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Exchange-Rate Regimes, Political Parties and the Inflation-Unemployment Tradeoff: Evidence from Greece

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Abstract

We use Greek data during 1960–1994 to test and estimate a model in which wage inflation, price inflation and unemployment depend on the exchange rate regime, the identity of the political party in power and whether an election is expected to take place. We respect the Lucas critique and take into account the statistical properties of the data. The main results are: (i) The exchange rate regime matters for inflation. After the fall of the Bretton Woods regime in 1972, there is a Barro-Gordon type inflation bias due to the inability of all policymakers to precommit to low inflation. (ii) There are no Barro-Gordon type partisan differences in inflation or unemployment.

Introduction

The limited ability of central banks to precommit to price stability results in high inflation without any employment benefits. This has been shown by Barro and Gordon (1983) in a sequential-move game between wage setters and a central bank along the Phillips curve. Two extensions of this model include the rational partisan model and the exchange-rate regime model.

In the rational partisan model of Alesina (1987), different political parties have different preferences over the inflation-unemployment tradeoff. Say that Socialists care more about unemployment relative to inflation than Conservatives. Then, inflation is higher under Socialists, while unemployment equals its natural rate under both administrations. However, when wage contracts are signed before the election outcome becomes known, there are unemployment

cycles after elections: unemployment is below (resp. above) its natural rate in the aftermath of a Socialist (resp. Conservative) victory. In the exchange-rate regime model of Giavazzi and Giovannini (1987) and Giavazzi and Pagano (1988), there is an institutional solution to the inefficient Barro-Gordon outcome. Participation in a fixed exchange-rate regime, in which monetary policy is determined by an inflation-averse center country, ties the hands of the domestic central bank, and so the domestic economy ends up with the same average inflation as the center country[1]. Alogoskoufis, Lockwood, and Philippopoulos (1992) extended this literature by constructing a dynamic two-party model which combines the rational partisan model with the exchange-rate regime model. They showed that wages, prices and unemployment depend on the exchange-rate regime, the identity of the party in power and the time to go to the next election.

This paper tests and estimates a modified version of the model in Alogoskoufis and Philippopoulos (1992) (henceforth, AP) on Greek data. We investigate the joint determination of wage inflation, price inflation and unemployment by imposing the cross-equation restrictions of the Barro-Gordon model, the rational partisan model and the exchange-rate regime model. This differs from AP whose results are based only on unrestricted wage equation estimates. Here, our results are based on restricted system-equation estimates, so that we respect the Lucas critique and get estimates of the structural parameters of the model (see also Alesina and Sachs (1988) for the USA).

The theoretical model is as follows. Under fixed exchange rates, there is no monetary policy independence; hence, inflation is exogenously determined. Under managed floating exchange rates, there is room for policy independence; hence, inflation is endogenously determined via a Barro-Gordon game between the political party in power (say Conservatives and Socialists) and wage setters.

The model leads to structural equations for wage inflation, price inflation and unemployment. We test and estimate the model for Greece during 1960–1994. We take a two-stage approach to estimation. First, we investigate the integration and cointegration properties of the data. Second, given these properties, we transform the theoretical model so as to achieve stationarity, and then estimate it. The cross-equation theoretical restrictions are not rejected by the data, and all crucial coefficients are significant and have plausible values.

Our main empirical results are as follows. First, the exchange rate regime matters for wage and price inflation. In particular, after the fall of the Bretton Woods system of fixed exchange rates in 1972, there is a Barro-Gordon type inflation bias due to the inability of all policymakers to precommit to low inflation. Second, there are no Barro-Gordon type partisan differences in inflation. This result differs from AP, whose unrestricted wage equation estimates suggest that wage inflation was higher under Socialists in the post-1972 period[2]. The absence of partisan differences in inflation can also give a model-consistent explanation for the absence of partisan cycles in unemployment.

The rest of the paper is organized as follows. Section 1 presents the theoretical model. Section 2 presents the econometric model and results. Section 3 concludes and discusses policy implications.

