpha_0 - \alpha_1 u - (1-\lambda)v] \ .$$

As in Section C, the variable ψ is the shadow price of inflation, but in this case the price is in terms of votes rather than social welfare. The party's optimal policy is given by (34), (35), and the maximum of H :

$$\frac{\partial H}{\partial u} = 0 = \beta\alpha_1 - 2u - \psi\gamma\alpha_1$$

or

(36) $$u = \alpha_1[\beta - \psi\gamma]/2 \ .$$

Solve (36) for ψ, differentiate this with respect to time, and substitute for ψ and $\dot{\psi}$ in (34):

(37) $$\dot{u} = Au + B$$

where $A = \gamma(1-\lambda) - \mu$ and $B = -\frac{1}{2}\alpha_1\beta(\gamma-\mu)$.

What is the typical policy. First, note that as election nears the shadow price on future inflation becomes nil ($\psi \to 0$ as $t \to \theta$) so u tends to $\beta\alpha_1/2$. Integrating (37) backwards from θ we get the optimal

policy $\{u^*(t)\}$:

$$u^*(t) = \left(\frac{\beta\alpha_1}{2} + \frac{B}{A}\right)\exp[A(t-\theta)] - \frac{B}{A} .$$

We can now easily describe the political business cycle. First note that the unemployment rate must be falling over the entire electoral regime.[1] It will fall relatively faster at the end or beginning depending on whether A is positive or negative respectively. The typical cycle will run as follows: immediately after an election the victor will raise unemployment to some relatively high level in order to combat inflation. As elections approach, the unemployment rate will be lowered until, on election eve, the unemployment rate will be lowered to the purely myopic point.

Figure 9 shows political business cycle based on approximate magnitudes for the United States.[2] The optimal policy gives a sawtoothed path for unemployment and a slightly smoothed path for inflation.[3]

We can easily compare the cycles which would be obtained under different parameter values. First notice that the length of the electoral

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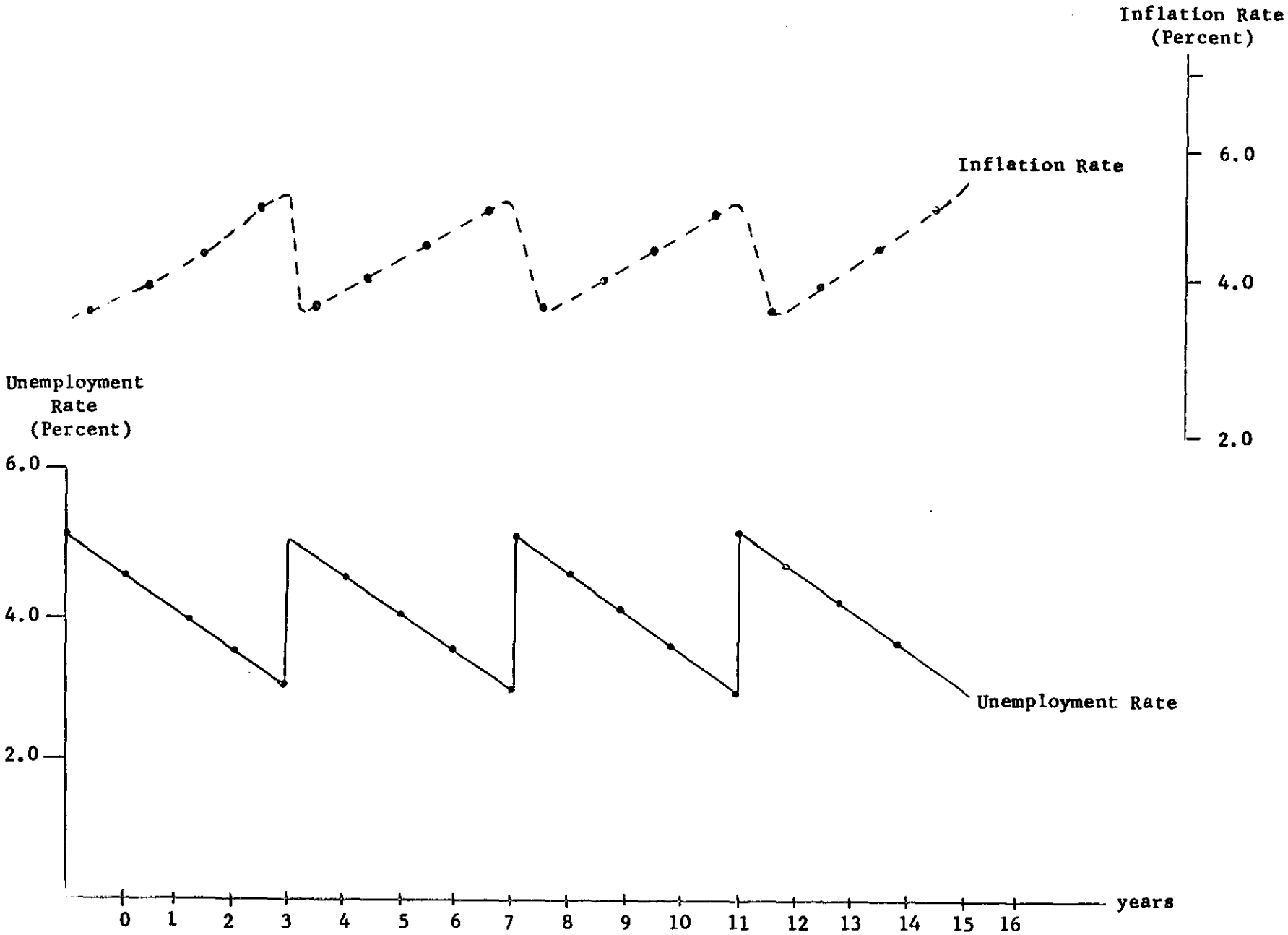
[1] This can be seen by noting (i) that $\dot{u}(\theta) = -\gamma\lambda u(\theta) < 0$, (ii) that if $A \geq 0$ and $\dot{u}$ is positive $\dot{u}$ will always be positive, and (iii) that if $A \leq 0$ and $\dot{u}$ is positive $\dot{u}(\theta) > 0$. Since (ii) and (iii) are exhaustive and either contradicts (i), $\dot{u}$ must be always nonpositive. The solution described is the steady state solution.

[2] Parameter values are $\beta\alpha_1/2 = 3.0\%$, $\lambda = 0.7$, $\gamma = 0.3$, $u = .03$. The values for γ and λ are consistent with deMenil and Enzler, op.cit.

