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# Price controls and electoral cycles

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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 tightened in periods leading to the election, and relaxed 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.

*JEL classification:* C72; D72; E64

## 1. Introduction

Price controls have been used repeatedly in the context of stabilization programs in developing countries, despite the well-known allocative inefficiencies that they generate. [1] In the 1960s, controls played a major role in three important stabilization programs – those of Brazil in 1964, Argentina in 1967 and Uruguay in 1968. More recently, in the mid-eighties, Argentina, Brazil and Israel launched comprehensive anti-inflation plans with extensive wage and price ceilings. Fig. 1

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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. Price controls were also used in several industrialized countries in the early 1970s. A particularly interesting case in this regard is Sweden, whose experience is discussed by Jonung (1990).


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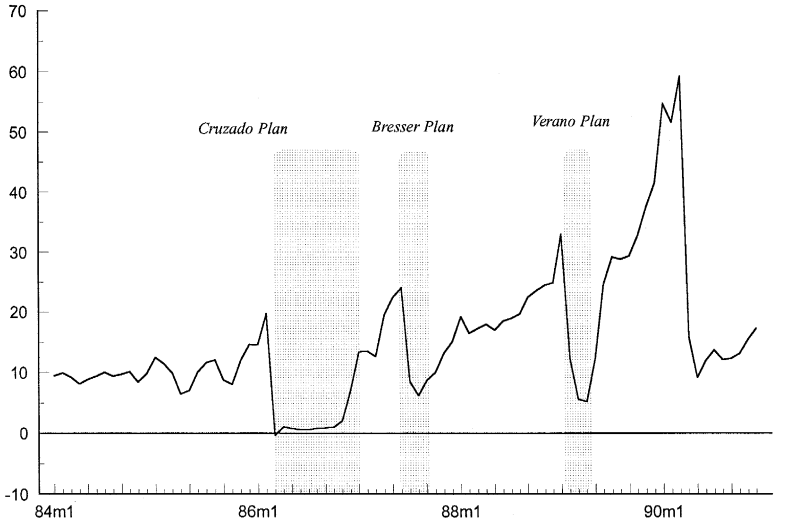


Fig. 1. Inflation and price controls in Brazil, 1984–90 (month-to-month percentages changes in consumer prices).

*Note:* Shaded areas indicate periods during which price controls were in effect.
*Source:* International Fiancial Statistics.

shows the behavior of the inflation rate in Brazil, before, during and after the imposition of price controls in three stabilization plans implemented during the 1980s.

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 on restrictive monetary and fiscal policies. [3] A fourth rationale emphasizes the role that price controls may play in enhancing political support. This 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

[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 counter-productive in the longer run, particularly when they are used as a substitute for monetary and fiscal adjustment.

[3] The first three rationales share the notion that inflation is a persistent process, while differing with regard to the source of such persistence. A detailed discussion of these views is provided in an earlier version of this paper (Agénor and Asilis, 1993). See also Agénor (1995) and Persson and van Wijnbergen (1993).

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. Moreover, price controls have an attractive feature from a political standpoint: they can often 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 (which may be difficult to identify) become evident only in the longer run. 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 inflation. A government facing elections or a fragile coalition may have therefore little incentive to adopt orthodox stabilization measures. Several economists have argued that, for instance, the pattern of price controls in Brazil (depicted in Fig. 1) was related to the presidential and congressional electoral cycles (Agénor and Taylor, 1992). The imposition of price controls in the Cruzado Plan implemented in early 1986, most notably, can be viewed as an attempt to reduce inflation and bolster the government's popularity in anticipation of the parliamentary elections held in November 1986.

This paper focuses on the interactions between electoral considerations and the decision to tighten – and, eventually, relax – price controls by opportunistic policymakers. Section 2 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 3 analyzes 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 the eventual collapse of the political coalition on which he or she relies. Finally, Section 4 summarizes the key results of the paper and examines some possible extensions.

## 2. The model

We consider a small open economy producing one good and 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. Households consume the domestic good as well as an imported good, whose price is determined in world markets. The production technology is linear, so that the equilibrium price of the domestic good depends only on the nominal wage.