1. The economic environment

With minor modifications the model is that of AP; hence details will be omitted when unnecessary. In each time period t, wage-setters sign one-period nominal wage contracts. Then, the party in power chooses the price level or price inflation. Finally, employment is demand determined. Concerning the electoral calendar, elections take place every two periods. We define the period following an election as a post-election period (denoted by the superscript p) and the period preceding an election as a non-election period (denoted by the superscript n). In post-election periods, wage contracts are signed before the election outcome becomes known, and so wage setters' inflation expectations are a weighted average of inflation under the two parties. In non-election periods, there is no electoral uncertainty and so inflation expectations adjust to the party in power. The probability of any party being elected is exogenous: Conservatives (denoted by the superscript c) are elected with $0 < q < 1$ and Socialists (denoted by the superscript s) with $1 - q$. For simplicity, the model is log-linear and deterministic.

1.1. The labor market

Output y_t is produced by using labor ℓ_t via a Cobb–Douglas function so that $y_t = \delta\ell_t + \mu_t$, where $0 < \delta < 1$. Productivity μ_t follows the exogenous deterministic process $\mu_t = g + \mu_{t-1}$, where g is a constant. Profit maximization by competitive firms leads to demand for labor:

$$\ell_t^d = -\beta(w_t - p_t - \mu_t) \tag{1}$$

where $\beta \equiv 1/(1-\delta) > 0$, w_t is the nominal wage and p_t is the price level at time t.

Nominal wages are set by a group of insiders $\bar{n}_t$, where $\bar{n}_t$ follows an exogenous deterministic process (defined below). On the other hand, the central bank cares about the whole labor force n, where n is exogenous and constant and also $n > \bar{n}_t$. Insiders $\bar{n}_t$ solve:

$$\min_{w_t} E_t\left(\ell_t^d - \bar{n}_t\right)^2 \qquad \text{subject to (1)} \tag{2}$$

where E_t is the rational expectations operator. Since the model is deterministic, and due to the sequential-move structure of the game, it is only p_t that is not observable by wage-setters when they choose w_t.

Using the first-order condition of (2) into (1), we get for the unemployment rate $u_t \equiv (n - \ell_t)$, and wage inflation $\Delta w_t \equiv (w_t - w_{t-1})$:

$$u_t = \bar{u}_t - \beta(\Delta p_t - E_t \Delta p_t) \tag{3}$$

$$\Delta w_t = g + E_t \Delta p_t - \frac{1}{\beta}(u_{t-1} - \bar{u}_t). \tag{4}$$

where $\bar{u}_t \equiv (n - \bar{n}_t)$ is the natural unemployment rate, $\Delta p_t \equiv (p_t - p_{t-1})$ is price inflation and $E_t \Delta p_t \equiv (E_t p_t - p_{t-1})$ is expected price inflation[3]. Equation (3) is a surprise supply function and Eq. (4) is a Phillips-curve type expression.

In what follows, we set $\beta = 1$ for notational simplicity.

1.2. Exchange-rate policy regimes

The institutional constraints of Bretton Woods reduced the ability of member-countries (except the USA) to follow an independent monetary policy. Since Greece fully participated in the Bretton Woods regime, we assume that until its collapse in 1972, price inflation was exogenously determined. By contrast, in the post-1972 period, we assume that policymakers were free to choose price inflation by playing a Barro-Gordon game with wage setters and also to use policy for political purposes (see McKinnon (1993) for the international financial system)[4].

1.3. Solution under fixed exchange rates

Under fixed exchange rates (denoted by the superscript f), price inflation is exogenously determined. Then, using (3) and (4), we have for equilibrium price inflation, wage inflation and unemployment:

$$\Delta p_t^f = \pi^f \tag{5a}$$

$$\Delta w_t^f = g + \pi^f - (u_{t-1} - \bar{u}_t) \tag{5b}$$

$$u_t^f = \bar{u}_t \tag{5c}$$

where $\pi^f > 0$ is exogenous and constant (see below).

1.4. Solution under managed floating exchange rates

Under managed floating exchange rates (denoted by the superscript m), inflation is endogenously determined via a Barro-Gordon game between policymakers and wage setters and, in addition, monetary policy can be used for political purposes. Party $i = (c, s)$ solves:

$$\min_{\Delta p_t^{im}} \left[\left(\Delta p_t^{im} - \pi_t^{im} \right)^2 + \alpha \left(u_t^{im} \right)^2 \right] \quad \text{subject to (3)} \tag{6}$$

where π_t^{im} is the target rate of inflation for party i under managed floating, and the parameter $\alpha > 0$ is the weight given to unemployment relative to inflation. We assume that π_t^{im} follows an exogenous deterministic process (see below).