[3] The sawtooth character of the cycle is a result of our assumption that unemployment can be changed instantaneously. (See footnote 1, on page 6). If realistic lags are introduced the cycle will be smoothed.

FIGURE 9. The Political Business Cycle



period does not enter into equation (37) so the longer the electoral period the larger is the political business cycle. The other important parameters are γ, μ, and $(1-\lambda)$. Take the case where θ is very large so $u^*(0) \cong -B/A = u^*(\theta)(\gamma-\mu)/[\gamma-\mu-\gamma\lambda]$. The item to note is that the initial unemployment rate will be high as $\gamma\lambda$ is large. Note that $\gamma\lambda$ is the rate of feedback of current policies on the long run values: the larger the feedback the more initial unpleasantness should be substituted for later pleasures. Finally, note that as the rate of decay of memory increases (μ is larger) the slope of the curve in Figure 9 increases downward.

F. GENERAL RESULTS[1]

Through the analysis given above we have assumed that the preferences of voters are stable and that the aggregate voting function is quasi-concave. We now return to the general system and discuss its properties.

Recall from Section B that individuals have quasi-concave preference functions:

$$U_t^i = U^i(z_t) \quad (3)$$

They vote on the basis of a comparison of actual performance (z_t) with expected performance $(\hat{z}_t)$:

$$V_t^i = \varpi^i(z_t, \hat{z}_t) = \begin{cases} 1 & \text{if } U^i(z_t)/U^i(\hat{z}_t) > 1 \\ 0 & \text{if } U^i(z_t)/U^i(\hat{z}_t) = 1 \\ -1 & \text{if } U^i(z_t)/U^i(\hat{z}_t) < 1 \end{cases} \quad (5)$$

where

$$\hat{z}_t = \delta z_{t-1} + (1-\delta)\hat{z}_{t-1} \quad (4)$$

and the aggregate voting function is

$$V_t = \sum_{i=1}^{n} \varpi^i(z_t, \hat{z}_t) .$$

---

[1] The present section is more technical than other sections and can be skipped without loss of continuity.

In the present section we consider whether the properties assumed for convenience in statements (8) and (10) carry over to the general system in (3), (4), and (5).

The use of aggregate voting functions as a social welfare function is full of perils. Three kinds of problems may arise: (1) There is first the danger that the "Arrow paradox" may arise, or that a voting function may lead to intransitive choices. In our static (or one period) decision problem, this is not a problem: the opportunity set is a convex set with a one-dimensional efficiency frontier and all individual preferences functions are quasi-concave. Gerald Kramer has shown that in such a case intransitivities cannot arise.

If, however, we broaden our horizon and view this as a multiperiod choice problem, with the entire future configuration of macroeconomic policies open to choice, intransitivity may result. We have ruled out this possibility by assuming myopic decisionmaking on the part of individuals.

(2) A more serious problem is the possibility that (at least in the short run) the aggregate voting function may not have the proper shape (quasi concavity) even if individual preferences do.[1] An example of irregularity is shown in Figure 9a. Here the heavy line dividing minority from majority vote is jagged and does not describe a convex sex. It can be easily seen that this possibility will often arise for voting involving less than unanimous decisions, but can never arise for cases involving unanimity.

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[1]This possibility was, to my knowledge, first noted by Susan Lepper, op.cit.

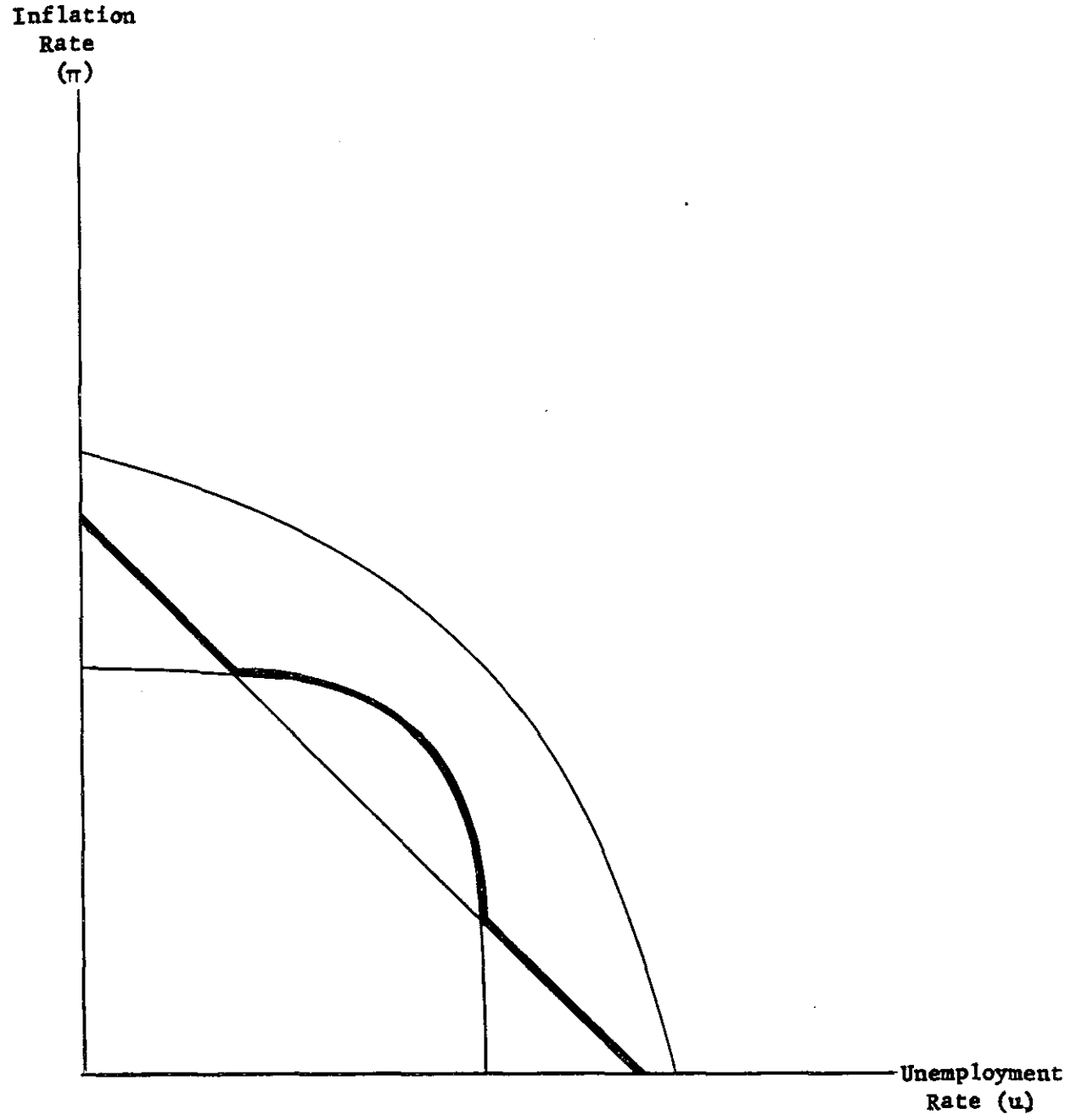

FIGURE 9a. Irregular Aggregate Voting Function

In any case, the possibility of an irregular shape for the aggregate voting function does not appear to be a serious shortcoming. At worst, this may produce cyclical behavior or corner solutions.

