

A model of political competition with activists applied to the elections of 1989 and 1995 in Argentina

Norman Schofield*, Guido Cataife

Center in Political Economy, Washington University in Saint Louis, 63130, MO, United States

Received 10 July 2006; received in revised form 27 September 2006; accepted 15 January 2007

Available online 21 February 2007

Abstract

The mean voter theorem suggests that all parties should rationally converge to the electoral center. Typically this leads to an outcome which is unattractive to the rich. This paper develops a general stochastic model of elections in which the electoral response is affected by the *valence* (or quality) of the candidates. Contributions made by policy-motivated activists can influence valence, leading to the failure of the mean voter theorem. The model is then applied to the presidential elections in 1989 and 1995 in Argentina, to suggest why Carlos Menem, who won in 1989 with a populist platform, was able to win in 1995 with quite different policies that favored the upper middle class.

© 2007 Elsevier B.V. All rights reserved.

Keywords: Local Nash equilibrium; Stochastic electoral model; Valence

JEL classification: C13; C72; D72

1. Introduction

The main contenders in Argentina's 1989 presidential election were Carlos Menem, the candidate of the PJ (*Partido Justicialista*) and Eduardo Angeloz, the candidate of the UCR (*Union Civica Radical*).

Angeloz had the disadvantage of coming from the same political party as the president in office, forced to call an election in 1989 because of hyperinflation. Angeloz's platform was located in the center-right of the economic axis of the political space. His most important proposal was the so-called "red pen," to reduce the size of the state apparatus in an attempt at fiscal austerity.

*Corresponding author.

E-mail addresses: schofield.norman@gmail.com (N. Schofield), gcataife@artsci.wustl.edu (G. Cataife).

Menem was a charismatic, populist candidate, but lacked a sound political platform. His platform, such as it was, included a universal rise in salaries (*salario*) and an emphasis on the productive sector (*revolucion productiva*). This platform, clearly located in the left of the economic axis, gave Menem broad support from the working class, and constituted the key to his electoral victory.

Surprisingly, once in office Menem adopted policies that were the opposite of his electoral promises, including the liberalization of trade, the privatization of several state companies, a freeze of public salaries and the deregulation of the markets. Also, in 1991 Menem established a currency board, the so-called “Convertibility Plan,” which succeeded in controlling hyperinflation. This provided the basis for four years of macroeconomic stability and growth.

However, the Convertibility Plan proved to be vulnerable to both exogenous “contagion” and fiscal imbalances and led to a progressive appreciation of the Argentinean currency. This currency appreciation created both losers and winners in the polity. Among the latter were the recently privatized firms, (seeking to maximize the value of their assets and profits denominated in dollars) and most of the upper middle class, who came to enjoy the benefits of inexpensive imported goods. The losers consisted of the export-oriented sector, together with many small and medium-sized firms and their employees, who could not survive the appreciation of the peso and the liberalization of the economy.

Menem was re-elected in 1995, with a manifesto promising to maintain the administration’s economic policy. Because he had broken the electoral promises of 1989, Menem lost about 15% of the leftist votes. However, because of the high standard of living achieved during Menem’s administration, the gain in upper middle class votes compensated for the working class defection. In 1995 Menem took approximately 50% of the vote, with about 70% of his share coming from the traditional working class constituency of the PJ, and about 30% from other constituencies, mainly voters who had previously chosen the UCR (Gervasoni, 1997). The win for Menem was partly due to his newly acquired vote from the middle class, and partly due to the relative success of a new party, the FREPASO (with 29%). Minor parties took 4.6% and the UCR suffered a great defeat (with only 17% of the vote).

This sequence of events is at odds with the electoral models used to analyze elections. First, the policy positions of the main parties in 1989 seems to contradict the “mean voter theorem.” This theorem predicts the convergence of the candidates to the electoral center. Second, Menem’s policy positions in 1989 and 1995 were very different. In particular, the position that won him the election in 1995 led to considerable economic benefits for a constituency that was opposed to him in 1989.

The aim of this paper is two-fold. First, we aim to explain a “paradox”, which is contrary to generally accepted theory: Actual political systems generally display *divergence* rather than *convergence*. The case of the presidential elections in Argentina in the 1989 and 1995 is a good example of such divergence. Second, we aim to present a theory of the kind of “political realignment” (Sundquist, 1973) that occurred between these elections in Argentina, with a view to understanding such realignments more generally. Perhaps more importantly, the model suggests that there may well be a high degree of contingency over whether a populist leader or a right wing political candidate comes to power in presidential polities that resemble Argentina in the distribution of electoral preferences. Such polities include many in Latin America, as indicated by recent events in Mexico and Bolivia.

A key idea of this paper is that the convergence result does not necessarily hold if there is an asymmetry in the electoral perception of the “quality” of party leaders (Stokes, 1992). The average weight given to the perceived quality of the leader of the j th party is called the party’s

valence. In empirical models, a party's valence is usually assumed to be independent of the party's position. The addition of valence typically contributes to the statistical significance of the model. This has been indicated by the Bayes' factors in models of elections for polities as different as Britain, Germany, Netherlands, Italy, Israel and the United States (Quinn et al., 1999; Quinn and Martin, 2002; Schofield and Sened, 2006). In general, valence reflects the overall degree to which the party is perceived to have shown itself able to govern effectively in the past, or is likely to be able to govern well in the future (Penn, 2003). Formal models of elections incorporating valence have been developed recently (Ansolabehere and Snyder, 2000; Aragonés and Palfrey, 2002; Groseclose, 2001), but the theoretical results to date have not been of general validity.

The model presented here is based on the assumption that valence has two different forms. The first kind of valence is a fixed or *exogenous valence* for a party. The exogenous valence of party j is denoted λ_j and, as in empirical models, is assumed to be independent of the party's position. The second kind is known as *activist valence*. When party j adopts a policy position, z_j , then the activist valence of the party is denoted $\mu_j(z_j)$: Implicitly, we build on a model originally due to Aldrich (1983a,b) and Aldrich and McGinnis (1989), in which activists provide crucial resources of time and money to their chosen party. The party then uses these resources to enhance its image before the electorate, thus adding to the electoral perception of the quality of the leader of the party. It is worth emphasizing that although activist valence is affected by party position, it does not operate in the usual way, namely by influencing voter choice through the distance between a voter's preferred policy position, say x_i , and the party position. Instead, we assume that as party j 's activist support, $\mu_j(z_j)$, increases, then, *ceteris paribus*, all voters become more likely to support party j over all other parties. However, because activists are likely to be more extreme than the typical voter, if party j adopts a position favored by its activists, then it stands to lose voters with more centrist preferred positions. This forces the party to calculate the marginal condition that maximizes vote share. We offer a theorem that gives this marginal condition as a (first order) *balance condition* on the vector of party positions. Because activist support will take the form of money or time, it is appropriate to assume that the activist function exhibits decreasing returns to scale. In formal terms, we assume that these activist functions are concave, so that the Hessians of the activist functions are everywhere negative-definite.

The first order condition gives a necessary condition for what we call a "local strict Nash equilibrium" (LSNE). The negative definiteness of the activist Hessians at a balanced vector then gives a sufficient condition for the vector to be an LSNE. Theorem 1 asserts that if the activist functions are sufficiently concave (so the Hessians have negative eigenvalues of sufficient magnitude) then the LSNE will be pure strategy Nash equilibrium (PNE).