Notice that in (6), the parties differ only in their inflation targets. In particular, we make the standard assumption that $\pi_t^{cm} < \pi_t^{sm}$, i.e., Conservatives systematically go for lower inflation than Socialists. Allowing for additional partisan differences (e.g., $\alpha^c < \alpha^s$) would not affect the nature of our results.

The equilibrium of this one-shot sequential-move game is the Nash equilibrium. We will first solve for non-election periods (n) and then for post-election periods (p).

In non-election periods (n), there is no electoral uncertainty. Hence, wage-setters set $E_t \Delta p_t^{nim} = \Delta p_t^{nim}$. Then, we have for equilibrium (Nash) price inflation, wage inflation and unemployment:

$$\Delta p_t^{nim} = \pi_t^{im} + \alpha \bar{u}_t \qquad \text{under } i = (c, s) \tag{7a}$$

$$\Delta w_t^{nim} = g + \left(\pi_t^{im} + \alpha \bar{u}_t\right) - (u_{t-1} - \bar{u}_t) \qquad \text{under } i = (c, s) \tag{7b}$$

$$u_t^{nim} = \bar{u}_t \qquad \text{under } i = (c, s) \tag{7c}$$

where the assumption $\pi_t^{cm} < \pi_t^{sm}$ implies $\Delta p_t^{ncm} < \Delta p_t^{nsm}$ and $\Delta w_t^{ncm} < \Delta w_t^{nsm}$, i.e., price and wage inflation are higher under Socialists.

In post-election periods (p), there is electoral uncertainty because nominal wages are chosen before the outcome of the election is known. Hence, wage-setters set $E_t \Delta p_t^{pm} = q E_t \Delta p_t^{pcm} + (1-q) E_t \Delta p_t^{psm}$, i.e., expectations are correct on average. Then, we have for equilibrium (Nash) price inflation, wage inflation and unemployment:

$$\Delta p_t^{pcm} = k\left[\pi_t^{cm} + \alpha\left(q\pi_t^{cm} + (1-q)\pi_t^{sm}\right) + \alpha(1+\alpha)\bar{u}_t\right] \qquad \text{under } c \tag{8a}$$

$$\Delta p_t^{psm} = k\left[\pi_t^{sm} + \alpha\left(q\pi_t^{cm} + (1-q)\pi_t^{sm}\right) + \alpha(1+\alpha)\bar{u}_t\right] \qquad \text{under } s \tag{8b}$$

$$\Delta w_t^{pm} = g + \left(q\pi_t^{cm} + (1-q)\pi_t^{sm}\right) + \alpha\bar{u}_t - (u_{t-1} - \bar{u}_t) \qquad \text{under } c \text{ and } s \tag{8c}$$

$$u_t^{pcm} = \bar{u}_t + k(1-q)\left(\pi_t^{sm} - \pi_t^{cm}\right) > \bar{u}_t \qquad \text{under } c \tag{8d}$$

$$u_t^{psm} = \bar{u}_t - kq\left(\pi_t^{sm} - \pi_t^{cm}\right) < \bar{u}_t \qquad \text{under } s \tag{8e}$$

where $k \equiv 1/(1+\alpha) > 0$. In Eqs. (8a) and (8b), the assumption $\pi_t^{cm} < \pi_t^{sm}$ implies $\Delta p_t^{pcm} < \Delta p_t^{psm}$. Equation (8c) gives wage inflation as a weighted average of price inflation under the two parties. In Eqs. (8d) and (8e), the same assumption, i.e., $\pi_t^{cm} < \pi_t^{sm}$, implies that unemployment rises (resp. falls) above (resp. below) its natural rate immediately after a conservative victory (resp. socialist victory). Notice that we do not have a partisan cycle in unemployment (i.e., $u_t^{pim} = \bar{u}_t$), either when there is no electoral uncertainty (i.e., $q = 0$ or $q = 1$) or when there are no partisan differences (i.e., $\pi_t^{cm} = \pi_t^{sm}$).