(3) The most serious shortcoming of using the aggregate voting function as a social welfare function is that it assumes the function is exogenously given. As we noted in Section B, it is clearly more reasonable to assume that individuals adjust their expectations and consequently their voting to experience rather than having these fixed and innate preferences between political parties or platforms.[1]

Strictly speaking, if we assume fixed utility functions and constraints, but allow adaptive behavior as discussed briefly in Section B above, we get a different picture of the aggregate voting function. Recall that for an individual the vote line shown in Figure 9a is the indifference curve corresponding to the expected or accumstomed level of economic variables; call this the normal indifference curve for short. Clearly, the aggregate voting function will be stable only when the normal indifference curves (and therefore the accustomed economic conditions) are unchanged.

The crucial questions are then: first, when will the aggregate voting function be stable? And, second, what will the aggregate voting function look like when it has stabilized? The answer to the first question is clearly that the aggregate voting function will stabilize only when the

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[1]The Veblen-Duesenberry-Galbraith skepticism about innate preferences (or fixed utility functions) adds a further reason for questioning the assumption.

economic conditions have stabilized, as happens eventually in the model outlined above in Section D.[1] The answer to the second question is of some general interest. Consider an economy with three (groups of) individuals, and consider the aggregate voting function at three points on a Phillips curve in Figure 10. We have not indicated whether the Phillips curve is a short-run or a long-run curve. Clearly planning authorities should refer to the long-run curve. For the political mechanism we are examining, however, the short-run curve is clearly the relevant curve. The indifference curves are normal indifference curves corresponding to point A (in Figure 10a), B (in Figure 10b), and C (in Figure 10c). In Figure 10a, we have shown the solution corresponding to the long-run stable solution. It is interesting to note that point A is the vote maximizing point when expectations have adjusted so as to expect the utility of A to be the normal level. Point A is also the majority rule point among all feasible points on the opportunity locus.

At any other point on the Phillips curve (say B in Figure 10b) there is a range of policies (say between B and D) which will improve the vote for the incumbent. According to the adjustment mechanism specified above the system will eventually converge on point A .

We thus conclude that when an aggregate voting function is likely to be adaptive the information in this function of the same general nature

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[1] There is the possibility that an endogenous aggregate voting function will destabilize the stable system discussed in Section D. This is clearly not the case in either extreme [either $\delta = 0$ or $\delta = 1$ in equation (4)], but intermediate cases have not been investigated.