The analysis presented in Section 2 allows for comparative analysis of the model over a range of parameters, including the dimension and nature of the policy space, the importance of policy, the variation in voter's average perception of the relative quality of the various candidates, and the number of parties. Theorem 2 covers the specific situation when activist valence is identically zero, so that only exogenous valence is relevant. This theorem provides the necessary and sufficient conditions for convergence of all parties to the electoral center. We suggest that in Argentina in 1989, the necessary condition failed, leading to divergence of the positions of the two major parties. Once the parties were seen to adopt different positions, then activists were motivated to provide resources to the party most attractive to them. Such support then tends to drive the parties further apart.

Theorems 1 and 2 suggest that PNE for a vote maximizing game will not exhibit convergence of party position. Section 3 applies Theorem 1 to an examination of how a party's equilibrium

position will be affected when it responds to different activists groups with contradictory agenda. As the intensity of support from a group of activists increases, the party leader will consider the benefits of moving along a “balance locus” between them and an opposed group of activists. In particular, when there are two dimensions of policy, as in the case of Argentina in 1989–1995, these strategic moves by the parties in response to activist support will induce a rotation of the party positions. These transformations bring about a change in the most salient dimension of policy, thus inducing a political “realignment”.

We consider the Argentinean case to be an especially challenging test for the implications of a general electoral model. To the best of our knowledge, no other polity has suffered such deep transformations in such a short period. Indeed, between 1989–1995, Argentina’s polity experienced: (i) the saliency of a new dimension, namely the value of its currency, (ii) a sharp change in the population’s perception of the relative “quality” of the two major parties, the PJ and the UCR, and (iii) the emergence of a potent activist group, in the form of the recently privatized firms and their political allies.

The paper is structured as follows. Section 2 presents the formal model, and the statements of Theorems 1 and 2. (The proofs of these results are available in companion papers.) Section 3 develops Theorem 1 by showing the relation between activist contract curves and the balance solution for each party. Section 4 uses the activist vote maximizing model in an informal fashion to show how the two elections in Argentina conform to the model presented here. Section 5 concludes.

2. Local Nash equilibrium with activists and vote maximizing parties

The electoral model presented here is an extension of the multiparty stochastic model of McKelvey and Patty (2006), modified by inducing asymmetries in terms of valence. The justification for developing the model in this way is the extensive empirical evidence that valence is a natural way to model the judgements made by voters of party leaders (Schofield and Sened, 2006). There are a number of possible choices for the appropriate model for multi-party competition. The simplest one, which is used here, is that the utility function for party j , is proportional to the vote share, V_j , of the party. With this assumption, we can examine the conditions on the parameters of the stochastic model which are necessary for the existence of a pure strategy Nash equilibrium (PNE). Because the vote share functions are differentiable, we use calculus techniques to obtain necessary and sufficient conditions for a vector of party positions to constitute what we call *local pure strategy Nash equilibria* (LNE). From standard results (Schofield, 2003) it follows that a PNE must be an LNE, but not conversely. A necessary condition for an LNE is thus a necessary condition for a PNE. A sufficient condition for an LNE need not be a sufficient condition for PNE, unless additional conditions of concavity or quasi-concavity are imposed.

It is assumed that party leaders attempt to estimate the electoral effects of party declarations, or manifestos, and choose their own positions as best responses to other party declarations, in order to maximize their own vote share. The stochastic model essentially assumes that party leaders cannot predict vote response precisely, but can estimate an “expected” vote share. In the model with valence, the stochastic element is associated with the weight given by each voter, i , to the average perceived quality or valence of the party leader.

The data of the spatial model is a distribution, $\{x_i \in X\}_{i \in N}$, of voter ideal points for the members of the electorate, N , of size n . We assume that X is a compact convex subset of Euclidean space, \mathbb{R}^w , with w finite. Without loss of generality, we adopt coordinate axes so that $\frac{1}{n} \sum x_i = 0$. By assumption $0 \in X$, and this point is termed the *electoral origin*.

To characterize the variation in voter preferences, we represent in a simple form the electoral covariance matrix (or data matrix), ∇ , given by the distribution of voter ideal points. Let X have dimension w and be endowed with a system of coordinate axes $(1, \dots, r, s, \dots, w)$. For each coordinate axis let $\xi_r = (x_{1r}, x_{2r}, \dots, x_{nr})$ be the n -vector of the r th coordinates of the set of n voter ideal points. Let $\langle \xi_r, \xi_s \rangle$ denote scalar product and let $v_s^2 = \frac{1}{n} \langle \xi_s, \xi_s \rangle$ be the electoral variance on the s th axis. The electoral covariance between the r th and s th axes is $\langle v_r, v_s \rangle = \frac{1}{n} \langle \xi_r, \xi_s \rangle$

The symmetric $w \times w$ electoral covariance matrix ∇ is then defined to be

$$\nabla = \begin{pmatrix} \langle v_1, v_1 \rangle & \cdot & \cdot & \langle v_1, v_w \rangle \\ \cdot & \langle v_r, v_s \rangle & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ \langle v_w, v_1 \rangle & \cdot & \cdot & \langle v_w, v_w \rangle \end{pmatrix}$$

The total electoral variance is $v^2 = \sum_{r=1}^w v_r^2 = \sum_{r=1}^w \langle v_r, v_r \rangle = \text{trace}(\nabla)$, where $\text{trace}(\nabla)$ is the sum of diagonal terms in ∇ .

Definition 1. The stochastic vote model $M(\lambda, \mu, \beta; \Psi)$ with activist valence.

- (i) Each of the parties in the set $P = \{1, \dots, j, \dots, p\}$ chooses a policy, $z_j \in X$, to declare. Let $\mathbf{z} = (z_1, \dots, z_p) \in X^p$ be a typical vector of party policy positions. Given \mathbf{z} , each voter, i , is described by a vector

$$\begin{aligned} \mathbf{u}_i(x_i, \mathbf{z}) &= (u_{i1}(x_i, z_1), \dots, u_{ip}(x_i, z_p)), \quad \text{where} \\ u_{ij}(x_i, z_j) &= \lambda_j + \mu_j(z_j) - \beta \|x_i - z_j\|^2 + \epsilon_{ij} = u_{ij}^*(x_i, z_j) + \epsilon_{ij}. \end{aligned} \tag{1}$$

Here $u_{ij}^*(x_i, z_j)$ is the observable component of utility.

The term, λ_j , is the fixed or *exogenous valence* of party j , while the function $\mu_j(z_j)$ is the component of valence generated by activist contributions to agent j . The term β is a positive constant, called the *spatial parameter*, giving the importance of policy difference defined in terms of a metric induced from the Euclidean norm, $\|\cdot\|$, on X . The vector $\epsilon_i = (\epsilon_{i1}, \dots, \epsilon_{ij}, \dots, \epsilon_{ip})$ is the stochastic error. We assume the multivariate cumulative distribution of each ϵ_i is identical. This distribution is denoted by Ψ .

- (ii) The exogenous valence vector

$$\lambda = (\lambda_1, \lambda_2, \dots, \lambda_p) \text{ satisfies } \lambda_p \geq \lambda_{p-1} \geq \dots \geq \lambda_2 \geq \lambda_1.$$

- (iii) Voter behavior is modeled by a probability vector. The probability that a voter i chooses party j at the vector \mathbf{z} is

$$\rho_{ij}(\mathbf{z}) = \Pr[[u_{ij}(x_i, z_j) > u_{il}(x_i, z_l)], \text{ for all } l \neq j]. \tag{2}$$

$$= \Pr[\epsilon_{il} - \epsilon_{ij} < u_{ij}^*(x_i, z_j) - u_{il}^*(x_i, z_j), \text{ for all } l \neq j]. \tag{3}$$

Here \Pr stands for the probability operator generated by the distribution assumption on ϵ .