Changes in aggregate demand for domestic and foreign goods therefore have no feedback effects on domestic prices. [4]

To characterize the 'political stabilization cycle' in which the government – or incumbent politicians – manipulate the intensity of price controls for electoral gains, we follow the 'opportunistic' approach pioneered by Nordhaus (1975) and developed subsequently by a variety of authors – see, for instance, Neck (1991) and Gärtner (1994) – by assuming that the government's objective is to remain in office, but must face elections periodically. [5] 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 [6]

$$V_{t_0} = -\int_0^T \left\{ \left[ p_c(t) - \tilde{p}_d(t) \right]^2 / 2 + \Theta \pi_t \right\} e^{\rho t} dt, \quad \rho > 0, \tag{1}$$

where time 0 is the beginning of the electoral term, $\rho$ voters' rate of memory loss, $p_c(t)$ (the log of) the actual level of controlled prices, $\tilde{p}_d(t)$ the equilibrium level of (the log of) domestic prices, $\pi_t$ the overall inflation rate, and $\Theta > 0$ the relative weight attached to inflation. [7] The first term appearing in brackets in the integrand of expression (1) measures the macroeconomic cost of price controls. This cost is given by the squared difference between the actual level of controlled prices and the equilibrium level of domestic prices that would obtain from producers' optimal price setting behavior in the absence of price ceilings. This expression approximates the deadweight loss associated with price controls. [8] Voters also dislike inflation, which depends on controlled prices (as shown below) and appears linearly in Eq. (1). An increase in controlled prices above their equilibrium level raises both macroeconomic distortions and inflation. A reduction in the price of the domestic good below its equilibrium level raises support for the incumbent

[4] A previous version of this paper (Agénor and Asilis, 1993) shows that results similar to those derived below can be obtained in a setting where the production structure is characterized by monopolistic competition, along the lines of Helpman (1988).

[5] 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 assume that incumbent governments are concerned not only with reelection prospects but also with their ideological commitment (see Nordhaus, 1989).

[6] For simplicity, the 'desired' inflation rate (related, for instance, to seigniorage considerations) is assumed to be zero.

[7] Note that $\rho$ 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.

[8] Our measure is an approximation 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 (see Cox, 1980). Is does not, however, capture non-price distortions (such as those related to rent-seeking behavior) that may also be induced by price controls (see Agénor, 1995).

(since it reduces overall inflation) but increases at the same time macroeconomic distortions, generating a tradeoff in the use of price controls.

In log terms, the overall price level $p_t$ can be defined as

$$p_t = \delta p_c(t) + (1-\delta)\, p_I, \quad 0 < \delta < 1,$$

where $\delta$ (respectively $1-\delta$) is a parameter measuring the share of total expenditure allocated to the domestic (respectively imported) good in some base period, and $p_I$ the domestic price of the imported good, which is assumed constant throughout. The actual, overall inflation rate is thus given by

$$\pi_t \equiv \dot{p}_t = \delta \pi_c(t), \tag{2}$$

where $\pi_c(t) \equiv \dot{p}_c(t)$ denotes the actual rate of inflation in controlled prices. As indicated above, with a linear production technology, the equilibrium level of the price of the domestic good depends only on (the log of) the nominal wage, $w_t$:

$$\tilde{p}_d(t) = w_t. \tag{3}$$

The nominal wage is set under two alternative contract mechanisms. Under the first scheme, contracts are backward-looking and wages depend only on past levels of prices:

$$w_t = \mu \int_{-}^{t} e^{\mu(k-t)} p_k \, dk, \quad \mu > \rho, \tag{4}$$

where $\mu$ is a discount factor, which is assumed greater than the rate of memory loss. Differentiating (4) with respect to time yields

$$\dot{w}_t = -\mu(w_t - p_t). \tag{4'}$$

Under the second scheme, contracts are forward-looking and nominal wages depend on future prices: [9]

$$w_t = \mu \int_{t} e^{\mu(t-k)} p_k \, dk, \tag{5}$$

implying that

$$\dot{w}_t = \mu(w_t - p_t). \tag{5'}$$

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. $p_c(t)$ can be approximated by $p_c(t) = \int_0^t \pi_c(h)\,dh + p_c(0)$. [10] Substituting this result

[9] Eq. (5) is adapted from Willman (1988). It bears some similarity with the Calvo (1983) overlapping contract formulation, since $\omega_t$ in Eq. (5) can be interpreted as the rate of change of wages stipulated in new contracts as well as those renewed at time $t$. See Agénor and Montiel (1996, Ch. 9) for a more detailed discussion.

[10] This approximation is obtained by noting that a variable $z_t$ growing at a rate $g_t$ per period can be written as $z_t = z_0 \Pi_0^t (1+g_h)^h$. Taking logarithms and using the approximation $\ln(1+g_t) \cong g_t$ for $g_t$ small yields $\ln z_t \cong \int_0^t g_h \, dh + \ln z_0$ in continuous time. This approximation is necessary to transform the control problem into a standard one.