FIGURE 10. Long-Run Solutions with Adaptive Voting Behavior

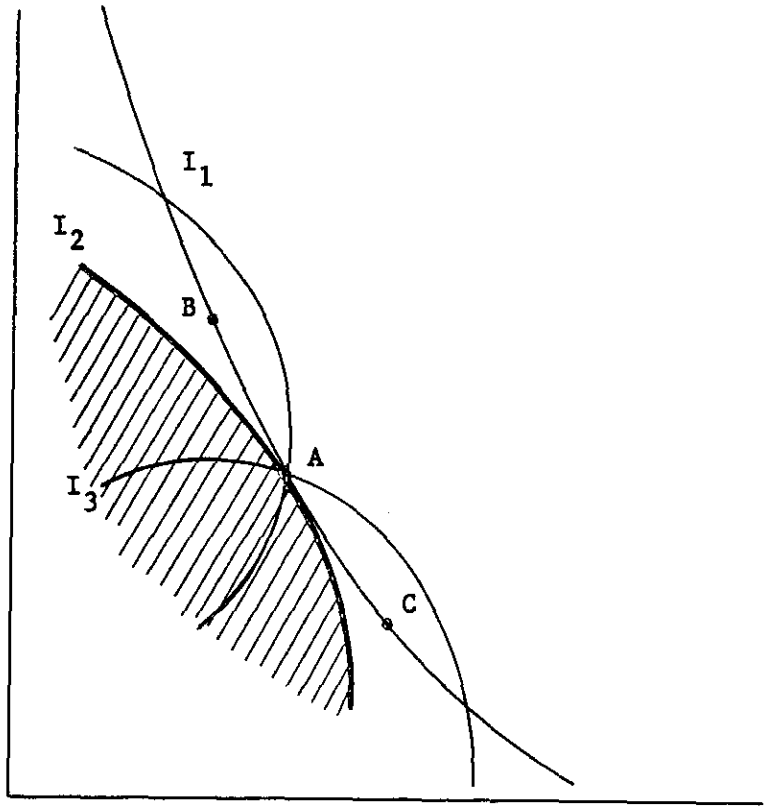

FIGURE 10a

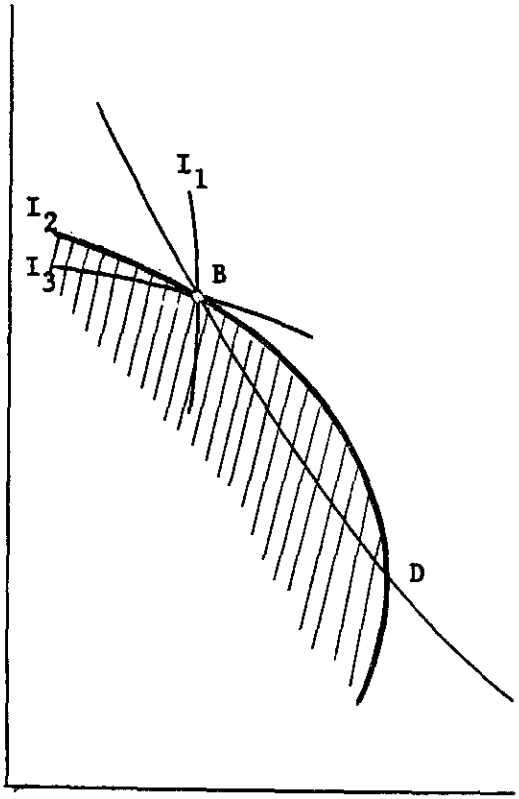

FIGURE 10b

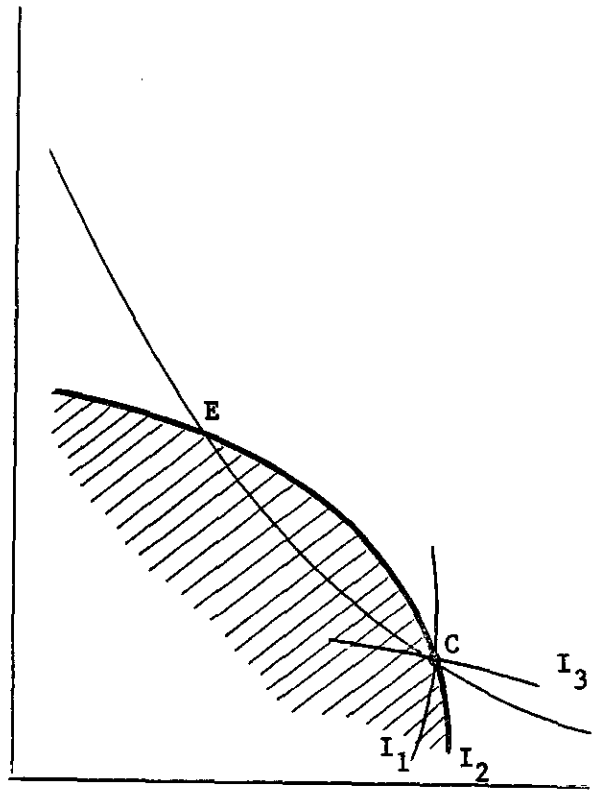

FIGURE 10c

G. HISTORICAL EVIDENCE

The highly simplified model of macroeconomic policy outlined above has two important predictions: (I) that the politically determined policy choice will have lower unemployment and higher inflation than is optimal and (II) that the optimal partisan policy will lead to a political business cycle, with unemployment and deflation in early years followed by an inflationary boom as elections approach.[1] Proposition I is not easily tested, but we can look for evidence of II.

Under what conditions would Proposition II be observed? The three important conditions are: (a) that the government be chosen in periodic competitive elections, (b) that the government have sufficient economic control and sophistication to move the economy in the desired direction, and (c) that the voting function be myopic in the sense defined above.[2] A quick review of macroeconomic policies led to the conclusion that four countries where these conditions might hold are Great Britain, United States, Sweden and New Zealand, which have used stabilization policies for most of the last twenty years.

The evidence for three countries is shown graphically in Figure 11. This chart shows the behavior of unemployment rates as continuous lines

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[1] We also consider the strategy in an open economy where the "stock variable" (v) is reserves of foreign exchange and the "flow variable" (u) is imports. In this situation the prediction is that imports will be restrained to build up foreign exchange in the early part of the cycle and imports will be gradually freed as elections approach.

[2] See footnote 1, page 33.

as in plebiscitary (or static) decisions. Further, although this has not been rigorously proved, it appears that the conclusions uncovered for stable aggregate voting functions appear justified for the adaptive mechanism as well.

Finally, note that while the long-run economic outcome is stable with the adaptive mechanism, the plurality of the incumbent (or the opposition) gradually evaporates (V tends to zero) as voters get accustomed to the equilibrium economic outcome. It would appear that elections will then be very close, and that random, noneconomic, or irrational events will determine the outcome. Thus economic stability implies political instability.