- (iv) The *expected vote share* of party j is

$$V_j(\mathbf{z}) = \frac{1}{n} \sum_{i \in N} \rho_{ij}(\mathbf{z}). \tag{4}$$

The differentiable function $V : X^p \rightarrow \mathbb{R}^p$ is called the *party profile function*. \square

Definition 2. Equilibrium concepts.

- (i) A strategy vector $\mathbf{z}^* = (z_1^*, \dots, z_{j-1}^*, z_j^*, z_{j+1}^*, \dots, z_p^*) \in X^p$ is a *local strict Nash equilibrium* (LSNE) for the profile function $V : X^p \rightarrow \mathbb{R}^p$ iff, for each agent $j \in P$, there is a neighborhood X_j of z_j^* in X such that

$$V_j(z_1^*, \dots, z_{j-1}^*, z_j^*, z_{j+1}^*, \dots, z_p^*) > V_j(z_1^*, \dots, z_j, \dots, z_p^*),$$

for all $z_j \in X_j - \{z_j^*\}$.

- (ii) A strategy vector $\mathbf{z}^* = (z_1^*, \dots, z_{j-1}^*, z_j^*, z_{j+1}^*, \dots, z_p^*)$ is a *weak Nash equilibrium* (PNE) iff, for each agent j ,

$$V_j(z_1^*, \dots, z_{j-1}^*, z_j^*, z_{j+1}^*, \dots, z_p^*) \geq V_j(z_1^*, \dots, z_{j-1}^*, z_j, z_{j+1}^*, \dots, z_p^*),$$

for all $z_j \in X$.

- (iii) A *local weak Nash equilibrium* (LNE) is a local equilibrium where the strict inequality of (i) is replaced with a weak inequality.
- (iv) A strategy z_j^* is a *local best response* to

$$z_{-j}^* = (z_1^*, \dots, z_{j-1}^*, z_{j+1}^*, \dots, z_p^*) \text{ when it locally maximizes } V_j \text{ at } \mathbf{z}_{-j}^*. \quad \square$$

The most common assumption in empirical analyses is that Ψ is the *Type I extreme value distribution* (sometimes called Gumbel). The theorems in this paper are based on this assumption. (See Laslier, 2005, for the use of the Gumbel distribution in a formal model of voting.) This distribution assumption is the basis for much empirical work based on multinomial logit (MNL) estimation. It is also possible to use multinomial probit (MNP) estimation based on the multivariate normal distribution. However, comparison of MNP and MNL models for the Netherlands and Britain reported by Quinn et al. (1999) suggests that the two classes of models are broadly comparable. Indeed, comparison of the MNL and MNP models gave significant Bayes factors (Kass and Raftery, 1995) for the logit estimation. Dow and Endersby (2004:111) also suggest that “researchers are justified in using MNL specifications.”

Definition 3. The Type I extreme value distribution, Ψ .

The cumulative distribution Ψ , has the closed form

$$\Psi(h) = \exp[-\exp[-h]],$$

with probability density function

$$\psi(h) = \exp[-h] \exp[-\exp[-h]]$$

and variance $\frac{1}{6} \pi^2$. \square

It follows from Definition 1 (iii) that the probability that a voter i chooses party j at the vector \mathbf{z} is

$$\rho_{ij}(\mathbf{z}) = \frac{\exp[u_{ij}^*(x_i, z_j)]}{\sum_{k=1}^p \exp u_{ik}^*(x_i, z_k)} \tag{5}$$

See Train (2003: 73). Thus

$$\rho_{ij}(\mathbf{z}) = [1 + \sum_{k \neq j} [\exp(f_k)]]^{-1} \tag{6}$$

where $f_k = \lambda_k + \mu_k(z_k) - \lambda_j - \mu_j(z_j) + \beta \|x_i - z_j\|^2 - \beta \|x_i - z_k\|^2$.

We can show that the first order condition for \mathbf{z}^* to be an LSNE is that it be a *balance solution*.

Definition 4. The balance solution for the model $M(\boldsymbol{\lambda}, \boldsymbol{\mu}, \beta; \Psi)$.

Let $[\rho_{ij}(\mathbf{z})] = [\rho_{ij}]$ be the n by p matrix of voter probabilities at the vector \mathbf{z} , and let

$$[\alpha_{ij}] = \left[\frac{\rho_{ij} - \rho_{ij}^2}{\sum_i (\rho_{ij} - \rho_{ij}^2)} \right] \tag{7}$$

be the n by p matrix of “weighting coefficients”.

The *balance equation* for z_j^* is given by expression

$$z_j^* = \frac{1}{2\beta} \frac{d\mu_j}{dz_j} + \sum_{i=1}^n \alpha_{ij} x_i. \tag{8}$$

The vector $\sum_i \alpha_{ij} x_i$ is a convex combination of the set of voter ideal points. This vector is called the *weighted electoral mean* for party j . Define

$$\frac{d\mathcal{E}_j^*}{dz_j} \equiv \sum_i \alpha_{ij} x_i. \tag{9}$$

Then the balance equation can then be expressed as

$$\left[\frac{d\mathcal{E}_j^*}{dz_j} - z_j^* \right] + \frac{1}{2\beta} \frac{d\mu_j}{dz_j} = 0. \tag{10}$$

The bracketed term on the left of this expression is termed the *marginal electoral pull of party j* and is a gradient vector pointing towards the weighted electoral mean of the party. This weighted electoral mean is that point where the electoral pull is zero. The vector $\frac{d\mu_j}{dz_j}$ is called *the marginal activist pull for party j*.

If \mathbf{z}^* satisfies the balance equation for all j , then call \mathbf{z}^* the *balance solution*. \square

The following theorem is proved in Schofield (2006).

Theorem 1. Consider the electoral model $M(\boldsymbol{\lambda}, \boldsymbol{\mu}, \beta; \Psi)$ based on the Type I extreme value distribution, and including both exogenous and activist valences.

- (i) The “first order” necessary condition for \mathbf{z}^* to be an LSNE is that it is a balance solution.
- (ii) A sufficient condition for the balance solution to be a PNE is that all activist valence functions are highly concave, in the sense of having negative eigenvalues of sufficiently great modulus. \square

In the case that the activist valence functions are identically zero, we write the model as $M(\boldsymbol{\lambda}, \beta; \Psi)$: Then the *mean voter theorem* for this stochastic model asserts that the “joint mean vector” $\mathbf{z}_0 = (x^*, \dots, x^*)$ is a PNE, where $x^* = \frac{1}{n} \sum x_i$. A key step in a proof of this assertion is to determine whether the joint mean vector is an LSNE. Using Eq. (6), it is readily shown that, when all z_j are

identical, then for each fixed j all $\alpha_{ij} = \frac{1}{n}$ and are thus identical. Thus, when there is only exogenous valence, the solution $z_j^* = \frac{1}{n} \sum x_i$, for all j is indeed a balance solution. By the change of coordinates mentioned above, we can choose $\frac{1}{n} \sum x_i = 0$, the *electoral origin*. In this case, the marginal electoral pull is zero at the origin and the joint origin $\mathbf{z}_0 = (0, \dots, 0)$ satisfies the first order condition. Schofield (in press) shows that in this case there is a “convergence coefficient,” c , defined in terms of the exogenous valence differences, the spatial coefficient, β , and the electoral variance. The necessary condition for \mathbf{z}_0 to be an LNE is that $c \leq w$, where w is the dimension of the policy space. When this condition fails, so does the mean voter theorem. Moreover, concavity of the vote share functions also fails, and there is reason to doubt existence of PNE.

