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Price Controls and Electoral Cycles

by

Pierre-Richard Agénor and Carlos M. Asilis

Authorized for Distribution by Donald J. Mathieson

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Abstract

This paper studies the interactions between electoral considerations and the imposition of price controls by opportunistic policymakers. The analysis shows that a policy cycle emerges in which price controls are imposed in periods leading to the election, and removed immediately afterwards. The shape of the cycle is shown to depend on the periodicity of elections, the relative weight attached by the public to inflation as opposed to the macroeconomic distortions associated with price controls, the nature of wage contracts, and the degree of uncertainty about the term in office.

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I. Introduction

Price controls have been used repeatedly in the context of stabilization programs in developing countries, despite the well-known allocative inefficiences that they generate. 1/ At the analytical level, various rationales have been advocated for the temporary use of price controls in disinflation programs. 2/ A first rationale stresses the inertia associated with backward-looking expectations and lagged wage indexation. A second hinges on the presence of staggered prices and wage contracts in settings where expectations are forward looking. A third alludes to credibility effects that controls may confer to restrictive monetary and fiscal policies. A fourth rationale emphasizes the role that price controls may play in enhancing political support. The first three rationales share the notion that inflation is a persistent process, while differing with regard to the source of such persistence.

The "expectational" view forms the basis of the so-called "heterodox" approach, and represents the argument most often referred to by policymakers--or their advisers--for justifying the implementation of price controls. This view is based on the notion that inflation displays inertia because it feeds upon itself through widespread indexation and backward-looking inflationary expectations. 3/ "Orthodox" disinflation policies (based on tight monetary and fiscal policies) are viewed in this context as largely ineffective. It has been argued that although controls distort relative prices, they may help remove the inertia by enabling the economy to shift rapidly from high to low inflation, thereby reducing the output cost of disinflation programs.

Bruno and Fischer (1990) provide a somewhat related "expectational" justification for price controls. They consider a setting in which an economy may possess two steady-state equilibria, the first characterized by a "high" inflation rate and the other by a "low" rate. If both equilibria are stable--a typical case under adaptive expectations--then price controls can help move the economy from the

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1/ See Dornbusch et al. (1990) and Kiguel and Liviatan (1992) for an overview of stabilization programs based on price and wage controls, particularly in Latin America.

2/ There exists a large consensus among macroeconomists that price controls can be useful--if at all--only in the short run and that they are often counter-productive in the longer run, particularly when they are used as a substitute for monetary and fiscal adjustment.

3/ See, for instance, Arida and Lara-Resende (1985). The early analytical literature on price controls did not explictly relate inflation to wage indexation, but emphasized rather the existence of backward-looking expectations (see Possen, 1978, and Shupp, 1976).

high-inflation equilibrium to the low one by dampening expectations during the transition process. A similar idea, although in a very different framework, appears in Dornbusch and Simonsen (1988). They examine the problem of coordination in the transition to a low-inflation state and argue that, in an economy where agents interact strategically, controls can act as a coordination device in shifting the economy from the high- to the low-inflation equilibrium. A price freeze provides individual firms with information the market mechanism may not be able to convey: it signals to each firm that all others will set their prices under the same rule, thus removing an important obstacle in moving the economy to a low-inflation state.

A second branch of the literature endorsing the use of price controls is the "staggered contracts" approach--or, more generally, staggered price setting--which implies a low degree of synchronization of prices and wages. According to this approach, even if expectations are rational and the government is fully credible, disinflation may lead to a recession, since wages that were determined in the past may be too high. Cukierman (1988) follows this approach in arguing that in an economy with staggered contracts, price and wage controls can alleviate dynamic inconsistency problems that arise as a result of the interaction between the government and labor unions in the presence of nominal rigidities and high inflationary expectations inherited from before the stabilization. Alternatively, in an economy with staggered price setting--as described, for instance, in Blanchard (1983)--controls may help reduce information costs incurred by consumers in the transition period while learning about prices, and avoid the temporary recession caused by a disinflation policy (Zeira, 1989).

The imposition of price controls can also influence inflationary expectations directly by means of a credibility effect, to the extent that agents are led to believe that future rates of inflation would be lower than what they would be otherwise in the absence of such controls. 1/ An immediate downward adjustment of expectations would contribute to a reduction of the actual inflation rate. The lack of policy credibility as a source of inflation persistence has been emphasized by Blejer and Liviatan (1987), Persson and van Wijnbergen (1993), and van Wijnbergen (1988). In Blejer and Liviatan's analysis, the lack of credibility stems from a severe problem of asymmetric information between the public and the government. At the outset of a stabilization program, private agents do not entirely believe the authorities' commitment to disinflate, and need time to verify the new policy stance. A price freeze in this context gives the policymaker a period of time during which it can convince the public--by adopting, and sticking to, restrictive monetary and fiscal policies--of the

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1/ Kiguel and Liviatan (1992) have argued that in high-inflation economies, staggered price setting is not the prime cause for persistence. In such economies, contracts are of a very short duration and highly synchronized. Inertia stems mainly from credibility and coordination problems.

seriousness of its policy targets. 1/ A game-theoretic analysis of the mechanisms through which controls can assist in establishing credibility has been provided by Persson and van Wijnbergen (1993), who build upon the "signaling" model developed by Vickers (1986). In this framework, the policymaker must signal its willingness to accept a recession in order to gain credibility--without resorting to inflationary measures and without giving in to pressures to reverse its policy stance. Price and wage controls allow the policymaker to minimize the cost of signaling its commitment to disinflate. However, as shown by Agénor (1992), the credibility effect of price controls will vanish if the policymaker is unable to control all prices and if forward-looking price setters in the free sector understand the policymaker's incentive--in an attempt to reduce the macroeconomic costs associated with a price freeze--to depart from a pre-announced price adjustment policy. The imposition of price controls in this setting may paradoxically lead to inflation inertia.