This completes the theoretical model. It differs from AP in two respects: (i) it is deterministic; (ii) the loss function (6) is quadratic in both inflation and unemployment so that equilibrium price inflation depends also on $\bar{u}_t$.

2. The econometric model: Greece 1960–1994

This section presents the econometric specification of the model, (5), (7) and (8), and discusses estimation and testing by using Greek annual data over 1960–1994.[5] We will work in three steps. First, to derive an estimable model, we specify the exogenous targets and introduce dummy variables to capture policy-induced parameter changes. Second, we investigate the integrating and cointegrating properties of the data. Third, we test and estimate the econometric model.

2.1. Exogenous targets and dummy variables

The model (5), (7) and (8) cannot be estimated as it stands before we specify the exogenous targets, $\bar{u}_t$ and π_t^{im}, and introduce appropriate dummy variables to capture changes in the exchange rate regime (fixed and managed floating), the party in power (Conservatives and Socialists) and the electoral cycle (post-election and non-election periods).

To model the employment target of wage setters $\bar{n}_t$, we assume that $\bar{n}_t$ is a weighted average of those who were employed in the previous period ℓ_{t-1} and the exogenous labor force n. Thus, $\bar{n}_t = \lambda\ell_{t-1} + (1-\lambda)n$, where $0 \leq \lambda \leq 1$. Then, by using $u_t \equiv (n - \ell_t)$ and $\bar{u}_t \equiv (n - \bar{n}_t)$, we get:

$$\bar{u}_t = \lambda u_{t-1} \quad \text{where } 0 \leq \lambda \leq 1. \tag{9}$$

To model the inflation targets of the parties π_t^{im}, we assume that π_t^{im} is a linear function of lagged-once inflation (i.e., the higher the inherited inflation rate, the more costly the policy adjustment required to reduce it to any given rate). Thus, for $i = (c, s)$, we have:

$$\pi_t^{im} = \pi^i + \theta\Delta p_{t-1} \quad \text{where } \pi^s > \pi^c \text{ and } \theta > 0. \tag{10}$$

Notice that while Eq. (10) accounts (via $\theta\Delta p_{t-1}$) for inflation persistence under managed floating exchange rates, this is not the case under fixed exchange rates (see Eq. (5a) above where π^f is a constant). This is deliberate in order to simplify notation; we report that there is no empirical evidence of inflation persistence during Bretton Woods.

We continue with dummy variables. Define d_t^f (resp. d_t^m) to be a dummy for fixed (resp. managed floating) exchange rates that takes the value of 1 during the pre-1972 (resp. post-1972) period and zero otherwise. To allow for political effects under managed floating exchange rates[6], we use four dummies, d_t^{pcm}, d_t^{psm}, d_t^{ncm}, d_t^{nsm}, which denote respectively a post-election year after a Conservative victory, a post-election year after a Socialist victory, a Conservative administration excluding the post-election year and a Socialist administration excluding the post-election year. That is, $d_t^{im} = d_t^{pim} + d_t^{nim}$ denotes the administration of party i including post- and non-election years, while $d_t^{pm} = d_t^{pcm} + d_t^{psm}$

and $d_t^{nm} = d_t^{ncm} + d_t^{nsm}$ denote respectively post- and non-election years under both administrations.

By using (9), (10) and the above dummies, the wage equations (5b), (7b) and (8c), the price equations (5a), (7a), (8a) and (8b), and the unemployment equations (5c), (7c), (8d) and (8e), can be summarized by[7]:

$$\Delta w_t = g_{w1} d_t^f + g_{w2} d_t^{ncm} + g_{w3} d_t^{nsm} + g_{w4} d_t^{pm} + g_{w5} d_t^m \Delta p_{t-1} + g_{w6} u_{t-1} + g_{w7} d_t^m u_{t-1} \tag{11a}$$

$$\Delta p_t = g_{p1} d_t^f + g_{p2} d_t^{ncm} + g_{p3} d_t^{nsm} + g_{p4} d_t^{pcm} + g_{p5} d_t^{psm} + g_{p6} d_t^m \Delta p_{t-1} + g_{p7} d_t^m u_{t-1} \tag{11b}$$