To present this result, we first note that at the profile, \mathbf{z}_0 , of party positions, the probability that voter i selects party j is independent of i . From Eq. (5) we can show that $\rho_{ij} = \rho_j$ where.

$$\rho_j = \left[1 + \sum_{k \neq j} \exp[\lambda_k - \lambda_j] \right]^{-1}. \tag{11}$$

We now define the *characteristic matrix* of the lowest valence party to be

$$C_1 = 2\beta(1-2\rho_1)\nabla - I$$

where I is the identity matrix, and ρ_1 is the vote share of the lowest valence party when all parties are at the origin. Schofield (in press) shows that the Hessian of the lowest valence party at \mathbf{z}_0 is of the form αC_1 , where α is a strictly positive constant. It then follows that \mathbf{z}_0 is an LSNE only if C_1 has strictly negative eigenvalues. Moreover, we can define the *convergence coefficient*, c , by

$$c = c(\lambda, \beta; \Psi) = 2\beta(1-2\rho_1)\text{trace}(\nabla) = 2\beta(1-2\rho_1)v^2.$$

This coefficient can be used to deduce necessary and sufficient conditions for local equilibria, as in Theorem 2 and its corollaries.

Theorem 2. *The necessary condition for the joint origin to be an LSNE in the model $M(\lambda, \beta; \Psi)$ is that the characteristic matrix C_1 has negative eigenvalues. \square*

Corollary 1. *Consider the model $M(\lambda, \beta; \Psi)$.*

In the case that X is w -dimensional, then the necessary condition for the joint origin to be an LNE is that $c(\lambda, \beta; \Psi) \leq w$. In this case, if there are two parties, with $\lambda_2 > \lambda_1$, then the joint origin fails to be an LNE if $\beta > \beta_0$ where

$$\beta_0 \equiv \frac{w[\exp(\lambda_2 - \lambda_1) + 1]}{2v^2[\exp(\lambda_2 - \lambda_1) - 1]}. \tag{12}$$

Corollary 2. *In the two dimensional case, a sufficient condition for the joint origin to be an LSNE for the model $M(\lambda, \beta; \Psi)$ is that $c(\lambda, \beta; \Psi) < 1$. \square*

Notice that the case with two parties of equal valence immediately gives a situation with $2\beta(1-2\rho_1)v^2 = 0$, irrespective of the other parameters. However, by Corollary 1, if $\lambda_2 > \lambda_1$, then the joint origin may fail to be an LNE if βv^2 is sufficiently large.

When the valence functions $\{\mu_j\}$ are not identically zero, then it is the case that generically \mathbf{z}_0 cannot satisfy the first order condition. Instead the vector $\frac{d\mu_j}{dz_j}$ “points towards” the position at which the activist valence is maximized. When this marginal or gradient vector, $\frac{d\mu_j}{dz_j}$, is increased (as activists become more willing to contribute to the party) then the equilibrium position is pulled

away from the weighted electoral mean of party j , and we can say the “activist effect” for the party is increased. If the activist effect is decreased, the local equilibrium of the party is pulled towards the electoral origin. We can say the “electoral effect” is increased.

We now apply these results when there are multiple activist groups.

3. Balance loci with multiple activist groups

We now consider competition between two parties, 1 and 2, in a policy space with $w=2$, where party 1 has traditionally been on the left of the economic (x) axis, and party 2 on the right of the same axis. To examine the effect of the second (y) axis of policy we develop the model presented by Miller and Schofield (2003) based on “ellipsoidal” utility functions of potential activist groups. In the application to the Argentine polity, the y -axis will represent policy in support of a hard or a soft currency.

Consider the first order equation

$$\frac{d\mu_1}{dz} = 0 \tag{13}$$

for maximizing the total valence of 1 when there are two activist groups, L, H , whose preferred points are, say, L, H , and whose utility functions are u_L and u_H . The contributions of the groups to party 1 are Σ_L and Σ_H . We make the following set of assumptions.

Assumption 1.

- (i) The total activist valence for 1 can be decomposed into two components

$$\mu_1(z_1) = \mu_L(\Sigma_L(z_1)) + \mu_H(\Sigma_H(z_1)). \tag{14}$$

where μ_L, μ_H are functions of Σ_L, Σ_H , respectively.

- (ii) The contributions Σ_L, Σ_H can be written as functions of the utilities of the activist groups, so

$$\Sigma_L(z_1) = \Sigma_L(u_L(z_1)) \text{ and } \Sigma_H(z_1) = \Sigma_H(u_H(z_1)). \tag{15}$$

Note that there is no presumption that these functions are linear.

- (iii) The gradients of the contribution functions are given by

$$\frac{d\Sigma_L}{dz} \Big|_z = \alpha_L^*(z) \frac{du_L}{dz} \Big|_z \text{ and } \frac{d\Sigma_H}{dz} \Big|_z = \alpha_H^*(z) \frac{du_H}{dz} \Big|_z. \tag{16}$$

The coefficients $\alpha_L^*(z), \alpha_H^*(z) > 0$, for all z , and are differentiable functions of z .

- (iv) The gradients of the two valence functions satisfy

$$\frac{d\mu_L}{dz} \Big|_z = \alpha_L^{**}(z) \frac{d\Sigma_L}{dz} \Big|_z \text{ and } \frac{d\mu_H}{dz} \Big|_z = \alpha_H^{**}(z) \frac{d\Sigma_H}{dz} \Big|_z, \tag{17}$$

where again the coefficients $\alpha_L^{**}(z), \alpha_H^{**}(z) > 0$, for all z , and are differentiable functions of z . □

Under these assumptions, the first order equation becomes

$$\frac{d\mu_1}{dz} \Big|_z = \left[\alpha_L(z) \frac{du_L}{dz} \Big|_z + \alpha_H(z) \frac{du_H}{dz} \Big|_z \right] = 0 \tag{18}$$

where $\alpha_L(z), \alpha_H(z) > 0$. Since these are assumed to be differentiable functions of z , this equation generates the smooth one-dimensional *contract curve* associated with the utility functions of the activist groups. \square

The solution to the first order equation will be a point on the contract curve that depends on the various coefficient functions $\{\alpha_L^*, \alpha_L^{**}, \alpha_H^*, \alpha_H^{**}\}$. Note that these various activist coefficients are left unspecified. They are determined by the response of activist groups to policy positions.

We regard Assumption 1, (i)–(iv), as natural. They posit that the utility gradient of the activist group dictates the gradient of each contribution function, which in turn gives the direction of most rapidly increasing valence for party 1.

To apply this analysis, we suppose that an economic activist, situated on the left of the economic axis, with preferred point $L=(x_l, y_l)$ has a utility function $u_L(x,y)$ based on the “ellipsoidal cost function,” u_L , of the form

$$u_L(x,y) = A - \left(\frac{(x-x_l)^2}{a^2} + \frac{(y-y_l)^2}{b^2} \right). \tag{19}$$

Assuming that $a < b$ means that such an activist is more concerned with economic policy than currency issues.