The political argument for price controls rests on the premise that a stabilization program must be able to stop inflation quickly, without too large an increase in unemployment, because otherwise the political consensus necessary for implementing the program would collapse, leading to loss of confidence and eventually to an abandonment of the program (Jonung, 1990). If controls can be made binding, a government that faces a fragile coalition of political forces or uncertain reelection prospects may be tempted to impose a price and wage freeze. 2/ Moreover, price controls have an attractive feature from a political standpoint: they can be put into effect immediately. Hence a government can create the impression that it is taking positive steps towards adjusting "the fundamentals." Therefore, price controls may yield immediate political gains whereas the associated political and economic costs become evident only in the longer run. Moreover, these costs are often difficult to identify as the consequences of price controls. By contrast, an orthodox disinflation program produces the opposite sequence of political costs and benefits: it typically results in rising unemployment in the short run whereas the fall in the rate of inflation tends to occur gradually over time. Hence private agents (who are also voters) tend to associate the introduction of an orthodox policy of aggregate demand restraint with increased unemployment and an unchanged rate of

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1/ However, in the Blejer-Liviatan framework the use of price and wage controls can also be counter-productive, since a freeze does not enable the public to learn whether the fiscal restraint is sufficient, that is, whether inflation has really stopped or is only temporarily repressed. Thus controls may also lengthen the adjustment period to a new equilibrium.

2/ Price controls, even when legally binding, have been notoriously difficult to enforce in developing countries. In Chile, for instance, inflation reached 558 percent in August 1973, in spite of widespread price controls (Corbo and Solimano, 1991).

inflation. A government facing elections or a fragile coalition may have therefore little incentive to adopt orthodox stabilization measures.

This paper focuses on the interactions between electoral considerations and the decision to implement--and, eventually, abandon--price controls by opportunistic policymakers. Section II presents the microeconomic foundations of the analysis. Section III characterizes the role of price controls in the context of the electoral cycle under alternative assumptions about the formation of wage contracts, and discusses the effects of changes in key parameters (including the degree of wage inertia, the structure of voters' preferences, and the election date) on the path of controlled prices. Section IV discusses an extended setting in which the incumbent policymaker faces, at any given moment in time, a positive probability of losing office, as a result of a collapse of the political coalition supporting it. Finally, Section V summarizes the key results of the paper and examines some possible extensions.

II. The Microeconomic Framework

We consider a small open economy composed of three types of agents: firms, households, and the government. Nominal wages are set through labor contracts that are negotiated between firms and workers. There are J firms in the economy, each producing one particular variety of the domestic good. Households consume all varieties of the domestic good as well as an imported good, whose price is determined in world markets. Labor supply is perfectly elastic at the going real wage. Aggregate spending, denoted by $\bar{D}$, is assumed exogenous. 1/ Households' preferences are described by

$$U = U[u(q_1,\ldots,q_J),\ u_I(q_I)] \qquad (1)$$

where q_k denotes consumption of variety k, where $k=1,\ldots,J$. The function U is assumed to be homothetic, and the sub-utility functions $u()$ and $u_I()$ are defined over the consumption of all sub-categories of domestic goods and the imported good, respectively.

Consider first the demand for varieties of the domestic good. The sub-utility function $u()$ takes the form 2/

1/ The exogeneity of aggregate spending may result, for instance, because aggregate spending is a function of wealth, which is taken as given in the time frame considered here. See Helpman (1988) for elaborations on this point.

2/ Preferences are assumed to be of the Spence-Dixit-Stiglitz variety, as in Helpman (1988).

$$u(q_1,\ldots,q_J) = \left(\sum_{j=1}^{J} q_j^{\eta}\right)^{1/\eta}. \qquad 0 < \eta < 1 \tag{2}$$

Let D denote total spending on the domestic good. From equation (2), the variety-specific demand functions are given by

$$q_k = Dp_k^{-\sigma} \Big/ \sum_{j=1}^{J} p_j^{1-\sigma}, \qquad k=1,\ldots,J \tag{3}$$

where $\sigma \equiv 1/(1 - \eta) > 1$.

The producer of variety k takes spending D and its competitors' prices p_j $(j \neq k)$, as given. The (absolute) price elasticity of demand for its product is given by

$$\epsilon_k = \sigma + (1 - \sigma)p_k^{1-\sigma} \Big/ \sum_{j=1}^{J} p_j^{1-\sigma}. \tag{4}$$

In symmetric equilibrium, $p_k = p$ for all k, so that

$$\epsilon = \sigma + (1 - \sigma)/J. \tag{5}$$

The elasticity of demand is therefore constant. Equations (2) and (3) imply that in symmetric equilibrium, in which $q_k = q$:

$$u(q_1,\ldots,q_J) = J^{1/\eta} q = J^{1/(\sigma-1)} D/p. \tag{6}$$

For convenience, let $u_I(q_I) \equiv q_I = D_I/p_I$. The consumer's optimization problem, under symmetric equilibrium, can therefore be expressed as

$$Max\ U\left[J^{1/(\sigma-1)}D/p,\ D_I/p_I\right], \tag{7}$$

subject to

$$D + D_I \leq \bar{D}, \tag{8}$$

where $\bar{D}$ denotes total spending.