$$u_t = g_{u1} d_t^{pcm} + g_{u2} d_t^{psm} + g_{u3} u_{t-1} \tag{11c}$$

where

$$\begin{aligned} &g_{w1} = g + \pi^f, g_{w2} = g + \pi^c, g_{w3} = g + \pi^s, g_{w4} = g + q\pi^c + (1-q)\pi^s, \\ &g_{w5} = \theta, g_{w6} = -(1-\lambda), g_{w7} = \alpha\lambda, g_{p1} = \pi^f, g_{p2} = \pi^c, g_{p3} = \pi^s, \\ &g_{p4} = k[\pi^c + \alpha q\pi^c + \alpha(1-q)\pi^s], g_{p5} = k[\pi^s + \alpha q\pi^c + \alpha(1-q)\pi^s], g_{p6} = \theta, \\ &g_{p7} = \alpha\lambda, g_{u1} = k(1-q)(\pi^s - \pi^c), g_{u2} = -kq(\pi^s - \pi^c), \\ &g_{u3} = \lambda, \text{ and } k = 1/(1+\alpha) \end{aligned} \tag{12}$$

Equations (11a)–(11c) are a system of reduced-form equations which displays the cross-equation restrictions (12). All variables are observable, so this is an estimable equation system.

2.2. Integration and cointegration properties of the data

Univariate analysis indicates that the series Δw_t, Δp_t and u_t are each individually $I(1)$ with constant. In particular, Dickey–Fuller (DF) t-statistics (allowing for the possibility of a constant, and with zero lagged differenced terms)[8] testing for unit roots in Δw_t, Δp_t and u_t have values of -2.55, -1.75 and 0.04 respectively, which are all higher than the 5% MacKinnon critical value of -2.95. Thus, the null of a unit root in the series Δw_t, Δp_t and u_t is accepted. In turn, we test for second-order integration. The null of a unit root is easily rejected when Δw_t and Δp_t are first-differenced, while the null of a unit root in Δu_t can be rejected at the 10% level (but not the 5% level)[9]. Taken together, these results suggest that the hypothesis that Δw_t, Δp_t and u_t are $I(1)$ with constant provides a good description of the statistical properties of the data.

Next, we look for cointegrating relationships and, if necessary, transform the model so as to achieve stationarity (see also King, Plosser, Stock, and Watson, 1991; Banergee, Dolado, Galbraith, and Hendry, 1993). The first regression (11a) contains the series Δw_t, Δp_t and u_t. The Johansen Maximum Likelihood test does not reject the null that (Δw_t, Δp_t and u_t) are cointegrated. In particular, when we test the hypothesis of one cointegrating equation against the

hypothesis of no cointegrating equations, the Likelihood Ratio is 10.34 which is less than the 5% critical value of 19.96. Hence, the null that there is one cointegrating equation is accepted[10]. Next, consider the second regression (11b). This is an unbalanced regression because it explains an $I(0)$ variable (differenced price inflation, $\Delta p_t - \Delta p_{t-1}$) by an $I(1)$ variable (unemployment, u_t). To avoid spurious regression problems, we will use the first-difference Δu_{t-1}, rather than the level u_{t-1}, when we estimate the model (the nature of our estimation results—available upon request—does not depend on whether we use u_{t-1} or Δu_{t-1} as a regressor in (11b)). Finally, consider the third regression (11c). This regression can also be spurious. Therefore, we will first-difference it when we estimate the model (again, the nature of our estimation results—available upon request—does not depend on whether we use the levels regression (11c) or its first-differenced version)[11].