We also suppose that a hard currency activist with preferred point $H=(x_h, y_h)$ has a utility function u_H of the form

$$u_H(x,y) = E - \left(\frac{(x-x_h)^2}{e^2} + \frac{(y-y_h)^2}{f^2} \right). \tag{20}$$

Assuming that $f < e$ means that such an activist is more concerned with currency policy than with issues on the x -axis. The contract curve generated by these utility functions is given by the equation

$$\left[\alpha_L \frac{du_L}{dz} + \alpha_H \frac{du_H}{dz} \right] = 0. \tag{21}$$

with $\alpha_L \geq 0, \alpha_H \geq 0$, but $(\alpha_L, \alpha_H) \neq (0, 0)$. Using this expression we can show that the “contract curve,” between the point (x_l, y_l) and the point (x_h, y_h) , generated by the utility functions is given by the equation

$$\frac{(x-x_l)}{a^2} \frac{b^2}{(y-y_l)} = \frac{(x-x_h)}{e^2} \frac{f^2}{(y-y_h)}. \tag{22}$$

This can be rewritten as

$$\frac{(y-y_l)}{(x-x_l)} = \gamma_1 \frac{(y-y_h)}{(x-x_h)} \text{ where } \gamma_1 = \frac{b^2 e^2}{a^2 f^2} > 1. \tag{23}$$

This “contract curve” between the two activist groups, centered at L and H , is a *catenary*, whose curvature is determined by the “salience ratios” $\left(\frac{b}{a}, \frac{e}{f}\right)$ of the utility functions of the activist groups. By Eq. (17), this catenary can be interpreted as the closure of the one-dimensional locus of points given by the first order condition for maximizing the total valence $\mu_1(z_1) = \mu_L(\Sigma_L(z_1)) + \mu_H(\Sigma_H(z_1))$, generated by the contributions (Σ_L, Σ_H) offered by the two groups of activists.

We therefore call this locus *the activist catenary for 1*. Note that while a position of candidate 1 on this catenary satisfies the first order condition for maximizing the total valence function it need not maximize vote share. In fact, maximization of vote share requires considering the marginal electoral effect. From Theorem 1, the first order condition is given by the *balance equation for 1*:

$$\left[\frac{d\mathcal{E}_1^*}{dz_1} - z_1^* \right] + \frac{1}{2\beta} \left[\alpha_L(z_1^*) \frac{du_L}{dz_1} + \alpha_H(z_1^*) \frac{du_H}{dz_1} \right] = 0. \tag{24}$$

The coefficient functions, $\{\alpha_L, \alpha_H\}$, depend on the various gradient coefficients introduced under Assumption 1, and are explicitly written as functions of z_1^* . For fixed z_2 , the locus of points satisfying this equation is called the *balance locus for 1*. It is also a one-dimensional smooth catenary, and is obtained by shifting the contract curve for the activists centered at L and H towards the weighted electoral mean of *party 1*. Notice, for example, that if $\alpha_H^*(z_1)$, the coefficient that determines the willingness of the currency activist group to contribute, is high, then this group will have a significant influence on the position of party 1. Obviously, the particular solution z_1^* on this balance locus depends on the second order condition on the Hessian of the vote function V_1 , and this will depend on the various coefficients and on $\frac{d\mathcal{E}_1^*}{dz_1}$. Moreover, the weighted electoral mean of 1 depends on the weighted electoral coefficients

$$[\alpha_{i1}] = \left[\frac{\rho_{i1}(1-\rho_{i1})}{\sum_i(\rho_{i1}(1-\rho_{i1}))} \right] \tag{25}$$

and thus on the valence functions as well as the location of the opposition candidate. Candidate 1 can, in principle, determine the best response to z_2 by trial and error. By the implicit function theorem, we can write $z_1^*(z_2)$ for the *best response*, or solution to the balance equation for 1, at fixed z_2 .

In the same way, if there are two activist groups for party 2, centered at $R=(x_r, y_r)$ and $S=(x_s, y_s)$ with utility functions based on ellipsoidal cost functions, with

$$u_R(x, y) = G - \left(\frac{(x-x_r)^2}{g^2} + \frac{(y-y_r)^2}{h^2} \right), \quad g < h \tag{26}$$

and

$$u_S(x, y) = K - \left(\frac{(x-x_s)^2}{r^2} + \frac{(y-y_s)^2}{s^2} \right), \quad r > s, \tag{27}$$

then the “contract curve” between the point (x_r, y_r) and the point (x_s, y_s) is given by the equation

$$\frac{(y-y_r)}{(x-x_r)} = \gamma_2 \frac{(y-y_s)}{(x-x_s)} \tag{28}$$

where

$$\gamma_2 = \frac{h^2 r^2}{g^2 s^2}. \tag{29}$$

As before, this contract curve gives the first order condition for maximizing the valence function

$$\mu_2(z_2) = \mu_R(\Sigma_R(z_2)) + \mu_S(\Sigma_S(z_2)) \tag{30}$$

and can be identified with the *activist catenary for 2*, given by

$$\left[\alpha_R(z) \frac{du_R}{dz} + \alpha_S(z) \frac{du_S}{dz} \right] = 0. \tag{31}$$

Again, this expression is derived from the utility functions u_R and u_S for the activist groups located at R and S respectively. The locus of points on which vote share is maximized is given by the *balance locus for 2*:

$$\left[\frac{d\mathcal{E}_2^*}{dz_2} - z_2^* \right] + \frac{1}{2\beta} \left[\alpha_R(z_2^*) \frac{du_R}{dz_2} + \alpha_S(z_2^*) \frac{du_S}{dz_2} \right] = 0. \tag{32}$$

As before, this locus is obtained by shifting the activist contract curve for 2, to adjust to the electoral pull for the party. The coefficients will be determined by the second order condition on V_2 .

Assumption 2. We assume that the contribution functions, Σ_L, Σ_H are concave in z_1 , and the contribution functions Σ_R, Σ_S are concave in z_2 .

We further assume that the valences $\mu_L, \mu_H, \mu_R, \mu_S$ are concave functions of $\Sigma_L, \Sigma_H, \Sigma_R, \Sigma_S$ respectively.

These assumptions imply that the total activist valence functions

$$\mu_1(z_1) = \mu_L(\Sigma_L(u_L(z_1))) + \mu_H(\Sigma_H(u_H(z_1))). \tag{33}$$

and

$$\mu_2(z_2) = \mu_R(\Sigma_R(u_L(z_2))) + \mu_S(\Sigma_S(u_S(z_2))). \tag{34}$$

are concave functions of z_1, z_2 , respectively. \square

These assumptions appear natural because (i) the utility functions of the activist groups for both 1 and 2 are concave in z , and (ii) the effect of contributions on activist valence can be expected to exhibit decreasing returns.

In this case of two activist groups for each of two parties, the pair of positions (z_1^*, z_2^*) satisfying the above balance loci gives the *balance solution* of Definition 4. Theorem 1, together with the above assumptions, can then be used to obtain a sufficient condition for existence of PNE. Indeed, once the parameters of the activist groups are determined, then existence and location of the PNE can be determined. The same technique can be used when there are more than two activist groups for each candidate.

As noted above, we can write $z_1^*(z_2)$ for the locus of points satisfying the balance equation for 1 at fixed z_2 . This balance locus given by the function $z_1^*(z_2)$ will lie in a domain bounded by the contract curve of the activists who contribute to party 1. A similar argument gives the balance locus $z_2^*(z_1)$, which again will lie in a domain bounded by the contract curve of the activists who contribute to 2. We can regard both $(z_1^*(z_2)$ and $z_2^*(z_1)$ as solution submanifolds of X^2 , where $z_i^*(z_j) \in X^2$ iff z_i^* is a best response to z_j . Then these two solution submanifolds are generically 2-dimensional submanifolds of X^2 . Transversality arguments can be used to show that these will generically intersect in a zero-dimensional vector (or set of vectors (Schofield, 2003)). There may be many first order solutions, but the assumption of sufficient concavity of the total valence functions gives a

balance solution which is a PNE. The same argument can be carried out for an arbitrary number of parties (Schofield, 2001).

4. Argentina's electoral dynamics: 1989–1995

As discussed in the Introduction, prior to the election of 1989, Argentina was under the administration of the UCR and in the grip of hyperinflation. Carlos Menem, the candidate for the opposition party, PJ, adopted a populist platform well to the left of the electoral center on the traditional left–right axis. Menem proposed typical redistributive policies in favor of the working class coupled with incentives to the “productive sector” of the economy. In contrast, the platform proposed by Angeloz, of the UCR, focused on fiscal discipline and a reduced role of the state. Thus, a one-dimensional policy space seems a reasonable approximation to Argentina in 1989.¹

The results of Section 2 suggest that there are two different cases depending on the parameters of the model.

