A Micro Application of the Spatial Theory of Voting*

Claudio Bonilla

CEDIEM, Universidad Diego Portales

Artículos

Ciencia Política

Este trabajo, investiga las características político espaciales de Chile durante el año 2001. El autor construyó mapas espaciales del año 2001 y, los comparó con los de 1989, obteniendo interesantes resultados. Primero, el radicalismo político de los años ochentas ha desaparecido desde la perspectiva del votante. Segundo, al actitud pro mercado, adoptada por el Partido por la Democracia (PPD) en algunos tópicos particulares (partido cuyas raíces se encuentran en la izquierda) ha llevado a sus candidatos a situarse a la derecha de algunos Demócrata Cristianos, situación impensable veinte años atrás.

I. INTRODUCTION

The Spatial Theory of Voting is the reigning paradigm in formal studies of political competition and elections. This theory, initially developed by Black (1958) and Downs (1957), gave birth to a vast literature in the public choice arena. Later contributions of Davis and Hinich (1966), Kadane (1972), Shepsle (1972), Hinich and Pollard (1981), Shepsle and Weingstag (1981), Enelow and Hinich (1982b) and Hinich and Munger (1994) among others, have placed the spatial theory of voting on a firm theoretical ground. Also, in contrast to what Green and Shapiro (1994) contend, an extensive empirical literature exists as well.

The Spatial Theory has been tested empirically in different contexts using different methodologies. Enelow and Hinich (1984) as well as Ghobarah (2000) applied the Cahoon-Hinich methodology[1] (see Cahoon [1975] and Cahoon, Hinich and Odershook [1978]) to study presidential elections in the US. Lin, Chu and Hinich (1996) applied the same statistical methodology to study presidential elections in Taiwan. Pappi and Eckstein (1998) applied it in Germany and Hinich, Khmelo and Odershook (1999) did the same in Ukraine. Alternative statistical methodologies using different nonmetric scaling techniques have been used to study elections. Here we find the works by Rusk and Weisberg (1972), Aldrich and Mckelvey (1973) and Poole and Rosenthal (1982) among others.

Chilean elections have been studied using the Cahoon-Hinich methodology. Here we find the studies of Dow (1998a, 1998b) and González (2000). These three studies used data obtained in the year 1989, few months before the presidential election. In 1989, Chile was having the first democratic election following 17 years of military rule. Consequently, the results of these studies are probably

1   I will explain this methodology later in the paper.

heavily influenced by the particular context that Chile was experiencing during those years; therefore, their validity is somewhat limited to that particular piece of history.

A very interesting exercise would be to repeat the 1989 analysis a decade later, once the political animosity has decreased and people have gotten used to live in a democratic environment.

This study has two goals. First, we want to apply the Cahoon-Hinich methodology to more recent Chilean data and analyze spatial maps for the year 2001. Second, we want to compare our results with those of González (2000), paying special attention to insights of changes in the spatial maps twelve years after the 1989 election. We have to keep in mind that some scholars support the idea that Chilean society is still very polarized. If this were really the case then the recovered spatial maps should show this situation.

This paper is organized as follows: Section 2 presents an overview of the election results obtained in Chile since the return of democracy. Section 3 presents the existing hypothesis concerning the degree of polarization of today's chilean society. Section 4 describes the data and the statistical methodology used in this study. Section 5 analyzes the results. Section 6 briefly compares our results with those of González (2000). Section 7 provides comments of general interest that can be obtained after the analysis of the Chilean case. The main results of the paper are summarized in section 8.

II. OVERVIEW OF ELECTION RESULTS IN CHILE

The 1988 national referendum put Chile back in its long democratic tradition, interrupted by the 1973 military coup led by General Augusto Pinochet who later became the president of Chile.[2] After the 1988 national referendum, there have been three presidential elections (December of 1989, 1993 and 1999).

The 1989 election has been widely studied using spatial analysis (see Dow [1998a], [1998] and González [2000]). In that election the major contenders were Hernán Büchi on the right, who received 29.4 percent of the vote, Francisco Javier Errázuriz on the center-right, who received 15.4 percent of the vote and finally Patricio Aylwin a Christan Democrat on the center-left, who won the election with 55.2 percent of the vote. Four years later Eduardo Frei, another Christian Democrat representing the center-left coalition (Concertación) won the presidency with 58 percent of the vote, Arturo Alessandri on the Right received 24 percent of the vote, José Piñera, an independent on the right received 6 percent of the vote. No other candidate was a real contender. A drastic change took place six years later during the 1999 election. The candidate representing the Concertación did not win in the first round.[3] Joaquín Lavín on the right and Ricardo Lagos representing the center-left coalition tied, each receiving 47 percent of the vote. In the second round Ricardo Lagos won the election by a small margin receiving 51.31 percent of the vote against 48.69 percent received by Joaquín Lavín. This change in the political preferences of Chilean Voters toward the right is something worth analyzing.