Homotheticity of $U()$ implies that there exist share functions, denoted by $s(p,p_I)$, and $s_I(p,p_I)$, such that the solution to this program can be represented as

$$\overset{- +}{s(p,p_I)} = D/\bar{D}, \qquad \overset{+ -}{s_I(p,p_I)} = 1 - s(p,p_I), \tag{9}$$

which indicate that the share of spending on each good is a homogeneous function of degree zero in prices.

The production side of the model is as follows. Producers for each variety of the domestic good face an identical technology. Production functions for each firm are given by $\Phi(E_k)$, where E_k denotes labor input used by producer k. Since the elasticity of demand for each variety is constant (equation 5), marginal revenue is αp, where $\alpha = (\epsilon - 1)/\epsilon$, and $0 < \alpha < 1$. Producers set prices so as to equate marginal revenue to marginal cost. In symmetric equilibrium, we have that

$$p = w\Psi'(q)/\alpha. \tag{10}$$

where $\Psi \equiv \Phi^{-1}$ and w denotes the predetermined nominal wage rate.

Closing the model requires specifying a market-clearing condition for the domestic good. 1/ In equilibrium, using equations (9), these conditions are given by

$$q = J^{-1}s(p,p_I)\bar{D}/p. \tag{11}$$

Equations (10) and (11) determine simultaneously the price of the domestic good and the equilibrium level of output--and therefore aggregate employment, since $E = \Psi(q)$. The equilibrium pricing equation is given by

$$p = \overset{+ + +}{p(w,p_I,\bar{D})}, \tag{12}$$

and aggregate employment can be written as

$$E = E(p,p_I,\bar{D}) \equiv \overset{- + +}{h(w,p_I,\bar{D})}. \tag{13}$$

An increase in nominal wages raises the domestic price, dampens demand for the domestic good and therefore reduces output and

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1/ Demand for the foreign good determines the change in net foreign assets of the central bank. We abstract at this stage from potential effects of this change on the domestic money stock and aggregate expenditure by households.

employment. 1/ An increase in the price of the foreign good increases demand for domestic goods, and thus raises output, employment, and the domestic price. A rise in aggregate expenditure stimulates output and raises the domestic price. 2/

Consider now the case in which, starting from an equilibrium position, the government decides to impose a ceiling on the price of the domestic good. In general, the output effect of controls is ambiguous and depends on the magnitude of price controls. To examine this issue in the present setting, let p^* and q^* denote equilibrium values in the absence of controls, and let $\Phi(E) \equiv E^{\gamma}$, where $0 < \gamma < 1$. Profit maximization implies that, using (10):

$$MC(J^{-1}q^*) \equiv (\frac{w}{\gamma})(J^{-1}q^*)^{(1/\gamma)-1} = \alpha p^*, \tag{14}$$

In symmetric equilibrium $p^* = D/q^*$. Substituting this expression in (14) yields

$$q^* = \left\{\frac{wJ^{2-(1/\gamma)}}{\bar{D}\gamma\alpha}\right\}^{-\gamma}. \tag{15}$$

The equilibrium position of the economy prior to controls is represented by point A in Figure 1.

Suppose now that the domestic price is set by governmental fiat at a level p_c, which is such that the (aggregate) marginal cost schedule intersects the new effective demand schedule along the flat portion p_c (point B in Figure 1). In such conditions, monopolistic competitive equilibrium implies

$$JMC(J^{-1}q) \equiv Jw\Phi^{-1'}(J^{-1}q) = (\frac{w}{\gamma})(J^{-1}q)^{(1/\gamma)-1} = p_c, \tag{16}$$

which yields the level of output under price controls:

1/ This result obtains, in part, because aggregate spending is assumed exogenous in real terms, thereby ignoring any wealth effect associated with the increase in the domestic price.

2/ Note that if the production technology is linear ($q_k = E_k$, say) the equilibrium price becomes independent of the foreign price and aggregate spending: from equation (10), $p = \alpha^{-1}w$.

$$q_c = \left\{ \frac{p_c \gamma J^{(1/\gamma)-2}}{w} \right\}^{\gamma/(1-\gamma)}. \qquad (17)$$

Consequently, setting the price at p_c has a negative effect on output whenever $q_c < q^*$, that is, using equations (15) and (17):

$$p_c < p_M \equiv \gamma^{-\gamma}(\alpha \bar{D})^{1-\gamma}/[J^{2-(1/\gamma)}w]^{-\gamma}. \qquad (18)$$

Put differently, if controls are very "tight" ($p_c < p_M$), output falls, implying that the government faces a trade-off when using price ceilings as a policy. In what follows we will assume that condition (18) holds, so as to examine the implications of the output-inflation trade-off associated with the use of price controls in the context of electoral cycles.

