OPTIMUM ELECTORAL AREAS

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ABSTRACT

Optimum Electoral Areas*

The paper lies at the intersection between the literature on macroeconomics and politics and the literature on coordination. It uses models of political business cycles in an open economy setting to investigate the costs and benefits of forming electoral areas, i.e. regions where countries share the same electoral calendar. Both opportunistic and partisan models are considered. The main finding of the paper is that the desirability of an electoral area between two countries is enhanced when the spillovers between these countries are large and positive, and when they face symmetric shocks (or are of comparable size). Hence, if a group of countries constitutes an optimum currency area it is also likely to be an optimum electoral area.

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NON-TECHNICAL SUMMARY

Differences in the timing of elections among economically interdependent states have important consequences for economic policies in several areas.

In every country, governments attempt to manipulate policy instruments in order to be re-elected and/or to further their own ideology. Such behaviour is likely to induce 'political business cycles'. With a high degree of economic interdependence, these cycles would tend to spillover between countries. For instance, a politically motivated expansion of money supply in one country could induce an expansion of economic activity in this country, but a recession abroad. Hence, a coordination problem arises.

In the literature on politics and macroeconomics, the issue of political business cycles has been widely studied. Research has identified two different types of cycles. One school postulates that governments generate 'opportunistic' cycles in order to be re-elected. The other assumes that parties voted into power produce 'partisan' cycles in order to pursue their ideologies. Opportunistic cycles are related to elections, while partisan cycles are connected to changes in government.

The literature on political business cycles was developed exclusively in a closed economy framework, which corresponded relatively well to the US situation. This framework is not suitable for analysing situations where economies are highly interdependent, however. Here, with different election dates, countries may experience cycles independently of their own electoral calendars due to political cycles generated by other countries. Coordination of macroeconomic policies or of election dates may prove useful in such situations.

When coordination is deemed profitable, the question is how to achieve it. Coordination of monetary policies among integrated countries could, in principle, be accomplished either by setting up a centralized monetary authority or by granting effective independence from government to national central banks. In practice, however, such solutions may not be feasible for all countries concerned.

An alternative solution studied here consists of coordinating election dates. The paper lies at the intersection between the literature on macroeconomics and politics and the literature on coordination. It uses models of political business cycles in an open economy setting to investigate the costs and

benefits of forming electoral areas, i.e. regions where countries share the same electoral calendar. Both opportunistic and partisan models are considered.

The main findings of the paper are as follows. Coordination of electoral calendars is the preferred option when there is an international positive spillover, provided countries are symmetric (in terms of both shocks and size). The result holds under the two political economy models considered. The fundamental reason behind our central result is that, with positive spillovers and symmetry, the policies of the two governments reinforce one another, which requires less deviation from the optimum in the two countries. Obviously, the precise mechanism producing this outcome depends upon the political model. With opportunistic models, the gains from cooperation come from the fact that each government is able to attain the signalling threshold with less inflation sacrifice. With partisan models, the gains result from less ideologically pronounced outcomes, the liberals being less inflation-prone and the conservatives less deflation-prone than with different election dates.

When the two economies are asymmetric, the preference for electoral coordination only holds under one of the two political economy models. Coordination is the preferred solution (when spillovers are positive) with opportunistic models, regardless of the type of asymmetry. Note, however, that gains from coordination are lower than in the symmetric case. With partisan models, economic agents are indifferent between the two electoral scenarios (with either positive or negative spillovers), regardless of the type of asymmetry. This contrasting result ensues from a crucial difference between the two models. In opportunistic models, employment and inflation play essentially different roles during election years: the former is used for signalling, while the latter adjusts so as to produce the required level of employment. On the contrary, in partisan models inflation and employment play identical roles in every period. Hence, the timing of elections only matters in opportunistic models, where coordination reduces the cost of signalling.

The difference between the symmetric and asymmetric cases rests with the difference in the probability of spillovers between the two economies. The greater the asymmetry, the lower the opportunity for spillovers and, therefore, the lower the gains from coordination. In the extreme situation (i.e. either a competent and an incompetent government or a very small and a very large country), spillovers operate in only one direction.

Our results have important implications for optimum electoral areas. The desirability of an electoral area between two countries is enhanced when the

spillovers between these countries are large and positive, and when they face symmetric shocks (or are of comparable size). This is strikingly similar to the theory of optimum currency areas originated by Mundell and McKinnon. The latter showed that the desirability of a currency area is positively related to the degree of interdependence, while the former argued that the cost of forming such an area increases with the degree of asymmetry. Note, however, that contrary to the theory of optimum currency areas, the welfare implication of electoral areas depends on the sign of the interdependence.

Hence, if a group of countries constitutes an optimum currency area it is also likely to be an optimum electoral area. If these countries decide to create a currency area the problem of electoral coordination vanishes since separate national electoral cycles would no longer exist. On the other hand, if these countries are unwilling to form a currency area, there may be a case to coordinate electoral calendars, creating an electoral area.

The paper sheds light on the situation in the European Union (EU), a collection of fifteen highly interdependent states, each with its own electoral calendar. In the context of 'political macroeconomics' with fifteen economically interdependent, but politically independent, states, the coordination problem discussed earlier can be solved in two ways. One solution would consist of preventing governments from manipulating economic policies, for instance by making central banks independent and/or by limiting public deficits as envisaged in the Economic and Monetary Union (EMU) chapter of the Maastricht Treaty. Another solution would be to adopt a single election day throughout the EU, like in the United States. The analysis can also be instructive in the context of the North American Free Trade Area (NAFTA), where coordination problems also arise due to increasing interdependence.

1. Introduction

Differences in the timing of elections among economically interdependent states have important consequences for economic policies in several areas.

In every country, decisions to implement certain structural reforms (for instance, trade liberalization) are difficult to take *before* an election because of the short-term costs of these reforms. Governments typically prefer to make such decisions immediately *after* an election, hoping that the benefits of the reforms will materialize in time for the next election. When the decision must be taken jointly by several countries (even by only a majority), it may never be adopted if electoral calendars differ substantially between these countries. A possible solution would be the adoption of a single election date in all the countries concerned.

Another problem arising from differences in the timing of elections relates to macroeconomic policy. In every country, governments attempt to manipulate policy instruments in order to be reelected and/or to further their own ideology. Such behavior is likely to induce "political business cycles". With a high degree of economic interdependence, these cycles would tend to spillover between countries. For instance, a politically motivated expansion of money supply in one country could induce an expansion of economic activity in this country, but a recession abroad. Hence, a coordination problem arises.

This paper focuses on the second issue, namely the relationship between the timing of elections and macroeconomic policy. A companion paper will examine the relationship between the timing of elections and structural reforms.

In the literature on politics and macroeconomics, the issue of political business cycles has been widely studied.[1] Research has identified two different types of cycles. One school postulates that governments generate "opportunistic" cycles in order to be reelected. The other assumes that parties voted into power produce "partisan" cycles in order to pursue their ideologies. Opportunistic cycles are related to elections, while partisan cycles are connected to changes in government. The initial contributions to the

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[1] For a survey, see Alesina (1993).

respective schools were Nordhaus (1975) and Hibbs (1977). Both papers adopted a non-rational expectation approach which was later rejected by the profession.

Starting in the mid-eighties, new models were introduced incorporating rational expectations. Opportunistic cycles were analyzed in contributions by Cukierman and Meltzer (1986), Rogoff and Sibert (1988), Rogoff (1990) and Persson and Tabellini (1990). Despite certain differences, these models share the assumption of informational asymmetry, whereby policy makers are better informed than voters about their competence. Partisan cycles models were developed by Alesina (1987, 1988). They rely heavily on the sluggishness in wage adjustments. Rational expectation models of political business cycles have received strong empirical support. See, for instance, Alesina and Roubini (1992).