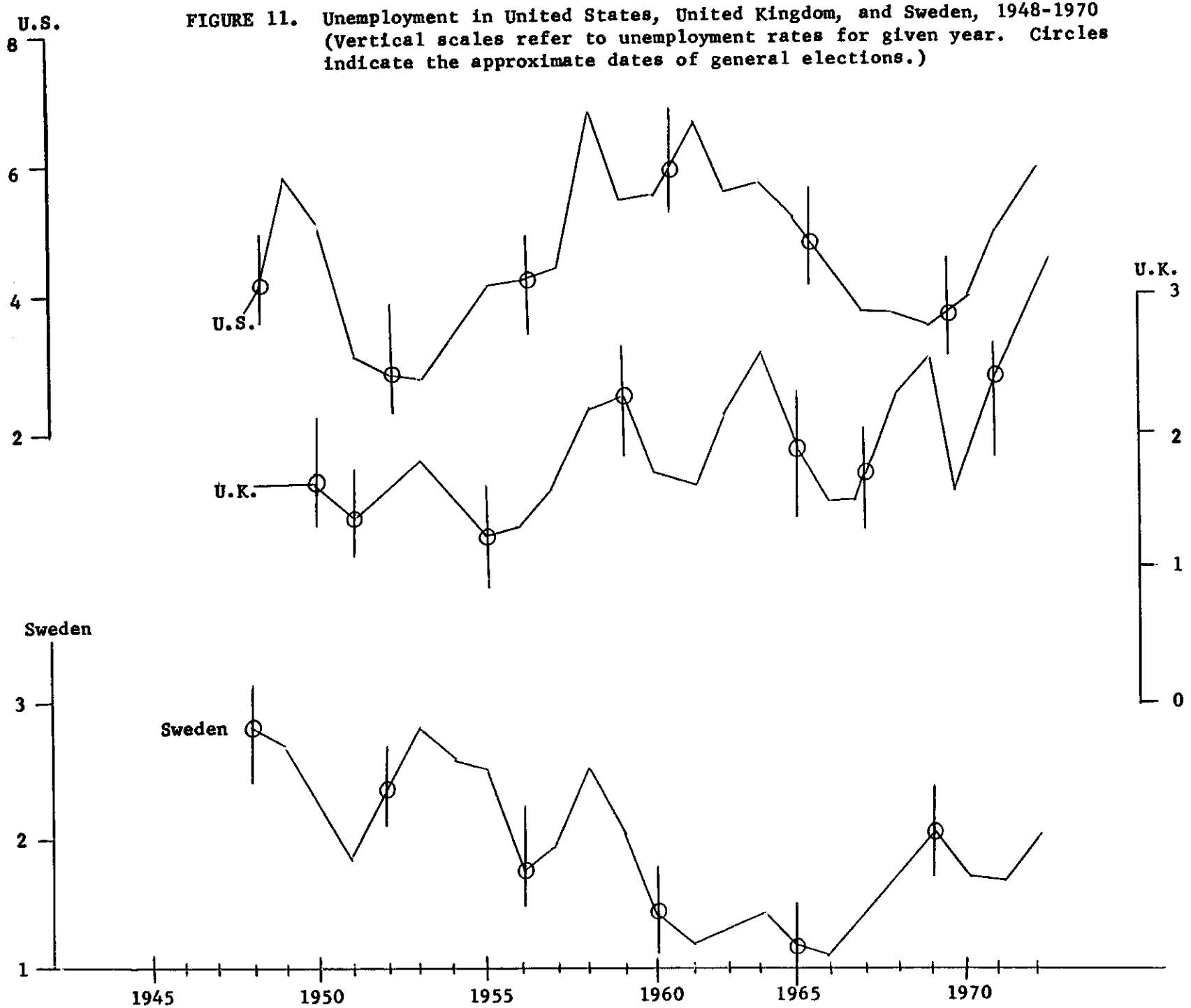

FIGURE 11. Unemployment in United States, United Kingdom, and Sweden, 1948-1970 (Vertical scales refer to unemployment rates for given year. Circles indicate the approximate dates of general elections.)

and the points of general elections as circles.[1] Proposition II states that the lines should rise after elections and fall before elections. The evidence is mixed. Especially strong political business cycles appear for the 1951-55, 1959-64, and post-1966 and post-1970 periods for the U.K.; for the 1952-56 and 1956-60 periods for Sweden; and for almost all postwar elections in the U.S.

Since the annual figures are likely to hide some of the movement near elections, Figures 12 and 13 examine monthly or quarterly data for the U.K. and U.S. The same general pattern stands out as in the annual figures. In Figure 12 the U.S. monthly data indicates very strong conformity with the theory for the elections of 1948, 1952 and 1956, with unemployment falling sharply before elections and rising after elections. Moreover, unemployment was falling before the 1964 election, and has risen sharply since the 1968 election. It is interesting to note that the two elections for which the pre-election patterns do not fit the theory (1960 and 1968) are years in which the incumbent party lost.

The quarterly and monthly figures for the U.K. are less definite. The elections for 1951, 1964, and 1966 show a rough correspondence to the theory, while the pattern after the 1970 election and before the 1955 and 1959 elections behaves as predicted. A closer look at the British postwar period, however, indicates why the simplest model might perform poorly, at least prior to the 1967 devaluation of the pound. Before 1967, macroeconomic policy was severely constrained by the British balance of payments position. As Samuel Brittain has written:[2]

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[1] Sources are the U.N. Statistical Yearbook, U.S. Economic Report of the President, National Institute Economic Review, and Swedish National Budget.

[2] Samuel Brittain, The Treasury under the Tories 1951-1964, Pelican, 1964, p. 288.