The first case is as follows. Suppose that the convergence coefficient $c=2\beta(1-2\rho)v^2$ is bounded above by the dimension of the policy space, $w=1$. In this case, we say that the *critical condition* is satisfied. If the exogenous valences are very similar (with $|\lambda_{PJ}-\lambda_{UCR}|$ close to zero), then the vote share, ρ , of both parties will be close to $\frac{1}{2}$, and c will be close to 0. As a result, the electoral origin will be a local equilibrium by Corollary 2. Also, with just two parties, Corollary 1 asserts that the critical condition is given by $\beta \leq \beta_0$, where

$$\beta_0 \equiv \frac{[\exp(\lambda_{PJ}-\lambda_{UCR}) + 1]}{2v^2[\exp(\lambda_{PJ}-\lambda_{UCR})-1]}. \quad (35)$$

Note that if λ_{PJ} approaches λ_{UCR} , then β_0 approaches ∞ so the critical condition is always satisfied.

For the sake of exposition we consider only two parties, but a similar critical condition can be obtained for an arbitrary number of parties. In fact, in 1989 three candidates contested the election. Angeloz obtained 37% of the votes, Menem 47%, and Alsogaray, a rightist candidate, about 6%.

We refer the reader to Fig. 1, in which we assume a distribution of voter ideal points whose mean is the electoral origin. The left–right axis is termed the “labor–capital” axis in the figure. The vertical axis may be ignored by the moment. The estimated strategies of the PJ and UCR in the 1989 election are represented by the points $PJ89^*$ and $UCR89^*$, respectively. Prior to the election, we may suppose that $|\lambda_{PJ}-\lambda_{UCR}|$ was indeed close to zero. In a model without activists there would be no reason for either party to vacate the center. Notice, however, that a perturbation in the valences of the parties, so that $|\lambda_{PJ}-\lambda_{UCR}| \neq 0$, will induce a move by the low valence party away from the origin whenever $\beta > \beta_0$.

In this second situation we may assume that $\lambda_{PJ} > \lambda_{UCR}$. By Theorem 2, if both the electoral variance v^2 and the spatial coefficient β are large enough, then the low valence party, the UCR, should retreat from the origin, in order to increase its vote share. Thus the position near to $UCR89^*$ is compatible with Theorem 2.

¹This standard, unidimensional, model of voting has been widely used in the recent literature. For example, see Osborne and Slivinski (1996), Bueno de Mesquita et al. (2003), Acemoglu and Robinson (2006), and Herrera, Levine and Martinelli (2005).

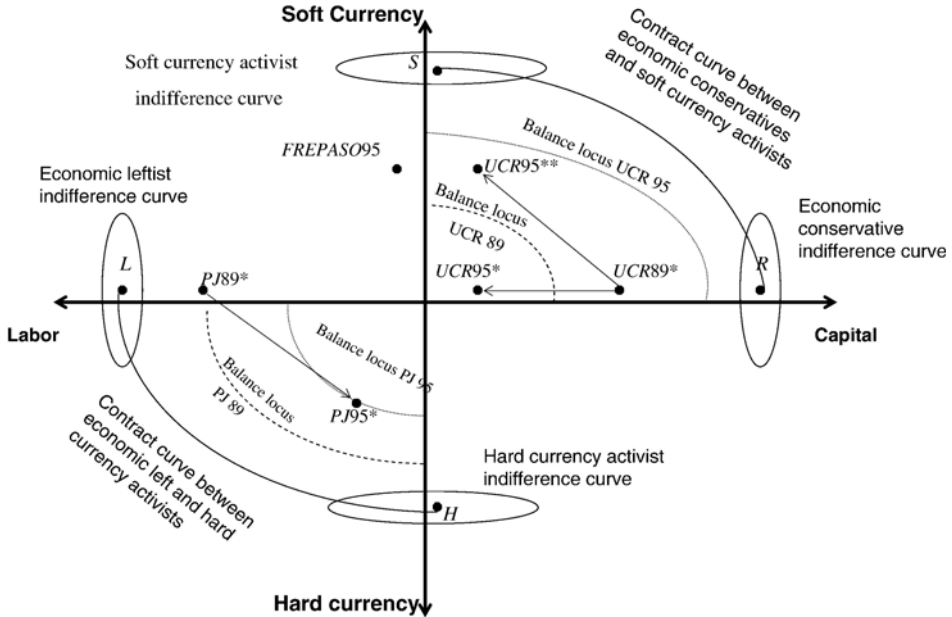


Fig. 1. Argentinean presidential elections 1989–1995.

However, because $\lambda_{PJ} > \lambda_{UCR}$, it follows that if the UCR cannot obtain electoral support from activists then it will lose the election. The consequence will be that both PJ and UCR should move further apart, in opposite directions away from the electoral origin, to obtain increasing support from the left activists, at *L* (for the PJ) and from the conservative activists at *R* (for the UCR). The vote maximizing equilibrium (*PJ89**, *UCR89**) results from these centrifugal moves to balance the attraction of the weighted electoral mean and the influence of the activists. Menem’s higher valence, together with populist support from the left activists at *L* gave him the electoral victory.

The point *L* can be taken to be the preferred policy of the working class “syndical” leaders, who provided key support for Menem’s 1989 electoral victory. Because the choices of the syndical leaders were followed by a large part of the Argentinean working class, the effect of this support, represented by the valence function μ_L , was pronounced. This explains why Menem’s strategy against a discredited UCR was far to the left, as indicated in Fig. 1. This analysis seems to be a fairly accurate description of Argentina’s polity for the election of 1989. We now use the model to analyze the events after 1989, leading up to the 1995 election.

The main issue is whether Menem’s drastic and successful repositioning after the 1989 election can be explained by our model. Until hyperinflation was defeated, any debate regarding the optimal real exchange rate was fruitless. Thus, it was not until Menem’s Convertibility Plan stabilized the level of prices that the currency issue gained significant saliency. Because the Convertibility Plan was successful against hyperinflation through fixing the nominal rate of exchange of the Argentinean peso in a 1-to-1 ratio to the American dollar, the currency issue naturally ended up focusing on the Convertibility Plan itself. The Convertibility Plan became most salient during the Mexican crisis, popularly known as “Tequila,” in December 1994. Because the next presidential election (in which Menem would seek his re-election) was scheduled for May 1995, the issue dominated the electoral debate. The vertical axis in Fig. 1 represents the policy options in this new axis, which we refer to as the “currency dimension.”

Two groups gained from the Convertibility Plan. The European firms that won most of the privatization concessions of Argentinean companies benefited from the progressive appreciation of the peso after 1991 via the increased value in their assets and profits. Though these originated in Argentina, they were denominated in dollars. The upper middle class benefited from this policy too, since it enjoyed a consumption boom of foreign goods and the reappearance of credit after so many years of high inflation.

The main losers from the Convertibility Plan were those small and medium entrepreneurs, and their employees, who could not overcome the difficulties associated with the appreciation of the Argentinean currency and the liberalization of the economy.²

Among all groups affected by the value of the currency, the privatized companies had the greatest potential as an effective activist group. This was a consequence of their small number, their large pool of financial resources and their lobbying power. On the other hand, any attempt at activism against the Plan by either small or medium entrepreneurs and their employees had to overcome the standard Olsonian collective action problem.

Consider again the positions $PJ89^*$ and $UCR89^*$ on either side of, and approximately equidistant from, the electoral origin as in Fig. 1. The figure also gives balance loci for the PJ and UCR in 1989 and 1995. We suggest that these balance loci can be derived from the four different activist groups centered at L , H , R and S .