The literature on political business cycles was developed exclusively in a closed economy framework, which corresponded relatively well to the American situation. An exception is Lohmann (1993). However, this framework is not suitable for analyzing situations where economies are highly interdependent. Here, with different election dates, countries may experience cycles independently of their own electoral calendars due to political cycles generated by other countries. Coordination of macroeconomic policies or of election dates may prove useful in such situations.

The recent analysis of macroeconomic coordination goes back to Cooper (1968).[2] Its motivation lies in the international transmission of economic disturbances and in potential policy conflicts. Since Hamada (1974), the literature has adopted a game-theoretic approach to assess the costs and benefits of coordination. Models differ in their assumptions regarding the structure of the economies, the channels of transmission, the interactions between governments and private agents, and the objectives of economic agents. Most conclude that the non-cooperative equilibrium is sub-optimal and, hence, that coordination is beneficial. A major exception is Rogoff (1985).

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[2] For a survey of the literature, see Horne and Masson (1988).

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An alternative solution studied here consists of coordinating election dates. The paper lies at the intersection between the literature on macroeconomics and politics and the literature on coordination. It uses models of political business cycles in an open economy setting to investigate the costs and benefits of forming electoral areas, i.e., regions where countries share the same electoral calendar. Both opportunistic and partisan models are considered.

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The plan of the paper is as follows. Section 2 analyzes the impact of electoral calendars on inflation, employment and welfare when political business cycles are opportunistic. Section 3 presents similar analyses for the case when political business cycles are partisan. Section 4 concludes.

2. Electoral Calendars and Opportunistic Cycles

In this section we consider opportunistic models to analyze the role of electoral calendars in interdependent economies subject to political business cycles. There are two economies denoted by A and B (a * refers to economy B), each generating its own cycle which is transmitted to the other economy. In each economy, the cycle is produced by governments attempting to be reelected. We formulate a three-period model and investigate two options : one where the two countries hold elections at the same time, the other where elections take place at different dates.

We assume, for the moment, that the two economies are identical in all respects, except possibly in terms of electoral calendars. We present the model assumptions for country A. At each election the "incumbent" competes with the "opponent" (denoted by i and o respectively). Voters are rational and forward looking. They elect the candidate who minimizes their expected loss function (all voters are assumed to be identical) :[3]

$$L = E\left[\sum_{t=1}^{3} \delta^{t-1}\left(\frac{\pi_t^2}{2} + \gamma\,\frac{X_t^2}{2}\right)\right] \tag{1}$$

where
$\qquad \pi_t$ = inflation rate at time t,
$\qquad X_t$ = employment at time t,
$\qquad \gamma > 0$,
$\qquad 0 < \delta < 1$.

The variables π and X are deviations from desired levels. The latter are assumed, without loss of generality, to be equal to zero.

Both candidates share the same objective. Candidate c minimizes the expected loss function :

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[3] A similar loss function is used by Alesina and Roubini (1992) and in the literature on macroeconomic coordination. By contrast Persson and Tabellini (1990) adopts a simpler function where employment appears in a linear form.

$$L^c = E\left[\sum_{t=1}^{3} \delta^{t-1}\left(\frac{\pi_t^2}{2} + \gamma\frac{X_t^2}{2}\right) - K\,Z^c\right] \tag{2}$$

$c = i, o.$

where K denotes the utility from being elected and Z is a dummy variable which has the value one if the candidate is elected and zero otherwise.

We assume that the central bank enjoys no independence from the government. In order to fulfill its objective the elected government can, therefore, manipulate monetary policy. Monetary expansion creates inflation,[4] which, if unanticipated, generates employment. The latter also depends on two other factors: competence and openness. Competence reflects the ability of each candidate to respond to exogenous shocks, while openness reflects the interdependence between the two economies. If candidate c is elected, employment in period t is :

$$X_t = \left(\pi_t - \pi_t^e\right) + \left(\mu_t^c + \mu_{t-1}^c\right) + \beta\left(\pi_t^* - \pi_t^{*e}\right) \tag{3}$$

$c = i, o.$

where μ measures competence, β measures openness and the superscript e stands for expectations. Like in Persson and Tabellini (1990), competence μ is a random variable which can take a high value $\bar{\mu} > 0$ with probability ρ or a low value $\underline{\mu} < 0$ with probability $(1 - \rho)$. Its mean is zero and variance σ^2.[5] Only candidates can observe their own competence.[6] Openness β is a

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[4] In this model there is a perfect correspondence between monetary policy and inflation. Therefore, we assume indifferently that governments set the monetary supply or the inflation rate.

[5] In addition we postulate that $\bar{\mu} < |\underline{\mu}|$. This insures that $\bar{\mu}^2 < \sigma^2 < \underline{\mu}^2$ and that L is minimised when $\mu = \bar{\mu}$.

[6] Voters cannot observe the competence of the candidates for period t. They can, however, infer it based on the economic performance in periods t and (t-1). In other words in our 3-period model, voters may rationally disregard the economic performance in period (t-2). This is justified on two grounds. First, regardless of the timing of elections in the two

parameter indicating the extent to which unanticipated inflation in one country affects employment in the other country. We assume that $|\beta| < 1$. Note that if one excludes the competence term, equation (3) can be derived from a two-country macroeconomic model with wage rigidity and managed floating like in Rogoff (1985).

A crucial assumption concerns the timing of actions by economic agents (voters and governments) and knowledge on the state of the economy. The timing depends, of course, upon whether elections take place at the same date in the two countries or not. We begin by examining the case where election dates differ. At the beginning of each period governments set the money supply. Elections take place at the end of period 1 in country A, and at the end of period 2 in country B. At the time of elections, voters in each country observe employment in both countries for the current and past periods. However, like in Persson and Tabellini (1990), they are not informed about the current monetary policy and, therefore, cannot observe current inflation.[7] Given the assumptions (see footnote 6), each government manipulates the money supply on the last occasion before facing elections so as to signal its competence and tilt the political balance in its favor. In the case where election dates coincide, we postulate that the common date is at the end of period 1. Figure 1 illustrates the timing of events.

FIGURE 1 HERE

In the remainder of the section, we determine the perfect Nash equilibrium of our three-period game. Given the assumption of asymmetric information, we have a signaling game with multiple equilibria. As is typically the case in such models, there are both "separating" and "pooling" equilibria. In a separating equilibrium, the incumbent's selection of monetary policy perfectly reveals his degree of competence. In a pooling equilibrium, it is not possible to ascertain the level of competence. We

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countries, voters enjoy comparable information. Second, logically, governments are assumed to manipulate the money supply only one period before elections.

[7] Nominal wage contracts are set at the beginning of each period. For simplicity, we assume that, at this time, workers have perfect knowledge regarding the competence of the government in office during the previous period and incorporate it in their anticipation of current period inflation. This assumption does not affect the main results of the paper.

focus on separating equilibria[8], and among these select the most efficient one using the "intuitive" criterion of Cho and Kreps (1987). We concentrate throughout on the case where incumbents in both countries are competent in all periods.[9]

A. Different election dates

We solve the model using the traditional backward algorithm. For each period, we present the solution in terms of inflation (or monetary policy) and employment.