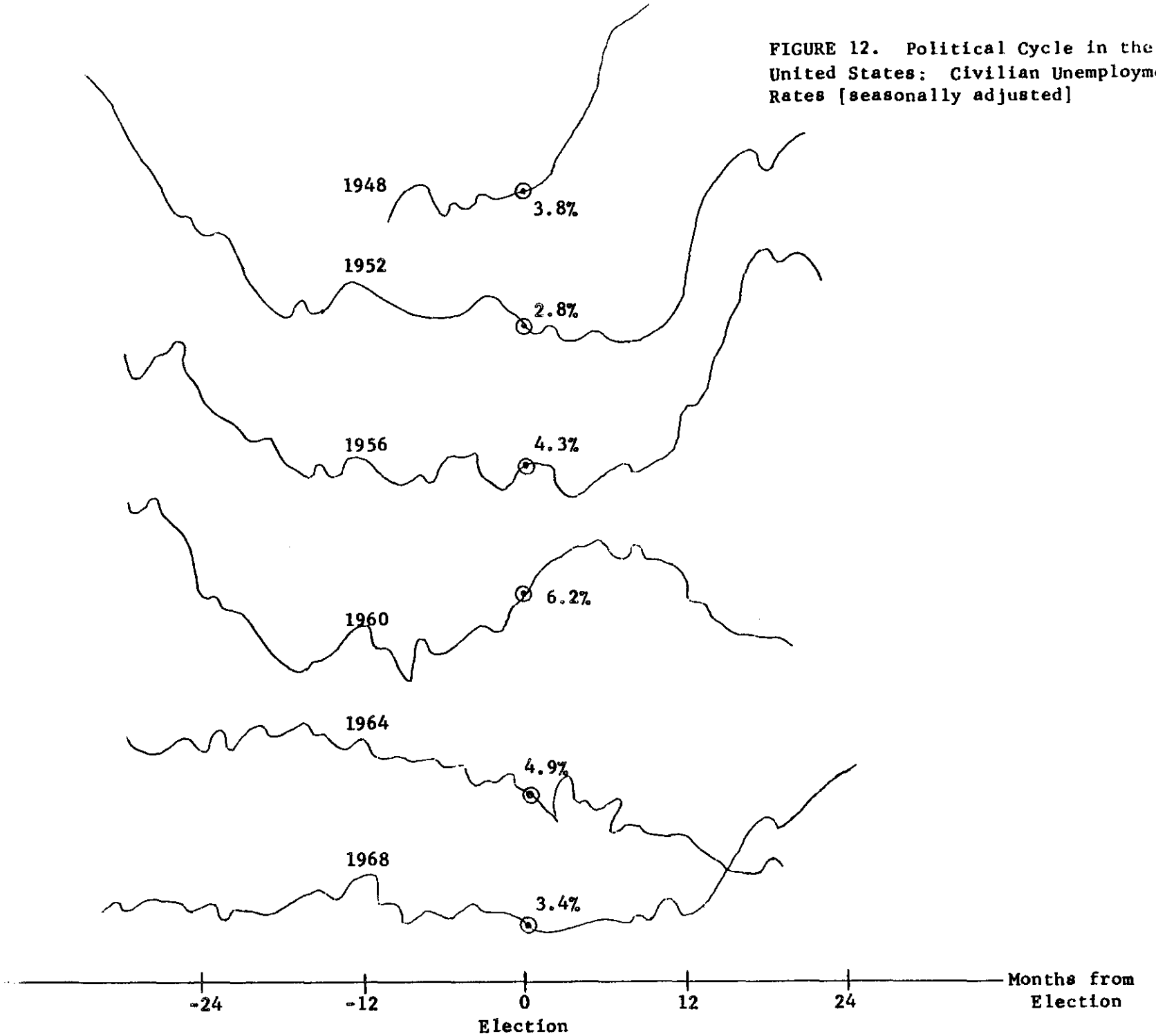
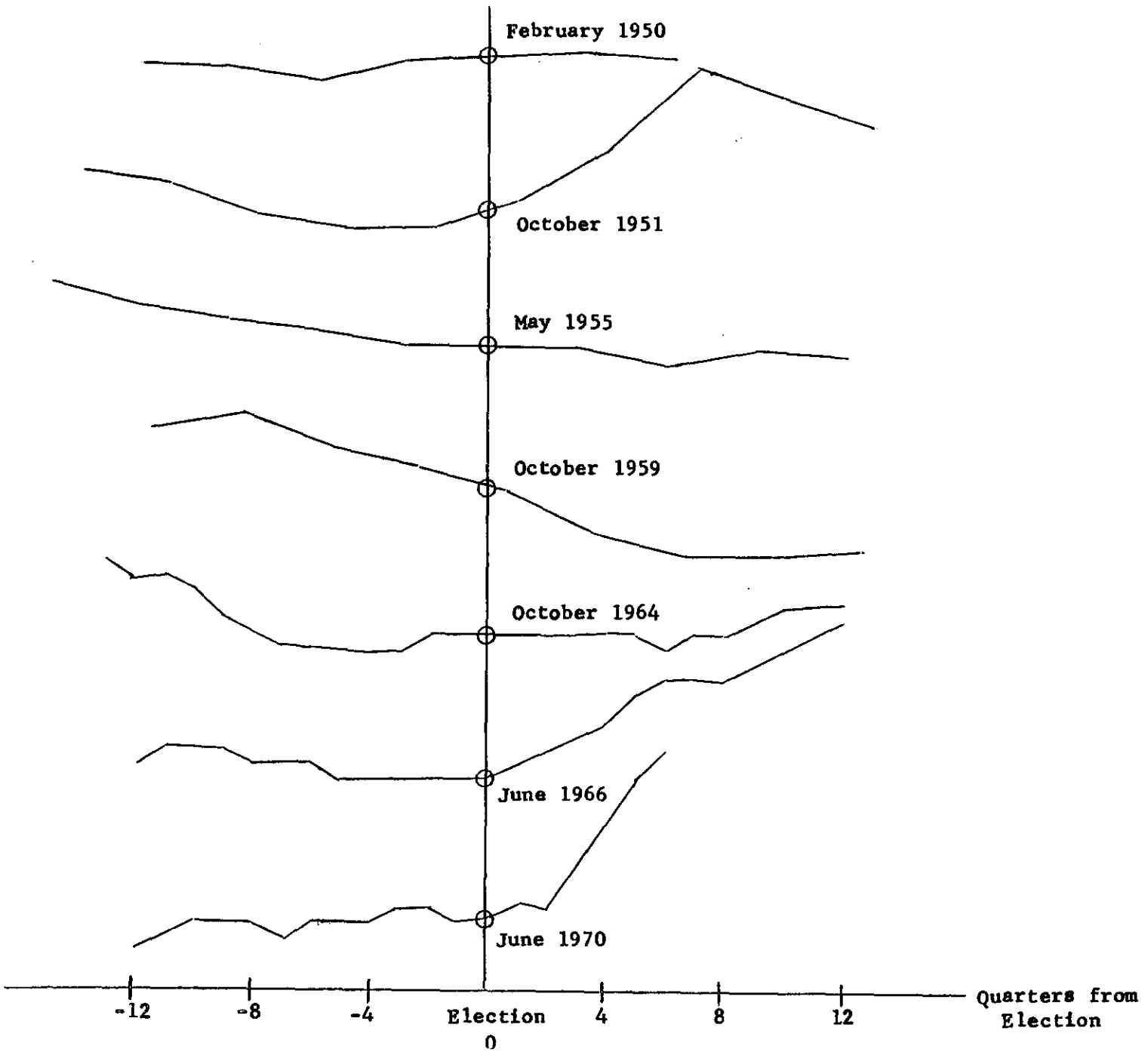


FIGURE 12. Political Cycle in the United States: Civilian Unemployment Rates [seasonally adjusted]

FIGURE 13. Percentage Unemployment U.K. (seasonally adjusted)



> In the 1950s and early 1960s the Treasury behaved like a simple Pavlovian dog responding to two main stimuli: one is "a run on the reserves" and the other is "500,000 unemployed."

In other words the stimulus of the balance of payments was so urgent that the balance of payments cycle may have swamped the political cycle.[1] It is fairly clear that this factor explains one perverse relation (post 1955) and leaves three others unexplained (pre-1950, post-1959, and pre-1970). It is interesting to note that in two cases where the pre-election behavior was perverse, in 1950 the election was very close, while in 1970 the incumbents suffered a surprise loss.

The current economic program in the United States is a textbook example of planning for the political business cycle. The Nixon "game plan" called for a recession during the early part of the administration, and unemployment rose from 3.4% in late 1968 to 6.0% in late 1970. Most economists felt that this drastic recession would make a substantial inroad on the rate of inflation. The announced plan of the Administration (in the 1971 Economic Report of the President) was then to return to 4.5% unemployment by late 1972, that is by the 1972 election.[2] The "game plan" did not work perfectly, however, for the inflation was more stubborn than anyone had anticipated. This led to the "New Economic Policy," with an expansionary fiscal policy aided by wage and price controls.

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[1] Ibid., Chapter 9.

[2] See the Economic Report of the President, 1971, p. 78. This goal was modified in the 1972 Report to account for the worse-than-expected performance in 1971. For a more detailed description of the personalities and politics, see Gilbert Burck, "Inflation: Hard Going for the Game Plan," Fortune, May 1970.

Similarly, in the U.K. the favorable post-1967 devaluation balance of payments has allowed a focus on domestic economic affairs. The "game plan" of the Heath government was identical to that of the Nixon Administration. David Wood, the London Times political editor, has written:[1]

> Nor are Mr. Heath and those closest to him flinching from the certain prospect of a sharp increase in unemployment, as the failure of Rolls-Royce sends repercussions throughout British industry.
>
> They believe that in the four years of life that remain in this Parliament there will be time for the Government's general economic strategy to evolve, and that an early period of unpopularity over high unemployment figures can be survived. Indeed, senior ministers may think that an increase in unemployment at this stage may force industry and the trade unions to face the realities of Britain's economic position and thereby help to counter inflation!

As a final example, we can examine the political business cycle for New Zealand.[1] As suggested above the proper index for an open economy like New Zealand is imports, which are almost completely subject to government controls. Moreover, unemployment is negligible. Figure 14 shows the rate of growth of imports over the period 1950-1969 along with election timing. The conformity of imports to politics is almost perfect.