To apply this model developed in the previous section, consider a move by Menem along the balance locus from position $PJ89^*$ to position $PJ95^*$. By such a move, Menem would certainly gain the support of the activists located at H , while losing some of the political contributions of erstwhile supporters located at L . While Σ_L would fall, Σ_H would increase. Because of the higher marginal gain of the hard currency activists, we expect $\mu_L + \mu_H$ to increase. This reasoning is reinforced by the assumption of concavity of each activist valence function, since this implies that $\frac{d\mu_H}{dz_{PJ}}$ would be positive and high, and $\frac{d\mu_L}{dz_{PJ}}$ would be negative, but of low modulus, as the PJ position moves along the balance locus away from L .

It is our interpretation of the change from 1989 to 1995 that Menem's overall exogenous valence was high in 1995 for two reasons. First, a large proportion of the electorate still regarded Menem as the guardian of the working class interests, mainly because his party, the *Partido Justicialista*, is associated with the iconic figures of Juan Domingo and Evita Peron, revered by the working class. Second, the absolute success of the Convertibility Plan in controlling hyperinflation had the effect of increasing Menem's exogenous valence because he appeared to be the only politician who could solve what appeared to be the most difficult problem facing the country. The increased exogenous valence shifted the balance locus for Menem towards the origin, while the emergence of the hard currency activist group, in turn, induced Menem to move along the one dimensional balance locus, from $PJ89^*$ to $PJ95^*$. These effects are illustrated in Fig. 1.³

Conversely, the exogenous increase in $\lambda_{PJ} - \lambda_{UCR}$ shifted the UCR balance locus towards the contract curve between the activist positions, R and S . Our model suggests that this change would imply an optimal position for the UCR at a position such as $UCR95^{**}$ in Fig. 1. Indeed, the drop in UCR valence led to a search for disaffected voters in the "north-west" region of the figure. A centrist position for the UCR, say at $UCR95^*$, would not cause centrist voters to choose the UCR with high probability (because of the higher exogenous valence of Menem). We suggest that

²The rate of unemployment peaked at 18% in 1995, the year in which the Tequila affected the Argentinean economy.

³Seligson (2003) and Szusterman (1996) discuss the electoral platforms of PJ, UCR and FREPASO in the 1995 election. Their estimates and ours, as illustrated in Fig. 1, are broadly consistent.

($PJ95^*$, $UCR95^{**}$) is a local equilibrium, in the sense that each position is a best response to the opposition position. With the assumption of sufficient concavity, this would be a PNE.

Two candidate slates competed in the UCR 1995 primaries. The Storani–Terragno slate adopted a position similar to $UCR95^{**}$ in the figure, which our model suggests is an optimal response to $PJ95^*$. The other, the slate, Massaccesi–Hernandez, adopted the position $UCR95^*$ in the figure. The model suggests that this was not a best response. Because of its low exogenous valence, severely aggravated by events between 1989 and 1995, the UCR could not win with such a centrist position.

The Massaccesi–Hernandez slate won the primaries, so we can represent the UCR position by $UCR95^*$. The UCR suffered a historical defeat, obtaining only 17% of the vote. Moreover, the candidate Jose Octavio Bordon, for a new party, FREPASO, outperformed UCR, with 29% of the vote. His position, denoted $FREPASO95$ in Fig. 1, was close to $UCR95^{**}$, although somewhat to the left on the economic axis.

The electoral data for the 1989 and the 1995 elections are consistent with the change of electoral support for Menem implied by our model. Among the voters with low to moderate income, Menem's support decreased from 63% to 59%. Among the voters of middle and upper middle income, it increased from 40% to 49% and from 38% to 47%, respectively. Finally, among the upper class voters, it increased from 13% to 42% (Gervasoni, 1997). Together, the vote proportions gave Menem 50% of the overall vote.

It is crucial for this analysis that there were indeed two dimensions of policy. If the distribution of voter ideal points displayed high covariance between the two axes in Fig. 1, then the contract curves between R and S and between L and H would be degenerate. To test the validity of this assumption, we examined a data set on Argentinean presidential elections for the period 1983–1999.⁴ This data set contains the following information on

- i) *actual vote* in the presidential elections of 1989 and 1995 and intention of vote for 1999.
- ii) the voter socio-demographical variables.
- iii) responses to several issue questions regarding the opinion of the “subject” on particular policy issues. These included the subject's degree of agreement regarding the Convertibility Plan at the time of the survey.

Applying factor analysis techniques to the issue questions allow us to estimate the position (or ideal point) of each voter in a space of reduced dimension.⁵

One of the fundamental premises of the model presented here is that the Convertibility Plan emerged around 1995 as a new dimension in the Argentinean polity. We estimated a principal-components factor model on the basis of the Arromer survey data, to test this premise.

Using the ten issue questions in the survey, we obtained four factors that can be given the following interpretations:

Factor 1 represented the standard “economic redistribution” dimension (whether extra social assistance should be provided, whether food and education should be taxed, etc.

Factor 2 reflected attitudes to the Convertibility Plan.

⁴The data set Arromer [TOP045(1998) in the Roper Center Archive] is based on a national poll conducted by the survey organization Graciela Romer & Asociados, with face to face methodology, and sample size of 1203 respondents.

⁵Because the poll obtained the “subject's actual vote in the elections of 1989 and 1995, we will use these data in a later empirical paper to test the model without activists for these elections.

An additional *Factor 3* representing the dimension associated with “economic structural reforms” (labor market flexibility, privatization, and other related policies) was not salient for the 1995 election, since by that time most of the structural reforms had been already implemented. A *Factor 4* representing the standard “social” dimension (human rights, order vs. freedom, etc.) had little salience, particularly after 1990 when the main policy issue on human rights was abruptly ended by President Menem’s pardon for those responsible for the violations of human rights during the dictatorships of the 1970s.

Factors 1 and 2 can be interpreted as the orthogonal axes of the underlying policy space defining the election of 1995. Factor 1 corresponds to the labor/capital axis, which we can call *econ* while factor 2 corresponds to the currency axis, which we label *cur*. We infer from this preliminary analysis that the formal model, outlined above, captures the essence of the Argentinean political economy circa 1995.

Fig. 2 presents an estimate of the distribution of voter positions in the space of reduced dimension given by factors 1 and 2. The central electoral domain shows the estimated probability density function of the voter distribution, while the dots are individual ideal points outside the central domain. Clearly the electoral covariance matrix ∇ generated by these data exhibits little covariance, and therefore we are justified in assuming that ∇ has insignificant off-diagonal terms.