At the beginning of period 3, governments in both countries have already faced elections. Whatever their outcome, current governments set monetary policy at the socially optimal levels. Inflation and employment are given by :

$$\pi_3 = -\gamma\bar{\mu}\left[1 + \frac{1}{(1+\gamma)+\beta\gamma}\right] \quad , \tag{4a}$$

$$X_3 = \bar{\mu}\left[1 + \frac{1}{(1+\gamma)+\beta\gamma}\right] \quad , \tag{4b}$$

$$\pi_3^* = -\gamma\bar{\mu}\left[1 + \frac{1}{(1+\gamma)+\beta\gamma}\right] \quad , \tag{4c}$$

$$X_3^* = \bar{\mu}\left[1 + \frac{1}{(1+\gamma)+\beta\gamma}\right] \quad . \tag{4d}$$

Given the objective function (1), the socially desirable level of employment is zero. With a shock to competence $\mu = \mu^* = \bar{\mu}$, it follows from equation (3) that employment in both countries would be equal to $2\bar{\mu}$ in the absence of

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[8] Although pooling equilibria can be regarded as more realistic, they do not add to our main argument. The crucial point is that both separating and pooling equilibria produce cycles which are transmitted between countries.

[9] Cases where incumbents are incompetent are of no interest since they involve no manipulation of monetary policy.

inflation surprises. In both countries, however, governments react to the shock by deflationary policies (π_3 and π_3^* negative) which lower employment (X_3 and X_3^*) below $2\overline{\mu}$. A shock to competence $\mu = \mu^* = \underline{\mu}$ produces, instead, inflationary policies.

At the end of period 2, elections are held in country B. Voters choose between the two candidates based on their perception of competence. Voters attribute to the opponent an average level of competence. In order to win the election, the incumbent must signal $\overline{\mu}$. Since we focus on separating equilibria, we postulate a threshold X^B such that voters regard the incumbent as incompetent if $X_2^* < X^B$, and as competent if $X_2^* \geq X^B$.

The set of threshold levels such that a competent incumbent would be willing to achieve a level of employment greater than a given threshold X^B, while an incompetent incumbent would not is given by:

$$\underline{\Psi}\,\varphi + 2\overline{\mu} - \overline{\mu}\,\beta\,\frac{\gamma}{1+\gamma} < X^B < \overline{\Psi}\,\varphi + 2\overline{\mu} - \overline{\mu}\,\beta\,\frac{\gamma}{1+\gamma} - (\overline{\mu} - \underline{\mu})(1-\rho)\frac{\gamma}{1+\gamma}\frac{1+\gamma(1-\beta^2)}{1+\gamma}, \quad (5)$$

where

$$\varphi = \frac{(1-\rho)(1+\gamma) - \beta^2\gamma(1-\rho)}{1+\gamma}\qquad ,$$

$$\overline{\Psi} = \left[\frac{2}{1+\gamma}\left(\delta K + \delta\frac{(1+\gamma)\gamma}{2}\left(\sigma^2 - \overline{\mu}^2\right)\right)\right]^{0.5}\qquad ,$$

$$\underline{\Psi} = \left[\frac{2}{1+\gamma}\left(\delta K + \delta\frac{(1+\gamma)\gamma}{2}\left(\sigma^2 - \underline{\mu}^2\right)\right)\right]^{0.5}\qquad .$$

It can easily be verified that this interval exists for reasonable values of the parameters. The existence of a set of separating equilibria is thus ensured. In other words with different election dates, governments are able to signal

their competence to voters despite the spillover from foreign monetary policy. This result holds regardless of the sign of β.

Within the interval of threshold levels, we select the most efficient equilibrium, which is given by the lower bound of X^B in equation (5). Assuming the incumbent is competent, he manipulates monetary policy at the beginning of period 2, achieves the target employment level, and wins the election. In this case, inflation and employment are given by :

$$\pi_2 = \frac{-\gamma}{1+\gamma}\left(2\bar{\mu} + (1-\rho)\beta\underline{\Psi} + \gamma\bar{\mu}\right) \qquad , \tag{6a}$$

$$X_2 = \frac{1}{1+\gamma}\left(2\bar{\mu} + (1-\rho)\beta\underline{\Psi} + \gamma\bar{\mu}\right) \qquad , \tag{6b}$$

$$\pi_2^* = -\gamma\bar{\mu}\left(1 - \beta\frac{\gamma}{1+\gamma}\right) - \gamma\underline{\mu} + \underline{\Psi}\frac{(1+\rho\gamma)(1+\gamma) + \beta^2\gamma^2(1-\rho)}{(1+\gamma)} \qquad , \tag{6c}$$

$$X_2^* = 2\bar{\mu} - \bar{\mu}\beta\frac{\gamma}{1+\gamma} + \underline{\Psi}\frac{(1-\rho)(1+\gamma) - \beta^2\gamma^2(1-\rho)}{(1+\gamma)} \qquad . \tag{6d}$$

Compared with period 3, inflation and employment in period 2 are greater in B due to increased money supply in this country. In country A, inflation in period 2 is lower than previously if $\beta > 0$. Indeed, increased inflation in B results in higher employment in A which, because it is undesired, prompts the government to adopt a deflationary policy. The opposite holds if $\beta < 0$.

At the end of period 1, elections are held in country A. By analogy with country B in period 2, and selecting the most efficient threshold, inflation and employment are given by :

$$\pi_1 = \gamma\mu_0 + \beta\frac{\gamma^2}{1+\gamma}\bar{\mu} - \gamma\underline{\mu} + \underline{\Psi}\frac{(1+\rho\gamma)(1+\gamma) + \beta^2\gamma^2(1-\rho)}{(1+\gamma)} \qquad , \tag{7a}$$

$$X_1 = \bar{\mu} + \mu_0 - \bar{\mu}\beta\frac{\gamma}{1+\gamma} + \underline{\Psi}\frac{(1-\rho)(1+\gamma) - \beta^2\gamma^2(1-\rho)}{(1+\gamma)} \qquad , \tag{7b}$$

$$\pi_1^* = \frac{-\gamma}{1+\gamma}\left(\overline{\mu}+\mu_0+(1-\rho)\beta\underline{\Psi}+\gamma\mu_0\right) \qquad , \qquad (7c)$$

$$X_1^* = \frac{1}{1+\gamma}\left(\overline{\mu}+\mu_0+(1-\rho)\beta\underline{\Psi}+\gamma\mu_0\right) \qquad , \qquad (7d)$$

where μ_0 is the competence level in period 0.

In comparison with period 2, inflation and employment in period 1 are greater in A, but lower in B, regardless of the sign of β.

B. Single election date

We proceed like in the previous case. In periods 2 and 3, elections have already taken place in both countries. Hence, governments have no incentive to manipulate money supplies which are set at socially optimal levels. In period 3, inflation and employment are given by eqs. (4); analogous equations apply for period 2.

At the end of period 1, elections are held in both countries. Focusing again on separating equilibria, we assume the existence of a threshold couple $\left(X^A, X^B\right)$ such that if $X_1 \geq X^A$ and $X_1^* \geq X^B$ voters in both countries regard incumbents as competent.

With different election dates, the existence of a separating equilibrium was always guaranteed under normal conditions. Here existence is not trivial, because simultaneous manipulations of monetary policies may blur competence signals.