2   I keep academic distance from the political and social reasons that led to the military coup.

3   Under Chilean electoral law, if a candidate receives more than 50 percent of the vote, that candidate wins the election. Otherwise a second round between the two most voted candidates in the first round is required.

III. HYPOTHESIS ABOUT TODAY'S CHILEAN POLITICAL SPECTRA

The military govenment (1973-1990) had a profound effect in Chilean society. During the time that Pinochet ruled the country, an important polarization was observed between the supporter and detractors of the military government. We would like to know if that polarization is still alive. Mainwaring and Torcal (2002) argue that "the Chilean society remains politically polarized about the military dictatorship". They base their conclusions in a study that uses Chilean data up to the year 1995.

This study argues that, by the year 2001, that polarization has decreased considerably. The main reason, we claim, is the unimportant role that Pinochet has played in chilean politics in the last couple years. He started loosing influence in Chile when he was detained in London in October of 1998.[4] Once Pinochet was out of the way, the political actors adjusted their political discourse to cover a wider variety of issues. Now it matters not only their opposite view about the legacy of the military government, but also their political position about abortion, privatization of public firms, minimum wage, public spending, social programs and several other issues. This free space to maneuver has been used particularly efficiently by one party (The Partido por la Democracia [PPD]).[5]

We hyothesize that polarization is not an important part of today's Chilean political spectra, and this should be reflected in the spatial maps constructed with the data.

IV. DATA AND METHODOLOGY

1. Data

The data used in this study correspond to seven-point candidate evaluation scores (also called thermometer scores or simply t-scores) obtained in a survey conducted in District 20 in Santiago de Chile[6] during April 2001. Investmark, a private company dedicated to poll data, conducted the survey.[7] The sample size was 469.

One may argue that District 20 might not be representative of the social and economic diversity found across the country. That point is well-taken, but we want to study the spatial maps in a specific district for two reasons. First, an election will be held in that district, and candidates running for the House (Cámara de Diputados) in that district are certainly interested in the way voters perceive major political figures with which they are associated. With this information, candidates can adjust their campaigns' strategies in order to capture a larger electorate. Second, even though our sample restrictions do not allow us to extrapolate the results to a national level, the demographic characteristics of District 20 can give us at least some inights of the change in the Chilean political spectra in the last 12 years.[8] However, we understand that national data is

---

4   Pinochet spent 503 days detained in London waiting to be extradited to Spain. He was not extradited at the end.

5   As an example, even though the PPD belongs to the incumbent coalition, it appears as a party in opposition to the government when it comes to some public policies. Voters, instead of taking this as an inconsistency, take it as a sign of independence of opinion.

6   District 20 corresponds to the Municipalities of Maipú, Cerrilos and Estación Central.

7   I thank Jorge González for providing the data

8   Mostly middle class people quite representative of the average chilean voter compose this District.

required to have a definitive opinion about aggregate outcomes, and that, of course, is the logical next step in this line of research.

A thermometer-score is based on the response to the following question:

"Thinking of you and your family's well being, how do you evaluate the following personalities as presidents? Respond on a scale of 1 to 7 where 1 is very bad and 7 very good"

From the 469 respondents we eliminated those who could not assign t-scores to one candidate or more. Some respondents were unable to differentiate among the candidates and gave the same score to all of them. These were eliminated as well, leaving a final number of 256 respondents.

2. Methodology

The methodology used to recover the spatial maps is fully explained in Enelow and Hinich (1984, Apendix 9.1). For this reason, only a brief discussion is provided in this section.

Following Enelow and Hinich (1984), the satistical model contains the following assumption:

First, Let $\prod$ be a *dxd* matrix of the position of the k candidates in the d policy-oriented dimensions. Each candidate has attached a *dx*1 vector representing his coordinates ($\prod_k$ for candidate k). Let Z be a *dxn* matrix of ideal points of the n respondents in the sample in the d-dimensional policy space (voter i is represented by the *dx*1 vector Z_i).

Second, candidates can be mapped on a valence dimension using additional data. This valence dimension captures the non-policy issues that voters consider important at the time of the election. This valence dimension varies from country to country and from election to election; however, it is a key determinant of the election outcome. Examples of this valence dimension are integrity of the candidate, experience or competence. Let V be a 1*xk* vector of each candidate's scores in this non-policy dimension (v_k an element of V represents the valence score of candidate k).

Third, Let T be a *kxn* matrix of thermometer scores assigned to each candidate by each voter. In particular t_{ki} is respondent *it's* rating of candidate k.