2.3. Tests and estimation results

Therefore, the final econometric model is:

$$\Delta w_t = g_{w1} d_t^f + g_{w2} d_t^{ncm} + g_{w3} d_t^{nsm} + g_{w4} d_t^{pm} + g_{w5} d_t^m \Delta p_{t-1} + g_{w6} u_{t-1} + g_{w7} d_t^m u_{t-1} \tag{13a}$$

$$\Delta p_t = g_{p1} d_t^f + g_{p2} d_t^{ncm} + g_{p3} d_t^{nsm} + g_{p4} d_t^{pcm} + g_{p5} d_t^{psm} + g_{p6} d_t^m \Delta p_{t-1} + g_{p7} d_t^m \Delta u_{t-1} \tag{13b}$$

$$\Delta u_t = g_{u1} \Delta d_t^{pcm} + g_{u2} \Delta d_t^{psm} + g_{u3} \Delta u_{t-1} \tag{13c}$$

subject to the cross-equation restrictions (12). Given the integration and cointegration properties of the data, this transformed model does not suffer from stationarity problems[12]. We underline that our estimation results are robust to transformations being made to achieve stationarity.

By estimating the equation system (13a)–(13c) subject to (12), we respect the Lucas critique, and get estimates of the structural parameters ($g, \pi^f, \pi^c, \pi^s, \theta, \lambda, \alpha, q$). However, we will not attempt to derive estimates of the election probability q. The reason is that our model is too stylized to give plausible estimates of q. Therefore, we prefer to hold the election probability q fixed at 0.5 (this constraint is not rejected by the data).

The data do not reject the overidentifying restrictions (12). Restricted and unrestricted SUR estimates of the reduced-form equation system (13a)–(13c) give an F-statistic of 2.27. Thus, the restrictions are accepted at 7% level. The relevant χ^2-statistic is equal to 20.43 implying that the restrictions are accepted at 1.5% level (although they are rejected at the 5% level).

Restricted SUR estimates are reported in Table 1.

All estimated coefficients (except α) have signs and magnitudes consistent with the theory, and are significant. Both π^c and π^s are significantly higher

Table 1. Restricted SUR estimates of (13a)–(13c) subject to (12): Greece 1960–1994.

Parameter	Estimate	t-Statistic
g	0.072	8.54
π^f	0.020	2.38
π^c	0.080	4.42
π^s	0.080	4.40
θ	0.51	4.52
λ	0.694	6.29
α	−1.127	4.27

Notes: (a) The election probability q is 0.5. See in the text.
(b) The adjusted R-squared (R^2), the standard error of regression (σ) and the Durbin-Watson statistic (DW) for (13a), (13b) and (13c) are respectively:
R^2—0.671, 0.792 and 0.378
σ—0.039, 0.034 and 0.006
DW—1.925, 1.885 and 1.568.

than π^f. That is, price and wage inflation are higher during managed floating (under all administrations) than during the fixed exchange rate regime of Bretton Woods. Also, price and wage inflation persist during managed floating by $\theta = 0.510$ (while inflation persistence is insignificant during Bretton Woods). These results support the estimates of AP, and are consistent with the predictions of the exchange-rate regime model. Concerning the predictions of the partisan model, notice that $\pi^c = \pi^s$. That is, the Barro-Gordon type inflation bias is identical under both parties. This result differs from AP (see below). The parameter λ (i.e., the relative weight of insiders on wage-setting) is estimated to be 0.694 which is a very plausible value. It is only the estimate of α (i.e., the relative weight given to unemployment relative to inflation) that does not have the right sign. We believe that this is due to the negative Phillips-curve type effect of unemployment on inflation, which more than outweighs the positive Barro-Gordon type effect.

We comment further on the lack of partisan differences. Unrestricted estimates seem to suggest significant partisan differences in inflation, i.e., wage and price inflation is higher under Socialists than under Conservatives in the post-1972 regime of managed floating[13]. By contrast, as we saw above, restricted estimates do not imply partisan differences. Therefore, we can make the following three points: (i) The difference between restricted and unrestricted estimates provides a good example of the importance of the Lucas critique. That is, how to deal with the policy-induced parameter changes, and how to identify the "correct" model, by imposing the relevant cross-equation restrictions[14]. (ii) If there are partisan differences in inflation as the unrestricted estimates seem to suggest, they must be seen not from the angle of the Barro-Gordon model of credibility, but from another angle, e.g., incomes policy. (iii)

The absence of Barro-Gordon type inflation biases can explain the absence of partisan cycles in unemployment after elections (see Eqs. (8d) and (8e) or equivalently Eq. (13c) above)[15]. Since here we have respected the Lucas critique, this explanation is model-consistent[16].