In a separating equilibrium, X^A and X^B imply that competent incumbents choose to manipulate the money supply in order to be reelected, while incompetent ones do not. Incorporating this into the respective governments' loss functions, the following intervals of threshold values X^A and X^B are obtained (setting $\mu_0 = \mu_0^*$):

$$\underline{\phi} + \beta X^B < X^A < \overline{\phi} + \beta X^B \qquad , \qquad \text{(8a)}$$

$$\underline{\phi} + \beta X^A < X^B < \overline{\phi} + \beta X^A \qquad , \qquad \text{(8b)}$$

where

$$\underline{\phi} = \left(1 - \beta^2\right)(1 - \rho)\underline{\Psi} + (1 - \beta)(\overline{\mu} + \mu_0) \qquad ,$$

$$\overline{\phi} = \left(1 - \beta^2\right)(1 - \rho)\overline{\Psi} + (1 - \beta)(\overline{\mu} + \mu_0) - (\overline{\mu} - \underline{\mu})(1 - \rho)\frac{\gamma}{1 + \gamma}\left(1 - \beta^2\right) \ .$$

For each value of X^B and X^A, eqs. (8) define two surfaces in the space (X^A, X^B) bounded by two parallel lines of slopes β and $\frac{1}{\beta}$. If it exists, the intersection of these two surfaces represents the set of separating equilibria (X^A, X^B). Clearly, such a set exists as long as $|\beta| < 1$. If $|\beta| = 1$, there is no separating equilibrium. In fact, the size of the intersection decreases as β increases in absolute value and reduces to zero when $|\beta| = 1$. There is a very simple intuition behind this result. As β increases in absolute value, the impact of foreign monetary policy on domestic employment increases, which weakens the capacity of domestic incumbents to signal their competence through their own monetary policy. In the extreme case where $|\beta| = 1$, signals are not emitted at all since they would be completely blurred. Hence, with a unique election date, governments are still able to signal their competence to voters despite the spillover of foreign monetary policy, provided $|\beta| \neq 1$.

Within the set of separating equilibria, we select the most efficient one. It is given by the lower bounds of X^A and X^B in equations (8). Assuming both governments are competent, they manipulate money supplies at the beginning of period 1 and win the elections. Inflation and employment are given by :

$$\tilde{\pi}_1 = \underline{\Psi}\big[(1 + \rho\gamma) - \beta\gamma(1 - \rho)\big] - \gamma\underline{\mu} - \gamma\mu_0 \qquad , \qquad \text{(9a)}$$

$$\tilde{X}_1 = \underline{\Psi}(1 + \beta)(1 - \rho) + \overline{\mu} + \mu_0 \qquad , \qquad \text{(9b)}$$

$$\tilde{\pi}_1^* = \underline{\Psi}\left[(1+\rho\gamma)-\beta\gamma(1-\rho)\right]-\gamma\underline{\mu}-\gamma\mu_0 \qquad , \qquad (9c)$$

$$\tilde{X}_1^* = \underline{\Psi}(1+\beta)(1-\rho)+\bar{\mu}+\mu_0 \qquad . \qquad (9d)$$

Compared with periods 2 and 3, inflation and employment are now greater in both countries.

C. The costs and benefits of electoral coordination

This section compares the outcomes of the two electoral scenarios in terms of inflation, employment, and welfare. We focus on periods 1 and 2, since outcomes for the two scenarios in period 3 are identical. The comparison concerns both levels and variations. Only country A is examined.[10]

We begin with the case where β is positive.

When the election date is unique, inflation is lower in period 1 and deflation is lower in period 2. By contrast, employment is higher in period 1 and lower in period 2.

To understand the intuition behind these results, we underscore two features of the model. First, in each period, country A(B) faces three possibilities : (i) there are no elections in A(B); (ii) there are elections only in A(B); (iii) there are elections in A and B. Second, an expansion of monetary policy in one country creates employment in this country via two channels : (i) by lowering real wages; (ii) by lowering interest rates.

When there are no elections in country A, the incumbent there sets inflation so as to respond to competence shocks and spillovers from foreign manipulations. When elections are held in A, the incumbent manipulates monetary policy and increases inflation so as to achieve the target employment level. The resulting sacrifice in terms of inflation depends upon whether elections are simultaneous or not. If elections are also held in B, the incumbent in this country also expands the money supply. This

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10   Results for country B are symmetrical.

lowers real wages in B, which increases competitiveness at the expense of A. At the same time, however, monetary expansion lowers world interest rates, which increases employment in A. The relative magnitude of these two effects is represented by β.

With $\beta > 0$, the interest rate effect dominates, and the expansion of money supply in B (triggered by the elections in this country) increases employment in A. This reduces the magnitude of the inflation sacrifice in A (required to achieve the target employment level) compared with the situation where elections are only held in A. This explains why period 1 inflation is lower when elections are held simultaneously. In period 2, when elections are held at different times, monetary expansion in B increases employment in A. This prompts the authorities in country A to deflate more than when elections are held at the same time in both countries.

When the election date is unique, employment in period 1 is higher because of voters' rational expectations. Voters are aware that with a unique election date both governments manipulate monetary policies. They correctly anticipate that employment in their country increases not only due to their own government's actions, but also as a result of foreign monetary policy manipulations. This prompts voters to demand a higher threshold for separating competent and incompetent incumbents. By contrast, employment is lower in period 2 because there are no elections abroad. Figure 2 summarizes the results for inflation and employment in country A when $\beta > 0$.

FIGURE 2 HERE

The previous discussion indicates that inflation variations are lower and employment variations are higher when the election date is unique. These results hinge crucially on the positive sign of β. In period 1, with a positive spillover, the efficient signaling threshold must be higher when election dates are the same, but the inflation requirement to reach this threshold is lower. In period 2, on the other hand, the positive spillover effect is more pronounced when election dates are different. Employment is higher, which forces the government to more deflation.

We now turn to welfare and compute ΔL^A, which is defined as the welfare difference, for country A, between different and same election dates. Since L^A is a loss function, a positive value for ΔL^A implies that a unique election date is preferable to different dates.

The expression for ΔL^A is given by :[11]

$$\Delta L^A = \gamma\theta_1\left(\gamma\theta_1 + \theta_1 + 2\left(\tilde{\pi}_1 - \check{X}_1\right)\right) + \delta\frac{1+\gamma}{\gamma}\theta_2\left(\theta_2 - 2\tilde{\pi}_2\right) \qquad . \qquad (10)$$

where

$$\theta_1 = \beta(1-\rho)\left(1 + \frac{\beta\gamma}{1+\gamma}\right)\underline{\Psi} + \beta\frac{\gamma}{1+\gamma}\overline{\mu} > 0 \qquad ,$$

$$\theta_2 = \beta(1-\rho)\frac{\gamma}{1+\gamma}\underline{\Psi} + \gamma\overline{\mu}\left(\frac{1}{1+\gamma} - \frac{1}{(1+\gamma)+\gamma\beta}\right) > 0 .$$

We observe that ΔL^A is composed of two terms. The first reflects the welfare gain from lower inflation and the loss from higher employment in the first period when election dates coincide. The second reflects the gains from lower employment and lower deflation in the second period when elections are held simultaneously. The latter is unambiguously positive. The sign of the former requires closer examination. Using the analytical expressions for $\tilde{\pi}_1$ and $\check{X}_1$ from equations (9a) and (9b), it can be shown that $\left(\tilde{\pi}_1 - \check{X}_1\right)$ is positive and, therefore, that the first term is positive. In other words, the welfare loss due to a higher threshold employment level is more than outweighed by the gains from lower inflation. Accordingly ΔL^A is positive and, therefore it is preferable to hold elections on the same date when $\beta > 0$.