together with Eqs. (2) and (3) in Eq. (1), the incumbent's decision problem can be written as consisting of maximizing over the interval $(0, T)$, with respect to $\pi_c(t)$:

$$V_0(T) = -\int_0^T \left\{ \left[ \int_0^t \pi_c(h)\mathrm{d}h + p_c(0) - w_t \right]^2 /2 + \Theta\delta\pi_c(t) \right\} \mathrm{e}^{\rho t}\mathrm{d}t,$$

subject to Eq. (4′) written as

$$\dot{w}_t = -\mu \left[ w_t - \delta \int_0^t \pi_c(h)\mathrm{d}h + p_c(0) - (1-\delta)\, p_I \right],$$

and an initial condition on $w_0$. Forming the Hamiltonian of the system and denoting by $\lambda_t$ the costate variable (which measures the marginal electoral gain resulting from a reduction in the level of wages), necessary conditions for an optimum are given by, for $t \in (0, T)$: [11]

$$\frac{-\partial H}{\partial \pi_c(t)} = p_c(t) - w_t + \Theta\delta + \lambda_t \mu\delta = 0, \tag{6a}$$

$$\dot{\lambda}_t = -\rho\lambda_t - \frac{\partial H}{\partial w_t} = p_c(t) - w_t + (\mu - \rho)\lambda_t, \tag{6b}$$

$$\lambda_T = 0, \tag{6c}$$

subject to $\dot{w}_t = \mu[\delta p_c(t) + (1-\delta)p_I - w_t]$.

The transversality condition (6c) indicates that at time $T$ there is no further electoral gain from reducing nominal wages. [12] Combining Eqs. (6a) and (6c) yields

$$p_c(T) = w_T - \Theta\delta \leq w_T. \tag{7}$$

Taking the time derivative of Eq. (6a), using Eq. (2), Eq. (4′), Eq. (6a) and Eq. (6b) yields the following first-order linear differential equation in $p_c(t)$ and $w_t$:

$$\begin{bmatrix} \dot{p}_c(t) \\ \dot{w}_t \end{bmatrix} = \begin{bmatrix} \mu - \rho & -\kappa \\ \mu\delta & -\mu \end{bmatrix} \begin{bmatrix} p_c(t) \\ w_t \end{bmatrix} + \begin{bmatrix} (\mu - \rho)\Theta\delta + \mu(1-\delta)\, p_I \\ \mu(1-\delta)\, p_I \end{bmatrix}, \tag{8}$$

where $\kappa \equiv \mu(1-\delta) + (\mu - \rho) > 0$.

This system can be solved subject to a given condition on nominal wages $w_0$ and the terminal condition (7). To obtain saddlepath stability requires that the determinant of the matrix of coefficients appearing in Eq. (8) be negative. [13] This

[11] From concavity, conditions (6a)–(6c) are also sufficient.

[12] Technically, condition (6c) holds because there is no end-point restriction on nominal wages.

[13] 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 $w_t$ and $p_c(t)$.

condition holds if $\kappa\delta/(\mu-\rho)<1$ (see below). Assuming that this condition is satisfied, the complete solution to Eq. (8) is given by

$$w_t = w^* + A\exp(\nu_1 t) + B\exp(\nu_2 t), \tag{9a}$$

$$p_c(t) = p_c^* + \left\{\frac{(\mu-\rho)-\nu_1}{\kappa}\right\}A\exp(\nu_1 t) + \left\{\frac{(\mu-\rho)-\nu_2}{\kappa}\right\}B\exp(\nu_2 t), \tag{9b}$$

where

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

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

$$D = h_1(1-h_2)\exp(\nu_2 T) - h_2(1-h_1)\exp(\nu_1 T),$$

$$Q = (w^* - p_c^*) - \Theta\delta,$$

$$A = \left\{(w_0 - w^*)(1-h_2)\exp(\nu_2 T) - h_2 Q\right\}/D,$$

$$B = \left\{h_1 Q - (w_0 - w^*)(1-h_1)\exp(\nu_1 T)\right\}/D,$$

with $w^*$ and $p_c^*$ denoting the long-run equilibrium values – which depend on world prices $p_1$ – obtained by setting $\dot{p}_c(t) = \dot{w}_t = 0$ in system (8). To ensure the existence of a stationary cycle requires setting $w_0 = w_T$ in the above expressions.

The behavior of controlled prices and nominal wages during the electoral cycle

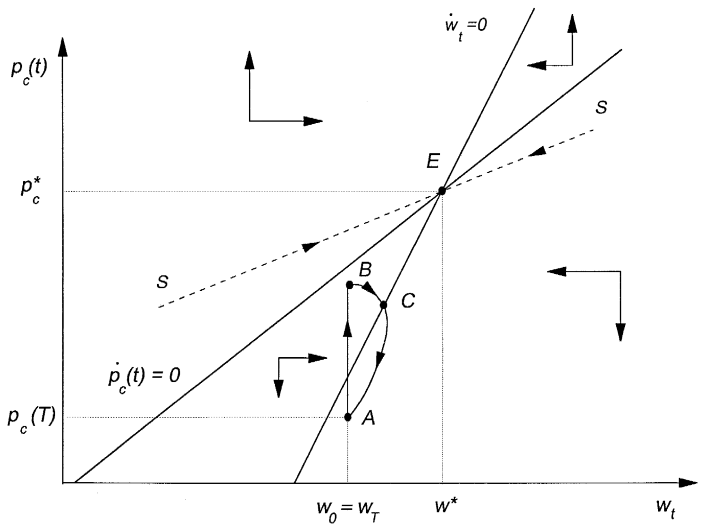


Fig. 2. The steady-state electoral cycle.