III. Price Controls and the Electoral Cycle

This section builds on the framework developed in section II to characterize a "political stabilization cycle" in which the government--or incumbent politicians--manipulate price controls for electoral gains. Following the "opportunistic" approach of Nordhaus (1989), we assume that the government's objective is to remain in office, but must face elections at well-defined periodic intervals. 1/ Voters have a distribution of preferences defined over inflation and the cost of price controls.

Elections occur every T periods. The incumbent chooses the path of controlled prices so as to maximize votes on election day. The aggregate voting function, which relates the prospects for re-election to economic outcomes, is given by: 2/

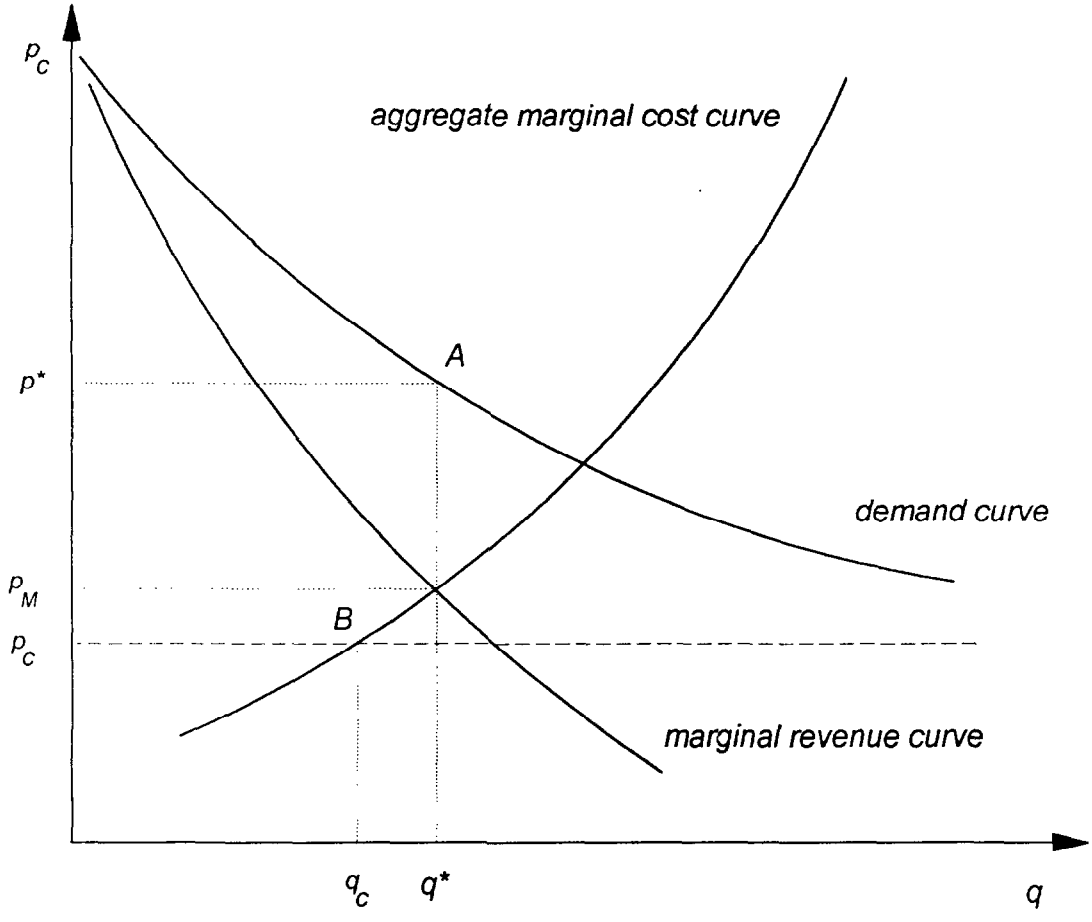
$$V_0(T) = -\int_0^T \left\{ [\pi_c(t) - \tilde{\pi}_c(t)]^2/2 + \Theta \pi_t^2/2 \right\} e^{\rho t} dt, \qquad \rho > 0 \qquad (19)$$

1/ In the opportunistic model examined here, the ideological orientation of political parties--as well as incumbent governments--does not matter for the setting of economic policy. A more general formulation would be to assume that incumbent governments are concerned not only with reelection prospects but also with their idelogical commitment (see Alesina, 1987, and Nordhaus, 1989).

2/ For simplicity, the "desired" inflation rate (related, for instance, to seigniorage considerations) is assumed to be zero.

Figure 1

Equilibrium with and without Price Controls



where ρ denotes voters' rate of memory loss, $\pi_c(t)$ the actual rate of inflation in controlled prices, $\tilde{\pi}_c(t)$ the "equilibrium" rate of inflation in domestic prices, π_t the overall inflation rate, and $\Theta > 0$ the relative weight attached to inflation. 1/ The first term appearing in brackets in the integrand of expression (19) measures the macroeconomic cost of price controls. This cost is given by the squared difference between the actual rate of inflation in controlled prices and the equilibrium rate of inflation in domestic prices that would obtain from producers' optimal price setting behavior in the absence of price ceilings--which is, as shown in Section II, a function of wages, aggregate spending, and foreign prices. This expression is an approximation to the deadweight loss associated with price ceilings. 2/ Voters also dislike inflation, which appears quadratically in equation (19). Increasing controlled prices above their equilibrium level raises both macroeconomic distortions and inflation. Reducing domestic prices below their equilibrium level raises support for the incumbent (since it reduces overall inflation) but increases at the same time macroeconomic distortions, generating a tradeoff in the use of price ceilings.