The crucial element is that $\tilde{\pi}_1 > \check{X}_1$. To see the intuition behind this, we take equation (3), and set, without loss of generality, $\beta = \mu_0 = 0$. The expected inflation level π_1^e is defined, before the realization of μ_1, as the

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[11]   The expression for ΔL^B is identical provided $\delta = 1$, or if the three-period game is repeated infinitely.

weighted average of inflation for a competent and for an incompetent government, which are both positive. Since there are elections in period 1, a competent incumbent will want to signal his competence. He will, therefore, choose a $\tilde{\pi}_1$ positive and greater than $\tilde{\pi}_1^c$. This proves that $\tilde{\pi}_1 > \check{X}_1$ since, even if $\tilde{\pi}_1$ were equal to $\tilde{\pi}_1^c$, $\check{X}_1$ would be equal to zero on average.

In the case where β is negative, the outcome is exactly opposite. Figure 3 summarizes the results in terms of inflation and employment. Regarding welfare, it can be shown that ΔL^A is always negative, and, therefore, that it is always preferable to hold elections at different dates when $\beta < 0$.

FIGURE 3 HERE

D. Asymmetric economies

So far, we have assumed that countries A and B are identical in all respects, except possibly for their electoral calendars. Here, we allow for two types of asymmetries, one concerning competence shocks, the other country size.

The extreme situation of asymmetric shocks corresponds to a zero correlation between competence shocks in the two countries. In this case the outcome is qualitatively the same as in the symmetric case, but quantitatively lower. The intuition is as follows. We distinguish two possibilities. First, if at least one incumbent is incompetent, the two electoral scenarios are equivalent in terms of welfare regardless of β. The reason is that they are identical as demonstrated with the help of figure 1. For instance, if $\mu = \bar{\mu}$ for A and $\mu = \underline{\mu}$ for B, A's government manipulates the money supply in period 1 while B's government never manipulates under either scenarios.

Second, if both governments are competent, the outcome is similar to the symmetric case (i.e. the same election date is preferable if $\beta > 0$ and less desirable if $\beta < 0$). However, the welfare gain (loss) of holding elections at the same time date when $\beta > 0$ ($\beta < 0$) is greater when shocks are symmetric. The reason is that the probability that both governments are competent in any period is greater in the symmetric case.

Asymmetric country size is examined by postulating that A is small and B is large, reflecting the fact that B's monetary policy affects A more than conversely. In the extreme case, B is totally unaffected by A and its β equals zero. Country B is, therefore, indifferent between the two electoral scenarios. Country A, on the other hand, is not indifferent. We can compute the expression for ΔL^A which turns out to be analogous to expression (10). Its sign is given by the sign of β. Hence, like in the purely symmetric case, it is preferable to hold elections on the same (different) date(s) when $\beta > 0$ (< 0).

3. Electoral Calendars and Partisan Cycles

In this section we investigate the role of electoral calendars when political business cycles are generated by partisan behavior. We retain our two-economy, three-period framework. In each economy, the cycle is produced by governments fulfilling their ideological preferences.

Like in section 2, we begin with the symmetric case where the two economies are identical in all respects, except possibly in terms of electoral calendars. In each country, voters are characterized by their preferences towards inflation. A voter j minimizes the following loss function :

$$L^j = E\left\{\sum_{t=1}^{3} \delta^{t-1}\left[\frac{\left(\pi_t - \pi^j\right)^2}{2} + \gamma\frac{X_t^2}{2}\right]\right\} \qquad , \qquad (11)$$

where the notations are like earlier on, and π^j is voter j's optimal inflation rate. In other words, voters have identical preferences towards employment (whose optimal level is assumed to be zero), but differ with respect to inflation.

At each election voters choose between two parties : the conservatives and the liberals. The former prefer a low inflation level ($\underline{\pi}$), while the latter prefer a high level ($\bar{\pi}$).

After each election, the government sets the money supply which corresponds to its optimal inflation level. Changes in employment are produced by domestic and foreign inflation surprises :

$$X_t = \left(\pi_t - \pi_t^e\right) + \beta \left(\pi_t^* - \pi_t^{*e}\right) \qquad , \qquad (12)$$

where β again measures openness.

Contrary to the opportunistic model, there is no information asymmetry here. All agents face the same uncertainty concerning the outcome of elections. Like in Alesina (1987), the probability of electoral success (p for liberals and (1 - p) for conservatives) is set exogenously. Perfect symmetry implies that, in any period, preferences of voters in the two economies are identical. However, such ideological (liberal or conservative) waves generate identical governments in both countries only when elections are held simultaneously. Obviously, the preferences of voters may alternate between periods.

The timing of events remains as before (see Figure 1), with two exceptions. First, nominal wage contracts are now set before each election. This assumption of sluggish wage adjustment is a crucial feature of partisan models. Second, the government does not manipulate the money supply since there is no information asymmetry.

A. Different election dates

At the beginning of period 3, the government in country B has just won the election, while the government in country A has been in office for one period. There are four possible configurations for the governments in the two countries : liberals in both countries, conservatives in both countries, or liberals in one country and conservatives in the other. For the sake of brevity, we concentrate on the case where liberals govern in A and conservatives rule in B.[12] Inflation and employment are given by :

$$\pi_3 = \overline{\pi} - \frac{\gamma\beta}{(1+\gamma)^2 - \beta^2\gamma^2}\left[\underline{\pi}^* - \hat{\pi}^*\right] \qquad , \qquad (13a)$$

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[12] The three other cases can easily be derived.

$$X_3 = \frac{\beta}{(1+\gamma)^2 - \beta^2\gamma^2}\left[\underline{\pi}^* - \hat{\pi}^*\right] \qquad , \qquad (13b)$$

$$\pi_3^* = \underline{\pi}^* - \frac{\gamma}{1+\gamma}\left[\underline{\pi}^* - \hat{\pi}^*\right] + \frac{\beta^2\gamma^2}{(1+\gamma)^2 - \beta^2\gamma^2}\frac{1}{1+\gamma}\left[\underline{\pi}^* - \hat{\pi}^*\right] \qquad , \qquad (13c)$$

$$X_3^* = \frac{(1+\gamma) - \beta^2\gamma}{(1+\gamma)^2 - \beta^2\gamma^2}\left[\underline{\pi}^* - \hat{\pi}^*\right] \qquad , \qquad (13d)$$

where $\hat{\pi}^* = p^*\overline{\pi}^* + (1-p^*)\underline{\pi}^*$.

The optimal inflation and employment levels are $\overline{\pi}$ and 0, respectively, for A's liberal government, and $\underline{\pi}$ and 0 for B's conservative government. Due to the wage setting scheme, the election in B generates a deflationary surprise which lowers employment in B below zero. This surprise also pushes employment in A away from zero due to the spillover between the two economies. If $\beta > 0$, employment in A is also below zero; if $\beta < 0$, employment is above zero. Given the trade-off between employment and inflation in equation (11), both governments react by modifying the money supply, which brings inflation in each country away from its desired level. Inflation in B is above the desired level $\underline{\pi}^*$. In A the inflation level depends on the sign of β : it is above the desired level $\overline{\pi}$ if $\beta > 0$, and below $\underline{\pi}$ if $\beta < 0$.