Finally, we report that there is no evidence of electoral cycles in inflation, and that our results are robust to a number of changes in the model (e.g., as we said above, the introduction of a dummy variable for incomes policy in 1986–1987 and the introduction of a dummy variable for oil price shocks).

3. Conclusions and policy implications

Our results show that after the fall of Bretton Woods in 1972, there is an inflation bias due to the inability of all political administrations in Greece to precommit to low inflation. This was not the case during the Bretton Woods regime of fixed exchange rates. Thus, our findings support the exchange-rate regime model of inflation.

Although these empirical findings are consistent with the widely accepted belief that exchange rates affect the inflation process both directly and indirectly (via credibility), we want to emphasize that these findings do not imply that low inflation can be attributed only to exchange-rate policy. For instance, we know from the recent European experience, that there is a common inflation performance independent of EMS membership (see Dornbusch, 1991). Clearly, a country can achieve disinflation on its own. However, the interesting question is not whether a country can disinflate on its own or not, but whether membership to an exchange rate mechanism (e.g., fixed exchange rates or target zones for the exchange rate) can make the disinflation process easier. If such a membership provides a form of incomes policy and breaks the inertia of inflation, it cannot make disinflation harder. If, however, nominal wages are driven without regard for inflation and exchange rate targets, any use of exchange rate commitments to control inflation will result, sooner or later, in overvaluation and stagflation, and finally speculative attacks on the currency. It is therefore important to work on disinflation further before moving to a fixed exchange rate or a narrow target zone for the exchange rate.

Therefore, disinflation requires the correction of economic fundamentals. Only when the fundamentals have been corrected, commitment to an exchange rate mechanism can function as an effective preventive device against the repetition of high-inflation episodes (see also Cukierman, 1994). Since 1993, steps have been taken in both directions in Greece. In particular, there have been efforts to correct the economic fundamentals (although they are still away from the EEC average) and, at the same time, the monetary authorities have resisted the temptation to use the option of crawling peg exchange-rate policies. In addition, steps have been taken to appoint inflation-averse central bankers (see Svensson (1997) for a survey of possible improvements to the inefficient (Nash) equilibrium of the Barro-Gordon game). However, the wage-price-exchange

rate dynamics continue to be an issue of political rift. Without incomes policy and further fiscal restraint, exchange rate stability and disinflation are not plausible (see also Dornbusch, 1991).

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Notes

1. Recently, Coles and Philippopoulos (1997) extended this result to a target zone model. The crucial assumption of all the literature on imported credibility is that exchange rate commitments (e.g., fixed exchange rates and target zones) are more credible than domestic anti-inflationary policy announcements. However, it is known from the literature on speculative attacks, that exchange rate commitments can easily collapse. It is also known that intervention (e.g., capital controls, borrowing of foreign reserves, increases in interest rates) can only delay the collapse. While such a credibility problem has had characterized most of the ERM period and the last years of Bretton Woods, it was not a serious problem in most of the Bretton Woods era (see McKinnon, 1993). Besides, capital controls enhanced the credibility of Bretton Woods. This was particularly true in a country like Greece where regulation was the economic dogma. See also below about the credibility of exchange rate commitments.
2. Therefore, if there are partisan differences in inflation, they must be seen not from the angle of the Barro-Gordon model of credibility but from another angle (e.g., incomes policies or wage indexation). Also, as we explain below, the difference between restricted and unrestricted estimates provides a good example of the importance of the Lucas critique, and how we can deal with the model identification problem by testing the relevant cross-equation restrictions.
3. Although here we do not model exchange rates (actual and expected), they can be easily introduced. For instance, we can use a small open economy model with purchasing power parity. Then, our solution remains unchanged, if we replace domestic prices with exchange rates (see e.g., Horn and Persson, 1988). This is especially true in a country like Greece in which the traded sector is particularly important, and hence there is a strong link between price inflation and exchange rate depreciation. Alternatively, we can use a more general model with traded and nontraded goods. Again, this would not change our qualitative results (see e.g., Rogoff, 1985b).
4. In what follows, we assume that the exchange-rate regimes are fully credible, and that wage setters fully predict regime switches. Such a deterministic modeling has been often used by the literature on exchange rates and speculative attacks. Alternatively, we could use probabilistic uncertainty about the exchange rate regime in the same way we model uncertainty about the electoral outcome. However, we do not do this because the period of uncertainty about the viability of Bretton Woods did not last long, and because Greece has been following some form of managed floating exchange rates since 1973 (Greece is not yet a member of the Exchange Rate Mechanism of the European Monetary System). See also Footnote 1 above.
5. Wage series (hourly earnings in manufacturing, 1990 $=$ 1), price series (retail price index, 1990 $=$ 1) and the unemployment rate are from the Main Economic Indicators of OECD.
6. We report that there is no evidence of political (partisan or electoral) effects on inflation during Bretton Woods.
7. Note that $d_t^f + d_t^{ncm} + d_t^{nsm} + d_t^{pm} = 1$.