The figure suggests that the electoral variance v_{econ}^2 on the labor/capital axis slightly exceeded the variance v_{cur}^2 on the currency axis, while the covariance $\langle v_{cur}, v_{econ} \rangle = 0$. If indeed $|\lambda_{PJ} - \lambda_{UCR}|$ were close to zero, then, for the exogenous valence model, Corollary 1 implies convergence to the electoral mean. Because of the lack of evidence for convergence, we can assume that $\lambda_{PJ} > \lambda_{UCR}$. Theorem 2, for the model with exogenous valence, suggests that the Hessian, C_{UCR} , at the joint origin, has two positive eigenvalues, corresponding to a minimum of the vote share function for the UCR. The model with exogenous valence alone then gives local equilibrium positions for the PJ and

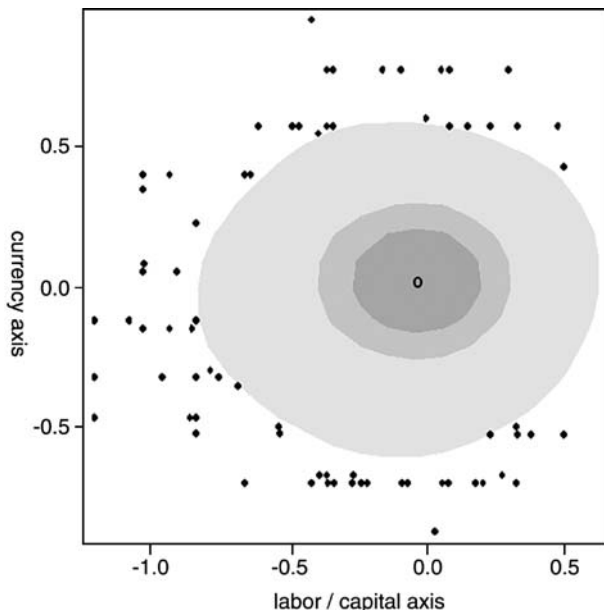


Fig. 2. Highest density contours of the Electoral Distribution, in Argentina in a two dimensional policy space in 1995, at the 10, 50 and 75% levels.

the UCR on opposite sides of the economic axis, with the PJ position closer to the origin than the UCR position. Our estimate of both the PJ and UCR positions in 1995 is at odds with this inference.

We suggest that the estimated locations of (*PJ95**, *UCR95***) in Fig. 1 are indeed compatible with the activist valence model, and that Menem was able to use his high exogenous valence to take advantage of the saliency of the currency issue by gaining support from both hard currency activists and labor supporters.

5. Concluding remarks

We have presented a general model of elections and used its insights to analyze the complex Argentinean polity in 1989–1995.

The success of the Convertibility Plan in controlling hyperinflation changed three of the political variables in the Argentinean polity: (i) it critically altered the relative valence of the two main parties, (ii) it introduced a second dimension, and (iii) it created a strong activist group.

These changes are compatible with the model proposed here, and can be used to account for the seeming paradox of non-convergence of the parties to the electoral origin.

The model implies that the changes in the political variables led to new equilibrium strategies of the candidates. The higher-valence candidate adopted a position closer than previously to the electoral center, and was supported by upper middle class voters. The low-valence candidate miscalculated, and moved even closer to the electoral center and suffered a damaging defeat. Part of this defeat was due to the emergence of a third party, which adopted a position close to what we estimate was the optimal strategy for the low valence party.

In our model, the Convertibility Plan, the fundamental cause of these exogenous changes, was the result of a clever electoral strategy adopted by Menem. We have suggested elsewhere (Cataife and Schofield, 2007) that the creation of the Convertibility Plan was due to the alignment of interest between three different actors: (i) Argentina's upper middle class (ii) money-motivated domestic politicians and (iii) the U.S. Department of Treasury (representing the interests of U.S. Government).

Because politicians need to win office in order to pursue their ultimate goals, and because the upper middle class provided activist support, the model given here gives a framework with which to understand this political realignment. Elaborating the model to examine the game between activists and candidates would also involve a more detailed analysis of the, implicit contract between candidates and activists and the compatibility of these political motivations with foreign interests.

Acknowledgement

This paper is based on research supported by NSF Grant SES 024173. The paper was presented at the 2006 Meeting of the Latin American Econometric Society in Mexico City and at the 2006 Midwest Economic Theory Meetings.

References

- Acemoglu, D., Robinson, J., 2006. *Economic Origins of Dictatorship and Democracy*. Cambridge University Press, New York.
- Aldrich, J.H., 1983a. A spatial model with party activists: implications for electoral dynamics. *Public Choice* 41, 63–100.
- Aldrich, J.H., 1983b. A Downsian spatial model with party activists. *American Political Science Review* 77, 974–990.
- Aldrich, J.H., McGinnis, M., 1989. A model of party constraints on optimal candidate locations. *Mathematical and Computer Modelling* 12, 437–450.

- Ansolabehere, S., Snyder, J., 2000. Valence politics and equilibrium in spatial election models. *Public Choice* 103, 327–336.
- Aragones, E., Palfrey, T., 2002. Mixed equilibrium in a Downsian model with a favored candidate. *Journal of Economic Theory* 103, 131–161.
- Arromer, 1998. Politics and the Presidential Election, Romer & Associates, Survey-TOP045: Roper Center Databank.
- Bueno de Mesquita, B., Morrow, J.D., Siverson, R., Smith, A., 2003. *The Logic of Political Survival*. The MIT Press, Cambridge MA.
- Cataife, G., Schofield, N. 2007. Electoral Oscillations in Argentina in the 1990's. Unpublished Paper, Washington University in St. Louis.
- Dow, J., Endersby, J., 2004. Multinomial logit and multinomial probit: a comparison of choice models for voting research. *Electoral Studies* 23, 107–122.
- Gervasoni, C., 1997. La sustentabilidad electoral de los programas de estabilizacion y reforman estructural: los casos de Argentina y Peru. Presented at the XX International Congress of the Latin American Studies Association.
- Groseclose, T., 2001. A model of candidate location when one candidate has a valence advantage. *American Journal of Political Science* 45, 862–886.
- Herrera, H., Levine, D., Martinelli, C. 2005. Policy Platforms, Campaign Spending and Voter Participation. Unpublished Paper. UCLA.
- Kass, R., Raftery, A., 1995. Bayes factors. *Journal of the American Statistical Association* 91, 773–795.
- Laslier, J.-F., 2005. Spatial approval voting. *Political Analysis* 14, 160–185.
- McKelvey, R.D., Patty, J.W., 2006. A theory of voting in large elections. *Games and Economic Behavior* 57, 155–180.
- Miller, G., Schofield, N., 2003. Activists and partisan realignment in the United States. *American Political Science Review* 97, 245–260.
- Osborne, M., Slivinski, A., 1996. A model of political competition with citizen candidates. *The Quarterly Journal of Economics* 111, 65–96.
- Penn, Elizabeth. 2003. A model of far-sighted voting. Unpublished Paper, Harvard University.
- Quinn, K., Martin, A., 2002. An integrated computational model of multiparty electoral competition. *Statistical Science* 17, 405–419.
- Quinn, K., Martin, A., Whitford, A., 1999. Voter choice in multi-party democracies. *American Journal of Political Science* 43, 1231–1247.
- Schofield, N., 2001. Generic existence of local political equilibrium. In: Lassonde, M. (Ed.), *Approximation, Optimization and Mathematical Economics*. Springer, Heidelberg.
- Schofield, N., 2003. *Mathematical Methods in Economics and Social Choice*. Springer, Heidelberg.
- Schofield, N., 2006. Equilibria in the spatial stochastic model with party activists. *The Review of Economic Design* 10, 183–203.
- Schofield, N., in press. The mean voter theorem: necessary and sufficient conditions for convergent equilibrium. *The Review of Economic Studies*, (April 2007).
- Schofield, N., Sened, I., 2006. *Multiparty Democracy: Elections and Legislative Politics*. Cambridge University Press, New York.
- Seligson, A.L., 2003. Disentangling the roles of ideology and issue positions in the rise of third parties. *Political Research Quarterly* 56, 465–475.
- Stokes, Donald, 1992. Valence politics. In: Kavanagh, D. (Ed.), *Electoral Politics*. Clarendon Press, Oxford.
- Sundquist, J.L., 1973. *Dynamics of the Party System: Alignment and Realignment of Political Parties in the United States*. The Brookings Institution, Washington, D.C.
- Szusterman, C., 1996. The 1995 Argentine elections. *Electoral Studies* 15, 109–116.
- Train, K., 2003. *Discrete Choice Methods for Simulation*. Cambridge University Press, New York.