At the beginning of period 2, the government in A has just won the election, while B's government remains from the previous period. There are again four possible configurations for the two governments, from which we choose the same as before. Inflation and employment are as follows :

$$\pi_2 = \overline{\pi} - \frac{\gamma}{1+\gamma}\left[\overline{\pi} - \hat{\pi}\right] + \frac{\beta^2\gamma^2}{(1+\gamma)^2 - \beta^2\gamma^2}\frac{1}{1+\gamma}\left[\overline{\pi} - \hat{\pi}\right] \qquad , \qquad (14a)$$

$$X_2 = \frac{(1+\gamma) - \beta^2\gamma}{(1+\gamma)^2 - \beta^2\gamma^2}\left[\overline{\pi} - \hat{\pi}\right] \qquad , \qquad (14b)$$

$$\pi_2^* = \underline{\pi}^* - \frac{\gamma\beta}{(1+\gamma)^2 - \beta^2\gamma^2}\left[\overline{\pi} - \hat{\pi}\right] \qquad , \qquad (14c)$$

$$X_2^* = \frac{\beta}{(1+\gamma)^2 - \beta^2\gamma^2}[\bar{\pi} - \hat{\pi}] \tag{14d}$$

The intuition behind these results is the same as for period 3.

In period 1, inflation and employment in both countries correspond to the respective government's desired levels since there were no elections in the previous period.

B. Single election date

In periods 1 and 3, the setting of money supply does not come immediately after elections. Inflation and employment are, therefore, set at the government's desired levels.

At the beginning of period 2, governments in both countries have just won the elections. Given the assumption of perfect symmetry, there are only two possible configurations for the two governments : either liberals or conservatives in both countries. Again for brevity we focus on one case, say the liberal configuration. Inflation and employment are given by :

$$\tilde{\pi}_2 = \bar{\pi} - \frac{\gamma}{1+\gamma}[\bar{\pi} - \hat{\pi}] + \frac{\beta^2\gamma^2}{(1+\gamma)^2 - \beta^2\gamma^2}\frac{1}{1+\gamma}[\bar{\pi} - \hat{\pi}] - \frac{\gamma\beta}{(1+\gamma)^2 - \beta^2\gamma^2}[\bar{\pi}^* - \hat{\pi}^*] \ , \tag{15a}$$

$$\tilde{X}_2 = \frac{(1+\gamma) - \beta^2\gamma}{(1+\gamma)^2 - \beta^2\gamma^2}[\bar{\pi} - \hat{\pi}] + \frac{\beta}{(1+\gamma)^2 - \beta^2\gamma^2}[\bar{\pi}^* - \hat{\pi}^*] \ , \tag{15b}$$

$$\tilde{\pi}_2^* = \bar{\pi}^* - \frac{\gamma}{1+\gamma}[\bar{\pi}^* - \hat{\pi}^*] + \frac{\beta^2\gamma^2}{(1+\gamma)^2 - \beta^2\gamma^2}\frac{1}{1+\gamma}[\bar{\pi}^* - \hat{\pi}^*] - \frac{\gamma\beta}{(1+\gamma)^2 - \beta^2\gamma^2}[\bar{\pi} - \hat{\pi}], \tag{15c}$$

$$\tilde{X}_2^* = \frac{(1+\gamma) - \beta^2\gamma}{(1+\gamma)^2 - \beta^2\gamma^2}[\bar{\pi}^* - \hat{\pi}^*] + \frac{\beta}{(1+\gamma)^2 - \beta^2\gamma^2}[\bar{\pi} - \hat{\pi}] \ . \tag{15d}$$

The optimal inflation and employment levels are, respectively, $\bar{\pi}(\bar{\pi}^*)$ and zero for country A (B). Due to the wage setting scheme, the election in both countries generates an inflation surprise which brings employment in the

two countries above zero. If the spillover parameter (β) is positive, the foreign surprise reinforces the domestic surprise, which brings employment even higher. Both governments react to this by setting the money supply so as to reduce inflation below the desired levels $\bar{\pi}$ and $\bar{\pi}^*$. If β is negative, foreign surprises weaken domestic surprises, but employment remains above zero. In the limit, when $\beta = -1$, employment falls to zero because the two surprises exactly cancel one another. With $\beta < 0$, inflation remains below $\bar{\pi}$ but less so that previously. If, $\beta = -1$, inflation in the two countries is exactly $\bar{\pi}$ and $\bar{\pi}^*$.

C. The costs and benefits of electoral coordination

This section compares the outcomes of the two electoral scenarios in terms of inflation, employment, and welfare. We focus on periods 2 and 3, since outcomes of the two scenarios in period 1 are identical. The comparison concerns both levels and variations. Only country A is examined.

In country A elections take place at the end of period 1. There are two possible outcomes : liberals win or conservatives win. We assume, without loss of generality that the winners are the liberals. Liberals remain in office throughout periods 2 and 3. If elections are held simultaneously in both countries, liberals also win in country B, given the assumption of symmetry. If election dates differ there are no elections in period 1 in country B and the existing government, led either by liberals or conservatives, remains in office. In period 2, voters in country B elect a new government, which may be either a liberal or conservative. Thus, if elections are held simultaneously liberals head government in A and B during periods 2 and 3. By contrast, if election dates differ there are two possible configuration in each period : liberals in A and conservatives in B, or liberals in A and B.

The comparison between the two electoral scenarios depends on the sign of β. We begin with the case where $\beta > 0$.

In period 2, under both scenarios, inflation is below the government's desired level $\bar{\pi}$ and employment is above zero regardless of the political configuration in B. With a single election date inflation is lower and employment is higher. In period 3, both inflation and employment are at

the government's desired levels, when election dates coincides. When they differ, inflation and employment diverge from the desired levels in opposite directions depending on the ideology of B's government. With a conservative government in B, inflation in A is above $\bar{\pi}$ while employment is below zero.

The intuition behind these results is a follows. Even if election dates differ, outcomes in period 2 are independent of the government leaning in B, because this government has been in power for several periods and, hence no monetary surprise is created. The election of a liberal government in A creates an inflationary surprise which raises employment above the desired level, and forces the government to reduce its inflation below $\bar{\pi}$. The same phenomena occurs in B if elections are simultaneous. With a positive spillover, the inflationary surprise in B obliges A's government to further reduce its own inflation. In period 3, outcomes with different elections dates depend on the ideology of B's government because its recent election creates a monetary surprise. A newly elected conservative government creates a deflationary surprise, which lowers employment in A and forces A's government to increase inflation above $\bar{\pi}$. Figure 4 summarizes the results for inflation and employment in country A, when $\beta > 0$ and the government is liberal.

FIGURE 4 HERE

The previous discussion indicates that employment and inflation variations are higher when the election date is unique, if the government elected at the end of period 2 in B is liberal. If it is conservative the relative size of variations is uncertain.

Turning to welfare, we compute ΔL^A which is defined as in the previous section. The expression of ΔL^A is given by :

$$\Delta L^A = \frac{\beta}{(1+\gamma)^2 - \beta^2\gamma^2}\, 2p\,(1-p)\,(\bar{\pi}-\underline{\pi})^2 \frac{\beta^2\gamma^2}{(1+\gamma)^2 - \beta^2\gamma^2} \qquad , \qquad (16)$$

where it has been assumed that $p = p^*, \bar{\pi} = \bar{\pi}^*$ and $\underline{\pi} = \underline{\pi}^*$. We observe that ΔL^A is positive, which implies that a single election date is preferable when $\beta > 0$.

In the case where β is negative, the outcome is exactly opposite in terms inflation, employment and welfare. Hence it is always preferable to hold elections at different dates when β < 0.

D. Asymmetric economies

We allow for two types of asymmetries : one concerns voters' preferences, the other country size.

Asymmetric preferences imply that, in any period, voters in the two economies do not necessarily prefer the same party. It follows that, even when elections are held simultaneously, government's ideology in the two countries may differ. In this case the two electoral scenarios are equivalent in terms of welfare regardless of β. The reason is that the four possible configurations for the government in the two countries (see the beginning of section A) have exactly the same probability of occurrence under the two scenarios, which was not the case when symmetry was assumed.