is represented in Fig. 2. Curves $[\dot{w}_t = 0]$ and $[\dot{p}_c(t) = 0]$ represent combinations of $w_t$ and $p_c(t)$ for which nominal wages and controlled prices remain constant, respectively. The saddlepath stability condition provided earlier requires that the $[\dot{w}_t = 0]$ curve be steeper than the $[\dot{p}_c(t) = 0]$ curve.

The path followed by controlled prices during the electoral cycle is depicted by the sequence *ABC*. Immediately after assuming office, the incumbent raises controlled prices, which jump from point *A* to point *B*.[14] Since contracts are backward-looking, nominal 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. Nominal wages initially rise – up to point *C*, located on the $[\dot{w}_t = 0]$ 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 Eq. (7), controlled prices are maintained below the 'equilibrium' level of domestic prices, that is, the level of 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 Fig. 2 to changes in the parameters of the solution can be easily assessed. An increase in the relative weight attached to inflation $\Theta$ 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 $\rho$ steepens the slope of the time profile of controlled prices and the path 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 domestic prices in the overall price index $\delta$ 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 $\delta$ means that the effect of changes in controlled prices on inflation are dampened, so that the incumbent find it optimal to wait longer before reducing controlled prices. A decrease in the discount factor used in wage contracts $\mu$ also leads to a faster reduction in controlled prices in the periods following the election, while the path of nominal wages following its peak is less steep. Finally, the optimal level of controlled prices is decreasing in the length of the electoral cycle, *T*. Moreover, as *T* increases, the profile of controlled prices

[14] The reason why the jump in controlled prices is finite is because of the existence of a positive cost attached to inflation in the aggregate voting function (parameter $\Theta$), which implies that it would be suboptimal to induce an arbitrarily large increase in prices 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 $T \to$ , in which case the economy jumps immediately to point *E*.

flattens out, and for $T \rightarrow$ settles at a constant value – which, as indicated earlier, depends on world prices – corresponding to the steady state depicted by point $E$.

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. In order to ensure that the transversality condition (7) – which does not depend on $\mu$ – holds at $T$ requires that it holds continuously throughout the electoral cycle. Thus $p_c(t) - w_t$ is constant over time. However, even in these conditions, controlled prices are *not* set at their equilibrium level: this would occur only if the relative weight of inflation in the voting function $\Theta$ were zero. In general, therefore, although perfect foresight prevents the government from manipulating prices over time for electoral gains, it is nevertheless optimal for the incumbent to maintain controlled prices below their equilibrium level. The economy would thus continue to suffer from a distortion cost.

## 3. Uncertain term in office

We now depart from the framework studied in Section 2 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 random. This setup appears to be particularly appropriate for developing countries (such as Brazil during the 1980s) 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 taking office at $t = 0$ is constant and equal to $q$. [15] 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. [16]

[15] A more realistic assumption might be to assume that the probability $q$ rises towards unity as period $T$ – the last possible data 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 would jump to unity.

[16] For alternative approaches to modelling electoral uncertainty, see Harrington (1993), Lächler (1982), and Van der Ploeg (1987).

The incumbent now maximizes the aggregate voting function (1) 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 the outcome of considering a reduction in $\rho$. 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 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 it optimal to choose a lower initial level of 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 controlled prices than in the case where $\rho > q$, 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 lower controlled prices at a smaller rate than in the previous case.

## 4. Concluding comments

Price controls have been used repeatedly in disinflation attempts in developing countries. Although various rationales have been proposed for justifying their use, this paper has focused on the interactions between political and economic factors contributing to the tightening – and eventually the relaxation – of price controls. The particular aspects of the political system on which we have focused 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 a tightening of 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 tightening such controls tend to dissipate. Hence prices are adjusted sharply toward 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 owes his position to 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 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 (Agénor and Montiel, 1996). 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 the extent to which 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 [17] – and may yield unsustainable pressures to finance the deficit through money creation. Capturing these different effects within a complete macroeconomic model would provide a more comprehensive framework for examining the relations between electoral considerations and the decision to impose or tighten price controls, but would not necessarily modify the qualitative features of our results.

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[17] 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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