The foregoing descriptive analysis can be formulated in Table 1. This shows the fraction of the time that the cycles conformed to theory and the probability that this frequency would occur by chance. The evidence for a political business cycle especially plausible for New Zealand,

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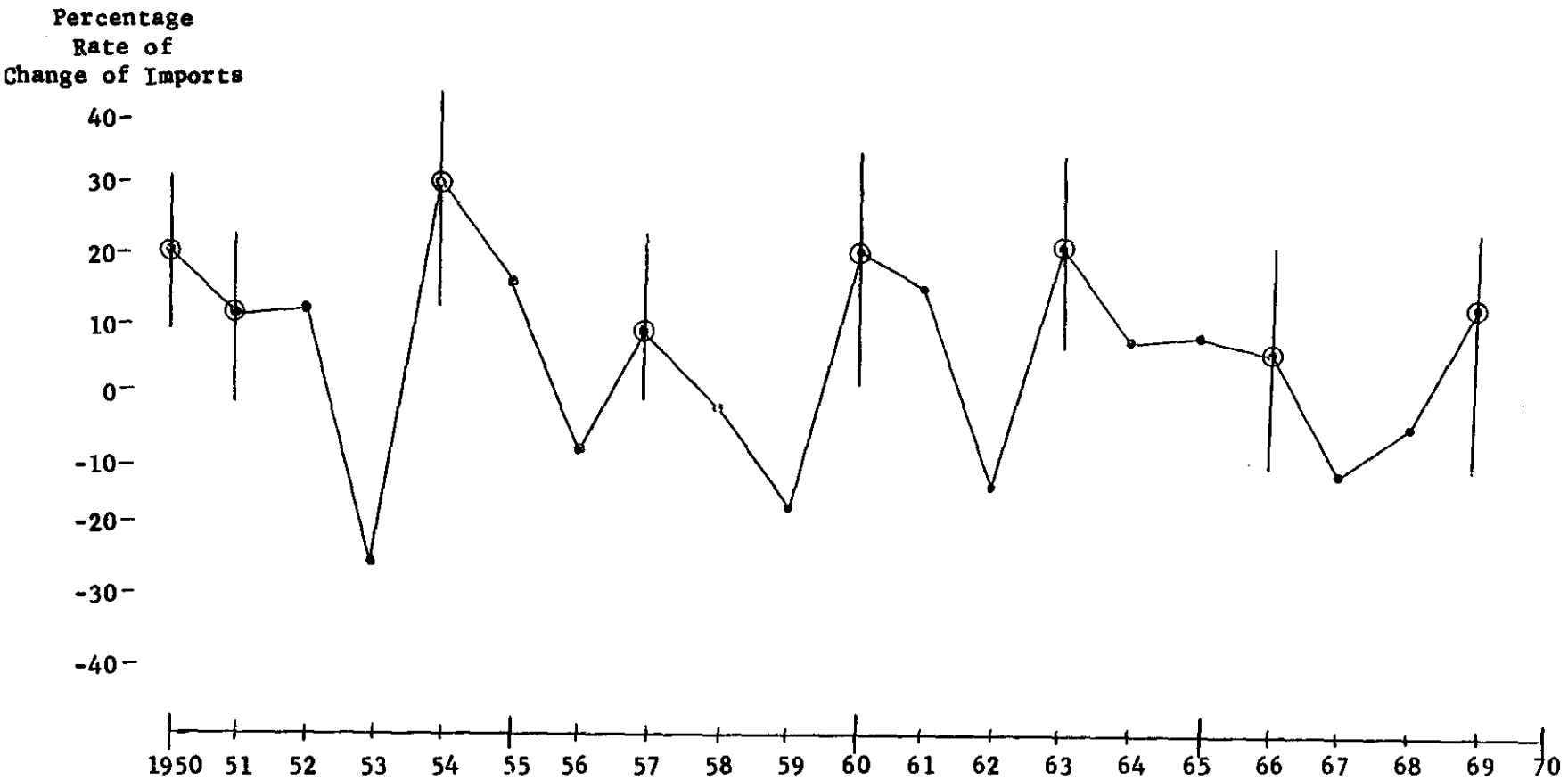
[1] The Times, February 9, 1971, p. 1.

[2] I am endebted to John Llewellyn for bringing this to my attention.

FIGURE 14. Rate of Growth of Imports, New Zealand, 1950-1969



the U.S., and the U.K., and unimpressive for Sweden. Assuming that the chance of indicators rising or falling is one-half, and that successive occurrences are independent,[1] the probability of the observed behavior due to chance is:

U.S.	0.01
U.K.	0.03
N.Z.	0.003
Sweden	0.37
Overall	0.5×10^{-6}

Using normal statistical criteria, it is unlikely that the occurrences were due to chance in the U.S. or U.K., extremely remote for New Zealand, and

---

[1] It must be noted that the assumption of independence is probably not warranted. Two possibilities have been brought to my attention: (1) If there is any dynamic structure to the economic system, it is possible that the probabilities would be understated. For example, if the business cycle were a completely exogenous sinusoidal fluctuation with a period the same length of the election cycle, the probability of perfect prediction for, say, seven electoral periods would be exactly one half rather than 0.0001. On the other hand, if the periods are out of phase by the fraction 1/2n, the prediction for n electoral periods, the probability is exactly zero. Without having derived exact results it appears that, given the sensitivity of the correlation to the period of the exogenous cycle, it is unlikely that the results in Table 1 are grossly misstated.

(2) A second possibility is that the movements of economic conditions are not independent. Thus let the structure be $u_t = \bar{u} + \epsilon_t$, where the ϵ_t are independent. In this case our criterion, $u_t - u_{t-1} = \epsilon_t - \epsilon_{t-1}$, is serially correlated. The magnitude of error can be judged by the following example. Suppose ϵ takes value $(-1, 0, +1)$, each with equal probability. The probability that the sign pattern is $(+, -)$ (as is predicted) is 5/27 in the case of non-independence and 3/27 in the case of dependence. Differences of this magnitude (which probably overstate the dependence) will not appreciably change the results.

clearly possible for Sweden. One final item which does not appear in the charts is that the theory works considerably better for the period after elections than before elections. This reinforces the belief that unpopular economic measures are often postponed until elections are over.

In sum, given both casual and formal evidence of economic behavior, and the historical record in the countries examined, it is clear that a political business cycle is a significant factor in the operation of capitalistic democratic economies.