The overall inflation rate is defined as

$$\pi_t = \delta\pi_c(t) + (1 - \delta)\pi_I, \qquad 0 < \delta < 1 \qquad (20)$$

where δ (respectively $1 - \delta$) is a parameter measuring the share of total expenditure allocated to the domestic (respectively imported) good in some base period, and π_I denotes the foreign inflation rate, which is assumed constant in the analysis. 3/ Assuming a linear production technology, equation (10) indicates that the equilibrium rate of inflation in domestic prices is set solely on the basis of the rate of growth of nominal wages, ω_t:

1/ Note that ρ is a backward-looking and not a forward-looking rate of discount, and corresponds to the rate at which past performance is discounted by voters.

2/ This approximation corresponds to the standard Harberger welfare result, according to which the cost resulting from the imposition of a distortion is proportional to the square of the initial distortion. Under the perfect foresight solution discussed below, this quantity can also be viewed as measuring the output cost of price controls if condition (18) is satisfied--that is, if the imposition of a price ceiling leads to a reduction in output.

3/ In the context of the framework formulated in Section II, δ can be derived from the following specification of equation (1):

$$U = [u(q_1, \ldots, q_J)]^{\delta}[u_I(q_I)]^{1-\delta}.$$

$$\tilde{\pi}_c(t) = \omega_t. \tag{21}$$

The rate of growth of nominal wages is set under two alternative contract mechanisms. Under the first scheme, wages are backward-looking and depend only on past inflation rates:

$$\omega_t = \mu\int_{-\infty}^{t} e^{\mu(k-t)}\pi_k dk, \qquad \mu > \rho \tag{22}$$

where μ is a discount factor, which is assumed greater than the rate of memory loss. Differentiating (22) with respect to time yields:

$$\dot{\omega}_t = -\mu(\omega_t - \pi_t). \tag{22'}$$

Under the second scheme, wage contracts are forward-looking and depend on future inflation rates: 1/

$$\omega_t = \mu\int_{t}^{\infty} e^{\mu(t-k)}\pi_k dk, \tag{23}$$

implying that

$$\dot{\omega}_t = \mu(\omega_t - \pi_t). \tag{23'}$$

The incumbent government maximizes the aggregate voting function subject to the equilibrium pricing equation and the equation determining the behavior of wages. Consider first the case where wage contracts are backward-looking. Substituting equations (20) and (21) in (19), the incumbent's decision problem is that of maximizing, with respect to $\pi_c(t)$:

$$V_0(T) = -\int_0^T \left\{[\pi_c(t) - \omega_t]^2/2 + \theta[\delta\pi_c(t) + (1-\delta)\pi_I]^2/2\right\} e^{\rho t} dt,$$

subject to (22') and an initial condition on ω_0. Forming the Hamiltonian of the system and denoting by λ_t the costate variable (which measures the marginal electoral gain resulting from a reduction

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1/ Equation (23) is adapted from Willman (1988), who follows Calvo's (1983) overlapping contract formulation. ω_t in equation (23) can be interpreted as the rate of change of wages stipulated in new contracts as well as those renewed at time t.

in the rate of growth of wages), necessary conditions for an optimum are given by 1/

$$\frac{\partial H}{\partial \pi_c(t)} = \pi_c(t) - \omega_t + \Theta\delta[\delta\pi_c(t) + (1-\delta)\pi_I] + \lambda_t\mu\delta = 0, \qquad (24a)$$

$$\dot{\lambda}_t = -\rho\lambda_t - \frac{\partial H}{\partial \omega_t} = \pi_c(t) - \omega_t + (\mu - \rho)\lambda_t, \qquad (24b)$$

$$\lambda_T = 0, \qquad (24c)$$

subject to

$$\dot{\omega}_t = \mu[\delta\pi_c(t) + (1-\delta)\pi_I - \omega_t]. \qquad (22')$$

The transversality condition (24c) indicates that at time T there is no further electoral gain from reducing the rate of growth of nominal wages. 2/ Combining equations (24a) and (24c) yields

$$\pi_c(T) = \frac{1}{1 + \Theta\delta^2}\left\{\omega_T - \Theta\delta(1 - \delta)\pi_I\right\} \leq \omega_T. \qquad (25)$$

Taking the time derivative of equation (24a), using (22'), (24a) and (24b) yields the following first-order linear differential equation in $\pi_c(t)$ and ω_t:

$$\begin{bmatrix} \dot{\pi}_c(t) \\ \dot{\omega}_t \end{bmatrix} = \begin{bmatrix} \mu-\rho & -\kappa \\ \mu\delta & -\mu \end{bmatrix}\begin{bmatrix} \pi_c(t) \\ \omega_t \end{bmatrix} + \begin{bmatrix} \alpha \\ \mu \end{bmatrix}(1- \delta)\pi_I, \qquad (26)$$

where, with $\Delta = (1 + \Theta\delta^2)$:

$$\alpha \equiv \Delta^{-1}[\mu + \Theta\delta(\mu-\rho)] > 0,$$

$$\kappa \equiv \Delta^{-1}[\mu(1-\delta) + (\mu-\rho)] > 0.$$

This system can be solved subject to a given condition on the rate of change of nominal wages ω_0 and the terminal condition (25). Necessary and sufficient conditions for saddlepath stability are that

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1/ From concavity, conditions (24a)-(24c) are also sufficient.