Asymmetric country size is examined by assuming that, in the extreme case, B is totally unaffected by A (its β equals zero), while A may be affected by B's monetary policy. It can easily be shown that both countries are indifferent between the two electoral scenarios. Country A is indifferent because the impact of B's monetary policy in periods when election are held simultaneously is exactly the same as the impact in period 3 when election are held at different time. Country B is indifferent because it is unaffected by A's monetary policy under both scenarios.

4. Conclusion

To summarize, we find that coordination of electoral calendars is the preferred option when there is an international positive spillover, provided countries are symmetric (in terms of both shocks and size). The result holds under the two political economy models considered. The fundamental reason behind our central result is that, with positive spillovers and symmetry, the policies of the two governments reinforce one another, which requires less deviation from the optimum in the two countries.

Obviously, the precise mechanism producing this outcome depends upon the political model. With opportunistic models, the gains from cooperation come from the fact that each government is able to attain the signaling threshold with less inflation sacrifice. With partisan models, the gains result from less ideologically pronounced outcomes, the liberals being less inflation-prone and the conservatives less deflation-prone than with different election dates.

When the two economies are asymmetric, the preference for electoral coordination only holds under one of the two political economy models. Coordination is the preferred solution (when spillovers are positive) with opportunistic models, regardless of the type of asymmetry. Note, however, that gains from coordination are lower than in the symmetric case. With partisan models, economic agents are indifferent between the two electoral scenarios (with either positive or negative spillovers), regardless of the type of asymmetry. This contrasting result ensues from a crucial difference between the two models. In opportunistic models, employment and inflation play essentially different roles during election years : the former is used for signaling, while the latter adjusts so as to produce the required level of employment. On the contrary, in partisan models inflation and employment play identical roles in every period. Hence, the timing of elections only matters in opportunistic models, where coordination reduces the cost of signaling.

The difference between the symmetric and asymmetric cases rests with the difference in the probability of spillovers between the two economies. The greater the asymmetry, the lower the opportunity for spillovers and, therefore, the lower the gains from coordination. In the extreme situation (i.e. either a competent and an incompetent government or a very small and a very large country), spillovers operate in only one direction.

Our results have important implications regarding optimum electoral areas. The desirability of an electoral area between two countries is enhanced when the spillovers between these countries are large and positive, and when they face symmetric shocks (or are of comparable size). This is strikingly similar to the theory of optimum currency areas originated by Mundell (1961) and McKinnon (1963). The latter showed that the desirability of a currency area is positively related to the degree of interdependence, while the former argued that the cost of forming such

area increases with the degree of asymmetry. Note, however, that contrary to the theory of optimum currency areas, the welfare implication of electoral areas depends on the sign of the interdependence.
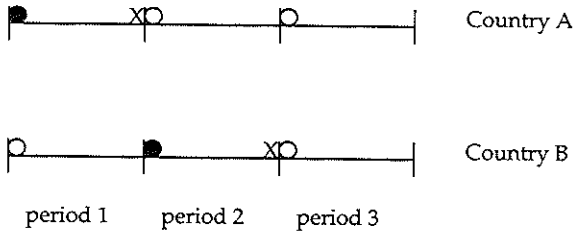
Hence, if a group of countries constitutes an optimum currency area it is also likely to be an optimum electoral area. If these countries decide to create a currency area the problem of electoral coordination vanishes since separate national electoral cycles would no more exist. On the other hand, if these countries are unwilling to form a currency area, there may be a case to coordinate electoral calendars, creating an electoral area.

There is an intense debate as to whether the European Union constitutes an optimum currency area.[13] It may be instructive to also consider whether it constitutes an optimum electoral area. Similarly, in North America, one may find it useful to examine whether there are potential gains from electoral coordination within the NAFTA. Ultimately, these are empirical issues which require further investigation.
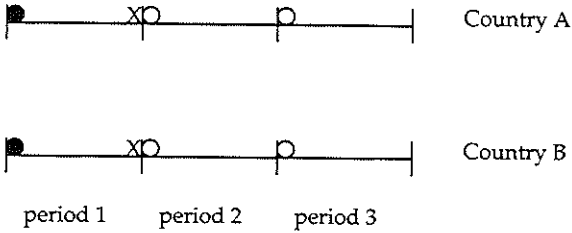
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[13]   See, for instance Mélitz (1995).

Figure 1. The timing of events

Different election dates

Country A

Country B

period 1   period 2   period 3

Single election date

Country A

Country B

period 1   period 2   period 3

O   = setting of money supply

●   = manipulation of money supply

X   = election

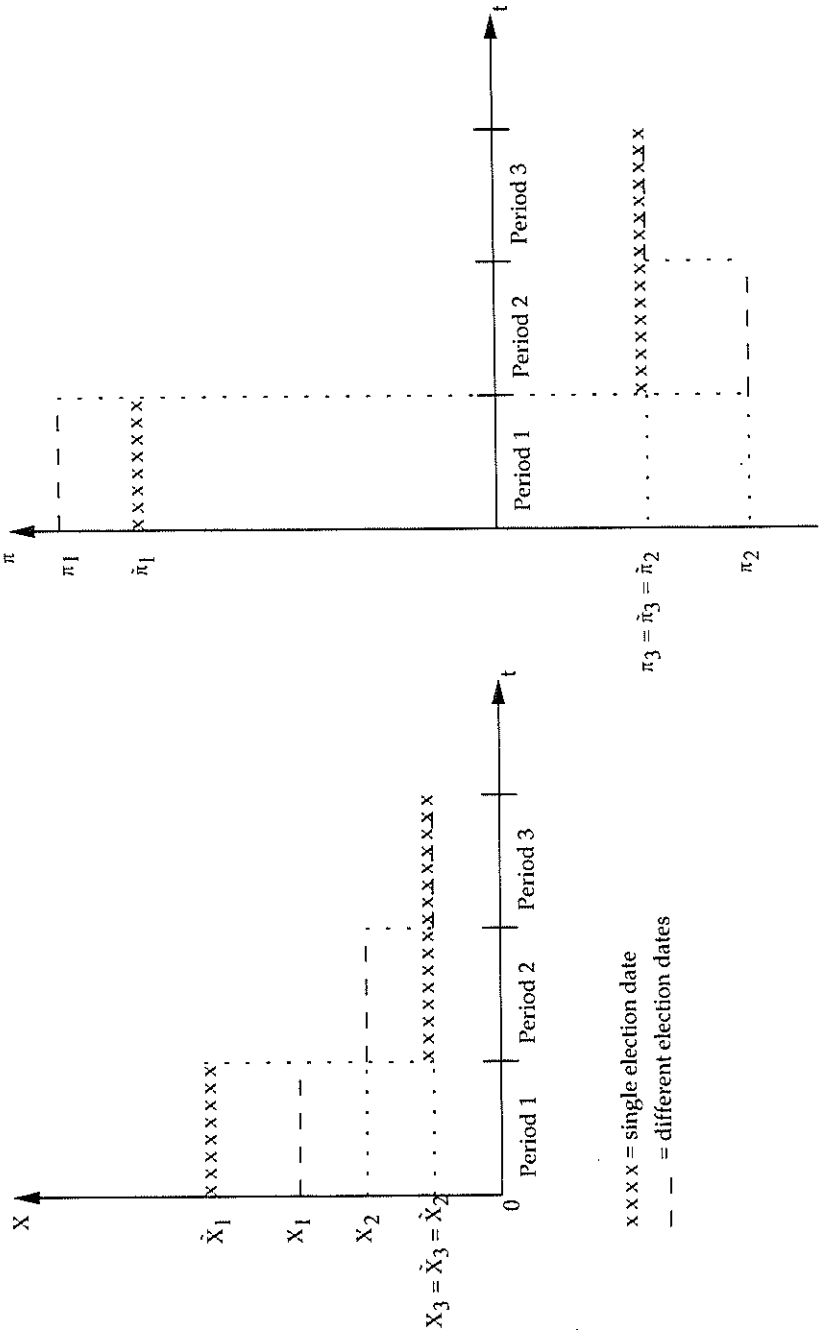Figure 2. Opportunistic Model. Inflation and employment in country A with $\beta > 0$