TABLE 1

Trends Before and After Elections

	U.S.	U.K.	N.Z.	Sweden	Total
Before Elections					
Indicator rising	1	1	1	2	5
Indicator falling*	4	4	5	3	16
p	.18	.18	.11	.50	.013
After Elections					
Indicator rising*	5	5	6	3	19
Indicator falling	0	1	0	2	3
p	.03	.11	.016	.50	.0004
Total					
Conforms with theory*	9	9	11	6	35
Does not conform with theory	1	2	1	4	8
p	.011	.033	.0032	.37	0.50×10^{-6}

Note: Indicators were unemployment rates for U.K., U.S., and Sweden, and rate of growth of imports for N.Z. An "Indicator is rising" if welfare is being increased--i.e., when unemployment falls or imports rise.

Calculations were made for the eighteen months before and after elections. The following points were omitted as inconclusive: for the U.S., the post-1960 period; for the U.K., the pre-1970 period, the post-1950 period, and the post-1955 period; New Zealand omits the short 1950-51 period. All periods are included for Sweden.

The "p's" indicate the probability that the given number of successful theoretical prediction (marked by *) would have occurred by chance.

H. CONCLUSIONS AND REMEDIES

In the analysis presented above we have discussed the behavior of democratic political systems which face choices between present and future welfare. The specific case examined was the tradeoff between inflation and unemployment. The general conclusion was that a perfect democracy with retrospective evaluation of parties will make decisions biased against future generations. Moreover, within an incumbent's term in office there is a predictable pattern of policy, starting with relative austerity in early years and ending with the potlatch right before elections.

The analysis applies in a similar way to other choices involving intertemporal choice. One example examined briefly above was balance of payments policy. It is predicted that the concern with loss of reserves and balance of payments deficits will be greater in the beginning of electoral regimes, and less toward the end.

A second and more important example is the process of social investment. To the extent that investment requires a subtraction from present consumption through taxation or inflation in order to raise consumption after the next election, the theory outlined here indicates that the level of such investment will be lower than is optimal. More specifically, in equilibrium the social rate of return on public investment will be higher than for private investment because of the democratic myopia. This result indicates that the famous "theory of social unbalance" of the private and public sector (discussed especially by J.K. Galbraith in The Affluent Society) is very plausible on theoretical grounds.

The basic difficulty in making intertemporal choices in democratic systems is that the implicit weighting function on consumption has positive weight during the electoral period and zero (or small) weights in the future. This is illustrated and compared with the usual pattern of exponentially declining weights in Figure 8a above.

It should be noted that the conclusions given above hold for either socialist or capitalist democracies. The only difference (as noted below) is that planned economies may show less fluctuation within electoral periods than unplanned economies.

Are there any remedies for these biases in democratic systems? Some possibilities for the case of the unemployment-inflation bias and the political business cycle are as follows:

1. An obvious solution (perhaps the "classical" political solution) is to improve the information available to voters so they can judge and condemn the partisan nature of myopic economic policies. When the transmission and reception of information is cheap, this is probably a sound policy for with proper information about the long-run trade-off, both the bias and the political business cycle disappear. On the other hand, it is clearly unrealistic to ask each citizen to carry a full-scale econometric model of the wage-price-unemployment nexus in his head. We question the practical possibility of the "classical" solution in such complicated matters.

2. It is possible to examine the effect of the electoral period on the decision process. The conclusion is that there is some effect of the length of the period on the level of welfare, with a shorter period reducing amplitude and raising the average inflation rate. In any case, this is only

a "second-best" solution: it does not remove the long-run bias and cyclical movement simultaneously. Moreover, there may be more important considerations in determining the length of the electoral period.[1]

3. A third possibility is to entrust economic policy to persons who will not be tempted by the Sirens of partisan politics. This procedure is typical for monetary policy, which for historical reasons is lodged in central banks (as in the independent Federal Reserve System in the U.S. or the Bank of England). A similar possibility is to turn fiscal policy over to a Treasury dominated by civil servants.[2] It may be objected, however, that delegating responsibility to an agency which is not politically responsive to legitimate needs is even more dangerous than a few cycles. This danger is frequently alleged regarding central banks which pay more attention to the "soundness of the dollar" or the latest monetarist craze than to fundamental policy problems. The costs and benefits of independent policy determination are difficult to weigh.

4. A different kind of solution is an "incomes policy." This removes the political business cycle by making the underlying trade-off disappear. The first possibility is to shift the Phillips curve to the left by various policies (manpower programs, wage and price controls, etc.). It can be

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[1] It should be noted that non-synchronization of electoral periods (as in the U.S.) should reduce the amplitude of the political business cycle. Since there is no time at which all officials are up for election, the day of potlatch never arrives. The average bias in decisions will, however, be unaffected.

[2] It is interesting to note that monetary policy is generally less closely controlled by representative bodies than is fiscal policy. Since monetary policy is central to allocation over time, this may be more desirable than is usually supposed.

shown that the amplitude of the political business cycle is a linear function of its slope, so that by "flattening" the curve we can reduce the political cycle. A second aspect of incomes policy is to reduce the burden of inflation. It is easily verified that by giving comfort to those hurt by inflation the magnitude of the cycle is decreased.

There is little doubt that if we could cure the disease, its symptoms would disappear. Many economists doubt whether inflation unemployment trade-off can be significantly improved within the traditions of a liberal mixed capitalist system. Even if this ailment were cured the more general problem --scarcity of resources and the need for investment--shows no sign of disappearing. As long as social investment remains a scarce good, the bias of political decisionmaking will be a serious problem.

5. A final approach is to broaden the base of participation in policy-making, as in the tradition of indicative planning. The planning framework forces governments to set down their policy and negotiate this policy with the opposition, with labor and management, and perhaps with other interest groups. It would be very difficult for a government to persuade the other interest groups to accept a plan which deliberately projects a political business cycle or uses myopic decision rules. Moreover, an agreement by all political parties to abstain from politically induced cycles would lead to a politically preferable state of the economy. As evidence, we note that among advanced countries those countries showing the highest cyclical variability are the unplanned economies of the U.S., Canada, Japan, and West Germany; while those showing the least cyclical variation are the

planned economies France and Sweden.[1]

Of these possibilities, the planning framework seems the most likely to be successful without having undesirable side-effects.

[1]Variation is the variance around a logarithmic growth trend for GNP over the period 1950-67. The order of countries (starting with highest variance) is Japan, Canada, Germany, U.S., Netherlands, Belgium, Italy, U.K., Sweden, and France.