8. There is nothing in our theoretical model (11a)–(11c) to suggest the presence of time-trends and/or lagged differenced terms. However, we have also allowed for the possibility of a trend and have used augmented DF tests with lagged differenced terms. These tests give the same conclusions. Therefore, all reported DF tests will be with constant and zero lagged differenced terms.
9. In particular, the DF t-statistic testing for a unit autoregressive root in Δu_t has a value of -2.61, which is higher than the 5% Mackinnon critical value of -2.95 (hence the null of $I(2)$ is accepted at 5%), but equal to the 10% Mackinnon critical value. Since the introduction of political dummies (as suggested by the theoretical model (11a)–(11c)) reduces even further the estimated DF t-statistic, it is reasonable to reject the null of $I(2)$.
10. The null of two cointegrating equations cannot be rejected either. However, only one of them satisfies the theoretical sign restrictions.
11. Alternatively, we could transfer u_{t-1} on the right-hand side of (11c) so as to regress Δu_t on the political dummies only. However, this implies $\lambda = 1$ (see the restrictions in (12)) which must be also imposed in the other two Eqs. (11a) and (11b). The null that $\lambda = 1$ in (11a)–(11c) and (12) is easily rejected. Therefore, we first-difference (11c). The nature of our estimation results is robust to the transformation we use (results are available upon request).
12. We report that when we test for unit roots in the residuals from the final restricted regressions, i.e., (13a)–(13c) subject to (12), we can reject the null. That is, the residuals follow a stationary pattern. So, there is no inconsistency between the statistical properties of the unrestricted data and the residuals from the econometric model.
13. In particular, unrestricted system-equation estimates of our model easily reject the hypothesis that there are no partisan differences in inflation (results are available upon request). The unrestricted single-equation estimates of AP for the wage equation give the same result (i.e., average wage inflation is significantly higher under Socialists).
14. A referee has pointed out that, as with almost any empirical results, our findings can be interpreted differently. In particularly, he pointed out that Conservatives were in power in Greece during the 1970s, a decade of high inflation everywhere, while Socialists were in power in Greece during the 1980s, when most industrialized countries felt that disinflation was a priority. Since inflation in Greece during the 1980s had a significant inertia component due to backward-looking indexation, it is possible that the identical inflation bias under the two administrations stems from the same external reasons, e.g., the oil price shocks of the 1970s. While this interpretation is possible, we believe that our empirical results are consistent with the theory we have put forward. That is, the data do not reject the cross-equation restrictions of the Barro-Gordon model of credibility, and also give sensible results. This is verified by the fact that all our results are robust to the introduction of a dummy variable for oil price shocks. They are also robust to the introduction of a dummy variable for the incomes policy followed by the socialist party in 1986–1987.
15. The hypothesis that unemployment equals its natural rate is also easily accepted by our unrestricted system-equation estimates (results are available upon request).
16. By contrast, AP speculate that there is no electoral uncertainty to explain why partisan differences in inflation are not translated into partisan cycles in unemployment after elections. In particular, they speculate that either the election outcome could be predicted well in advance of the actual election, or that wage contracts were signed after elections. Strictly speaking, the former argument should be supported by pre-election opinion polls, while the latter argument should be based on data on the timing of wage contracts as in Garfinkel and Glazer (1994) for the USA.

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