$x\,x\,x\,x$ = single election date

$-\,-$ = different election dates

Figure 3. Opportunistic model. Inflation and employment in country A with $\beta < 0$

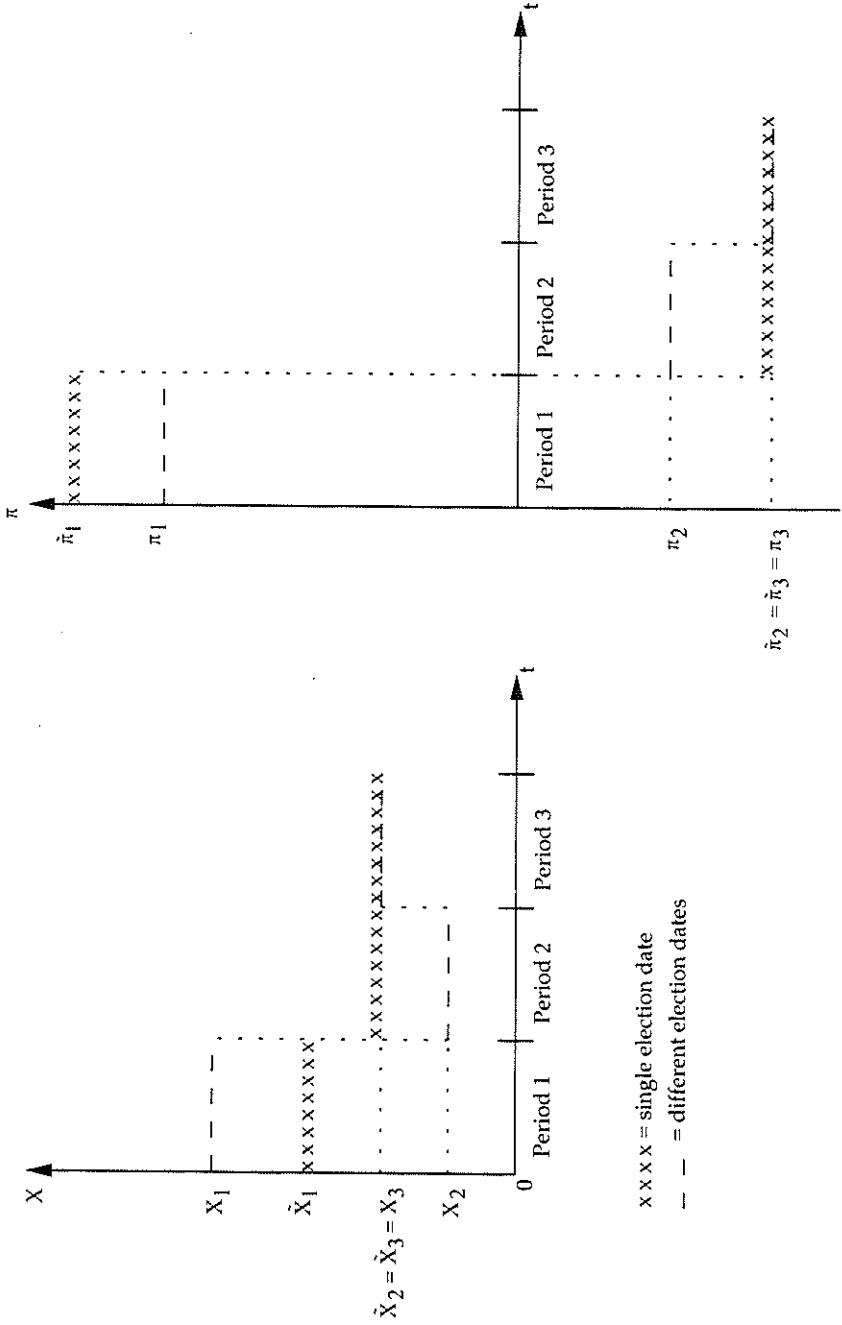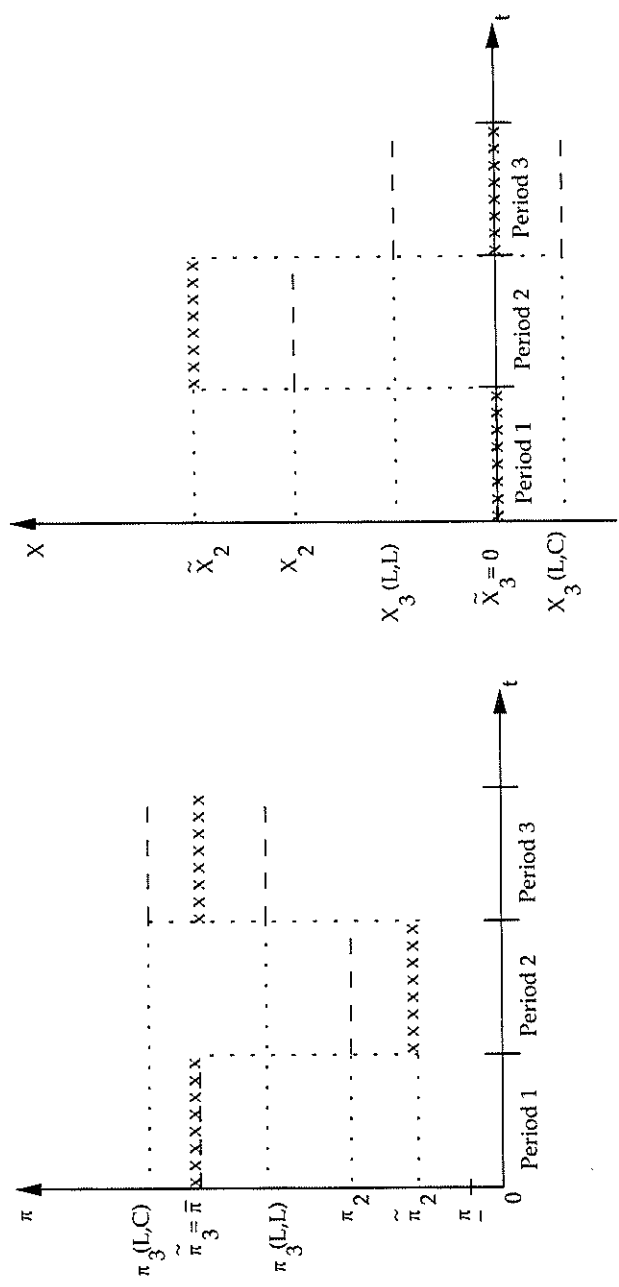x x x x = single election date

— — = different election dates

Figure 4. Partisan model. Inflation and employment in country A with $\beta > 0$ and a liberal government

x x x x = single election date

— — = different election dates

$\pi_3(L,C)$, $X_3(L,C)$ = inflation and employment with a conservative government in B.

$\pi_3(L,L)$, $X_3(L,L)$ = inflation and employment with a liberal government in B.

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