2/ Technically, condition (24c) holds because there is no end-point restriction on the rate of growth of nominal wages.

the trace of the coefficient matrix appearing in (26) be negative and that its determinant be negative. 1/ The first condition is always satisfied while the second holds if $\kappa\delta^{-1}/(\mu-\rho) < 1$ (see below). Assuming that this condition is satisfied, the complete solution to (26) is given by

$$\omega_t = \bar{\omega} + A\exp(\nu_1 t) + B\exp(\nu_2 t), \tag{27a}$$

$$\pi_c(t) = \bar{\pi}_c + \left\{\frac{(\mu-\rho)-\nu_1}{\kappa}\right\}A\exp(\nu_1 t) + \left\{\frac{(\mu-\rho)-\nu_2}{\kappa}\right\}B\exp(\nu_2 t), \tag{27b}$$

where

$$\nu_1,\ \nu_2 = \left\{ -\rho \mp [\rho^2 - 4\mu(\kappa\delta - (\mu-\rho))]^{1/2}\right\}/2,$$

$$\bar{\omega} = \frac{(\mu-\rho) - \mu\delta}{(1+\Theta\delta^2)[(\mu-\rho)-\kappa\delta]}(1-\delta)\pi_I > 0, \qquad \bar{\pi}_c = \bar{\omega}\delta^{-1} - (1-\delta)\delta^{-1}\pi_I,$$

$$h_1 = \kappa^{-1}[(\mu-\rho) - \nu_1] > 0, \qquad h_2 = \kappa^{-1}[(\mu-\rho) - \nu_2] > 0,$$

$$D = h_1(1 - \Delta^{-1}h_2)\exp(\nu_2 T) - h_2(1 - \Delta^{-1}h_1)\exp(\nu_1 T),$$

$$Q = \Delta^{-1}[\bar{\omega} - \Theta\delta(1-\delta)\pi_I] - \bar{\pi}_c,$$

$$A = \left\{(\omega_0 - \bar{\omega})(1 - \Delta^{-1}h_2)\exp(\nu_2 T) - h_2 Q\right\}/D,$$

$$B = \left\{h_1 Q - (\omega_0 - \bar{\omega})(1 - \Delta^{-1}h_1)\exp(\nu_1 T)\right\}/D,$$

$\bar{\omega}$ and $\bar{\pi}_c$ denoting the long-run equilibrium values. To ensure the existence of a stationary cycle requires setting $\omega_0 = \omega_T$ in the above expressions.

1/ The requirement that the system be saddlepath stable ensures that if the length of the electoral cycle tends to infinity, the system would evolve along a unique path towards the long-run equilibrium values of ω_t and $\pi_c(t)$.

The behavior of the rates of change of controlled prices and nominal wages during the electoral cycle is represented in Figure 2. Curves $[\dot{\omega}_t = 0]$ and $[\dot{\pi}_c(t) = 0]$ represent combinations of ω_t and $\pi_c(t)$ for which the rate of change of nominal wages and the rate of inflation in controlled prices remain constant, respectively. The saddlepath stability condition provided earlier requires that the $[\dot{\omega}_t = 0]$ curve be steeper than the $[\dot{\pi}_c(t) = 0]$ curve.

The path of controlled prices during an electoral cycle is depicted by the sequence *ABC*. Immediately after assuming office, the incumbent raises the inflation rate in controlled prices, which jumps from point *A* to point *B*. 1/ Since contracts are backward-looking, wages cannot change instantaneously. In the periods leading to the electoral contest, with overall inflation becoming increasingly important in the eyes of voters, controlled prices are lowered at an increasing rate. Wages initially rise--up to point *C*, located on the $[\dot{\omega}_t = 0]$ curve--to catch up with the initial jump in controlled prices and then begin to fall. The economy eventually returns to point *A*, which is reached at exactly period *T*, and a new cycle starts again. Note that at *T*, as indicated by equation (25), the rate of inflation in controlled prices is maintained below its "equilibrium" level, that is, the rate of change in nominal wages. The intuitive interpretation of this result is that a government concerned with its reelection prospects will tend to maintain price controls until the very last moment before the electoral contest takes place.

The sensitivity of the shape of the cycle depicted in Figure 2 to changes in the parameters of the solution can be easily assessed. An increase in the relative weight attached to inflation θ reduces the size of the initial jump in controlled prices, since inflation becomes relatively more important in the eyes of voters. An increase in the rate at which past performance is discounted by voters ρ steepens the slope of the time profile of inflation in controlled prices and the rate of change of nominal wages. By contrast, the path of these variables flattens out for $\rho \to 0$, as voters give less and less weight to the effect of future inflation on their current decisions. A reduction in the weight of controlled prices in the overall price

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1/ The reason why the jump in the rate of inflation in controlled prices is finite is because of the existence of a positive cost of inflation in the aggregate voting function (parameter θ), which implies that it would be suboptimal to induce an arbitrarily large increase in controlled price inflation at any time during the electoral cycle, as this would carry a correspondingly large cost to voters. But note that the initial jump is not large enough to put the economy onto the saddlepath *SS*. This occurs only if $T \to \infty$, in which case the economy jumps immediately to point *E*.

index δ shifts the curve describing the time path of controlled prices to the right, while it steepens the downward portion of the curve depicting the behavior of wages. Intuitively, the reduction in δ means that the effect of changes in controlled prices on inflation are dampened, so that the incumbent finds optimal to wait longer before reducing inflation in controlled prices. A decrease in the discount factor used in wage contracts μ also leads to a faster reduction in the rate of inflation in controlled prices in the periods following the election, while the path of wages following its peak is less steep. Finally, the optimal level of the rate of inflation in controlled prices is decreasing in the length of the electoral cycle, T. Moreover, as T increases, the profile of the controlled inflation rate flattens out, and for $T \to \infty$ settles at a constant value, corresponding to the steady state.

Consider now the case of forward-looking contracts. Since wage setters are now able to "see through" the government's intentions, the electoral cycle disappears. For the transversality condition (25)--which does not depend on μ--to hold at T requires that it holds continuously throughout the electoral cycle. Thus $\pi_c(t)/\omega_t$ is constant over time. However, even in these conditions, prices are not set at their equilibrium level: this would occur only if the relative weight of inflation in the voting function Θ were zero. In general, therefore, although perfect foresight prevents the government from manipulating prices over time for electoral gains, prices would still be maintained below their equilibrium level and the economy would still suffer from a distortion cost.

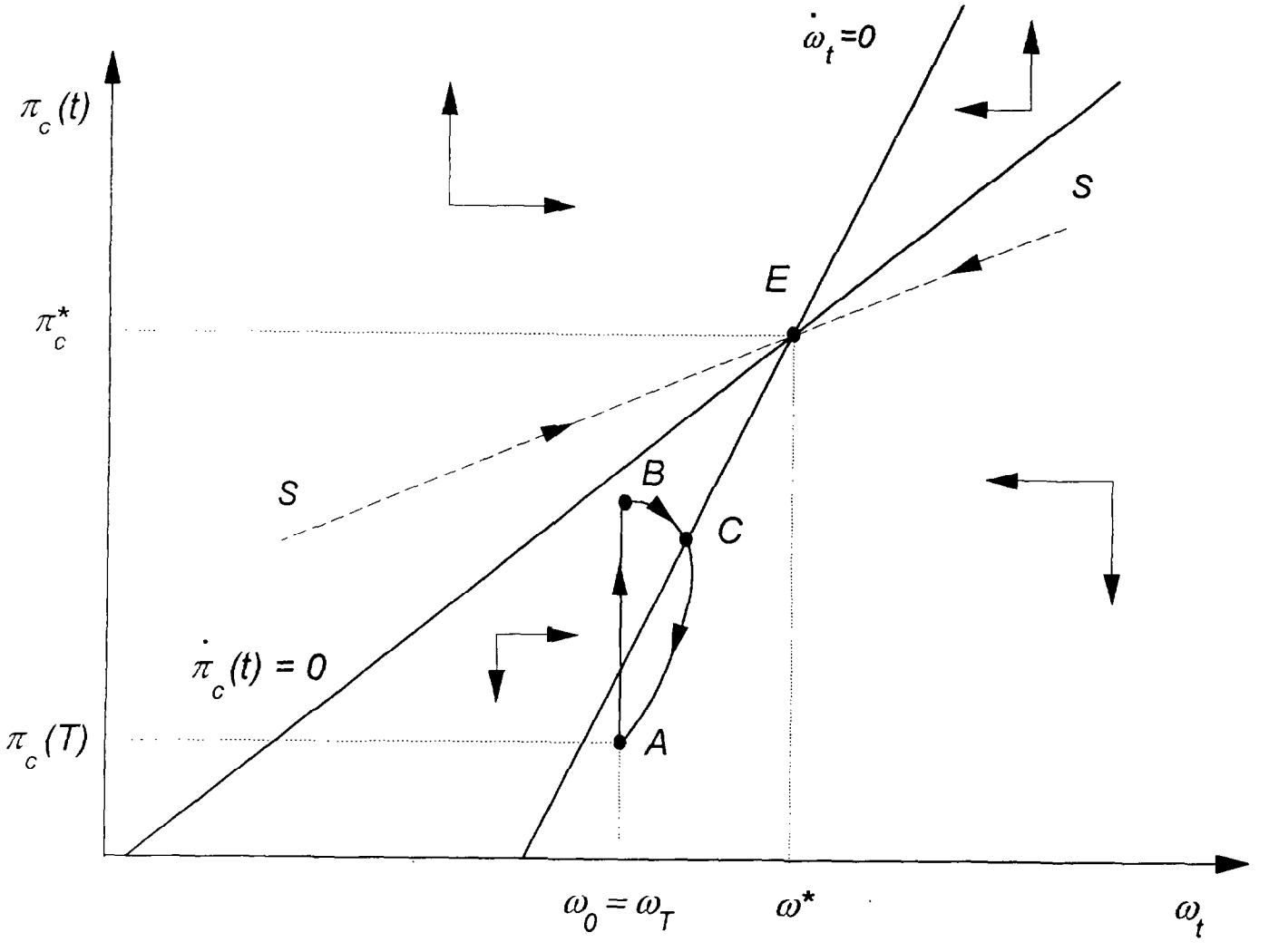
IV. Uncertain Term in Office

We now depart from the framework studied in section III and introduce electoral uncertainty. Elections are held every T periods as before, but rather than choosing among party representatives, atomistic voters elect a coalition of parties, which then appoints a government. Once the election is held and the government is in place, there is a positive probability that the coalition breaks down before the legal end of the term in office. If that happens, elections must take place to replace the incumbent government. In this framework, therefore, the "actual" period in office is probabilistic. This setup appears to be particularly appropriate for developing countries, where parties are often fragmented and not highly representative, and responsibility for policy choices is often attributed to the incumbent--who plays therefore the role of a "scapegoat" if popular discontent is high. We consider here only backward-looking contracts.

In general, the probability of a coalitional breakdown is endogenous and linked, at least in part, to economic outcomes. However, suppose for simplicity that the probability the government loses office and is forced to call an election at any date after

Figure 2

The Steady-State Electoral Cycle



taking office at $t = 0$ is constant and equal to q. 1/ The expected length in office is therefore equal to $1/q$. In addition, assume for simplicity that at any $t \geq 0$ the likely date for the next election is sufficiently far off that expectations of post-election policies have a negligible effect on voters' pre-election preferences. 2/

The incumbent now maximizes the aggregate voting function (19) with a discount factor equal to $(\rho - q)$. The discount rate is thus related to the expected length in office; it is high when the incumbent's expected stay in office is small and conversely. In general, $\rho - q \gtreqless 0$, but saddlepath stability still requires that $\mu > \rho - q$. As long as this condition holds--or, equivalently, as long as the probability of losing office is small enough--the solution obtained before carries through if $\rho \geq q$. The effect of an increase in uncertainty about the term in office is therefore identical to what obtains by considering a reduction in ρ. A higher probability of losing office flattens the path of controlled prices over the electoral cycle, because it lowers the weight attributed by the incumbent to the effect of future inflation on voters' current decisions.

If $\rho < q$--in which case the saddlepath stability condition always holds--the time path of the rate of inflation in controlled prices differs from the case where $\rho \geq q$ in two important respects. First, there is a level effect in that in the former case the incumbent finds optimal to choose a lower initial level of inflation in controlled prices in the periods following the election than in the case where $\rho \geq q$. The intuition for this is that with a negative "effective" discount rate, voters pay less attention to future policies and thus the present becomes more important for an office-motivated incumbent. Second, there is an intertemporal effect, which shows in a flatter time path of inflation in controlled prices than in the case where $\rho \geq q$, as a result of voters' higher marginal valuation of the present vis-à-vis the future. This intertemporal effect implies that the incumbent finds it optimal to reduce inflation in controlled prices at a smaller rate than in the previous case.

1/ A more realistic assumption might be to assume that the probability q rises towards unity as period T--the last possible date in office--approaches, since the government is mandated by law to schedule elections no later than T. However, even in this case q may remain constant until an instant before the final date, when it jumps to unity.

2/ For alternative approaches to modelling electoral uncertainty, see Harrington (1993), Lächler (1982), and van der Ploeg (1987).

V. Concluding Comments

The purpose of this paper has been to examine the interactions between political and economic factors that contribute to the implementation--and eventually the removal--of price controls. The particular aspects of the political system we focused on are the role of elections and the cohesiveness of party coalitions.

The analysis showed that, to the extent that macroeconomic outcomes affect voters' behavior, an incumbent seeking re-election will attempt to secure the short-term political advantage of the lower rate of inflation brought about by price controls prior to the electoral contest. Immediately after the election, the macroeconomic losses associated with price controls assume greater importance at the same time that the potential political gains from imposing such controls tend to dissipate. Hence prices are adjusted sharply beyond their equilibrium value. However, with backward-looking wage contracts, controls are tightened rather quickly afterwards, since past inflation rates tend to have a larger effect on the current rate. When uncertainty about the term in office prevails--a situation that may occur if the incumbent represents a coalition of political parties, which may collapse at any given moment--price controls tend to be used less intensively over the electoral cycle.

The analysis developed here, although rigorously derived from microeconomic principles, is based on a number of simplifying assumptions and can be extended in a variety of directions. A particularly interesting route would be to determine the "optimal" degree of temporariness of controls. The evidence suggests that the effectiveness of price ceilings diminishes relatively fast, even in cases where they initially proved useful (Arstein and Sussman, 1990). Controls can therefore have enduring effects only if accompanied by other measures, which must be adopted promptly during the limited time in which price ceilings are effective. In this regard, it seems worth investigating to what extent price controls--if maintained for too long--may lead to the development of illegal markets, which can "distort" the signal that they are supposed to transmit to private agents in the first place. In addition, price controls may tend to worsen the fiscal deficit--because of, say, lags in the adjustment of public sector prices 1/--and may yield unsustainable pressures to finance the deficit through money creation. Capturing these different effects within a detailed macroeconomic model would provide a more comprehensive framework for examining the relations between electoral considerations and the decision to impose price controls, but would not necessarily modify the qualitative features of our results.

1/ This should be balanced with the fact that a temporary price and wage freeze may increase real tax revenues via the Olivera-Tanzi effect, and therefore reduce the extent of fiscal adjustment required to stabilize the economy (Dornbusch et al., 1990).

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