The model assumes that the t-scores depend on both policy and non-policy factors in the following way:

$$t_{ki} = c_{ki} - [(\pi_{k1} - z_{i1})^2 + (\pi_{k2} - z_{i2})^2 + ... + (\pi_{kd} - z_{id})^2 + av_k]^{1/r} \tag{1}$$

where c_{ki} is a random error assumed to be independent of t_{ki}, π_{ki} and z_{ij} for $j = 1,2,...,d$. a is positive parameter associated with the valence dimension. The error c_k has variance y^2_k and is uncorrelated across candidates. r denotes the sensitivity of the t-score to differences between $\prod_k$ and Z_i. For $r = 1$ equation (1) becomes[9]

$$t_{ki} = c_{ki} - ||\prod_k - Z_i||^2 - av_k \tag{2}$$

expanding equation we get

$$t_{ki} = c_{ki} - \prod'_k \prod_k + 2\prod'_k Z_i - Z'_i Z_i - av_k \tag{3}$$

---

9   The case of r=1 is used here for some intuition, but to make my results comparable with those of González (2000) I use r=2 when running the program.

Fourth, assume that the variance-covariance matrix of Z_i is a diagonal matrix Σ, whose diagonal elements are σ_j^2 for $j = 1,2,...,d$. The expected value of z_{ij} is denoted[10] μ_j for $j = 1,2,...,d$.

3. Estimation Procedure

First, in order to make the model linear in Z_i, choose any candidate whose score will be subtracted from all other candidates. We call this candidate the reference candidate, and we label him with a zero subscript. Because the assignment of the origin is arbitrary, the origin $\pi_o = 0$ is set as the common reference point, then

$$t_{ki} - t_{0i} = c_{ki} - c_{0i} - \Pi'_k \Pi_k - a(v_k - v_0) + 2\Pi'_k Z_i \qquad (4)$$

Second, calculate the sample mean across voters for each one of the canidates and compute the difference between the sample mean of candidate and the reference candidate

$$\overline{t}_k - \overline{t}_0 = \overline{c}_k - \overline{c}_0 - \Pi'_k \Pi_k - a(v_k - v_0) + 2\Pi'_k \overline{Z} \qquad (5)$$

then subtract (5) from (4) to get

$$y_{ki} \equiv (t_{ki} - t_{0i}) - (\overline{t}_k - \overline{t}_0) \qquad (6)$$

which equals

$$y_{ki} = 2\Pi'_k (Z_i - \overline{Z}) + (c_{ki} - \overline{c}_k) \cdot (c_{0i} - \overline{c}_0) \qquad (7)$$

for candidate k and voter i.

Define the vector Y_i of all the candidates y_{ki}, and rearrange equation (7) to obtain

$$Y_i \equiv 2\Pi' (Z_i - \overline{Z}) + (-c_{0i} + \overline{c}_0)1 + (C_i - \overline{C}) \qquad (8)$$

for voter i, where **1** is a $kx1$ vector of ones, C_i is a $kx1$ vector of the random component that voter 1 attaches to each candidate, and $\overline{C}$ is a kx1 vector of the average error for each candidate across voters.

Third, compute the sample variance-covariance matrix of Y_i. This kxk matrix converges in probability to the population variance-covariance matrix (as $n \longrightarrow \infty$)

$$\Sigma_y = 4\Pi'\Sigma\Pi + \psi^2_0 11 + \psi \qquad (9)$$

where ψ is a kxk diagonal matrix of the variances of c_j for $j = ,2...,k$.

Note that (9) can be rewritten as

$$\Lambda C \Lambda' + \psi \qquad (10)$$

where the symmetric square root of $\Lambda C \Lambda'$ is $\Lambda C^{1/2}$. This allows us to use maximum likelihood factor analysis on the variance-covariance matrix of y_i to produce an estimated of $\Lambda C^{1/2}\Gamma$, where Γ is the unknown orthogonal rotation matrix.[11]

---

10   The subscript is dropped because we take the expected value across voters, which are a random sample.
11   Factor analysis techniques are explained in Morrison (1976: chapter 9).

Finally, we have to estimate the voters' ideal points in the spatial map. To do so, we run an ordinary least squares (OLS) fit to

$$t_{ki}-t_{0i}=y_k+2\pi_{k1}z_{i1}+2\pi_{k2}z_{i2}+\ldots.2\pi_{kd}z_{id}+u_{ki} \tag{11}$$

where $u_{ki}=c_{ki}-c_{0i}$, and the hat denotes the estimates obtained from Λ after applying the factor analysis. This way we obtain an estimate of the voters' most preferred points in each dimension $(z_{1i},z_{2i},\ldots,z_{di})$

Fortran Program

Lawrence Cahoon and Melvin Hinich have developed a program (Map.exe) using the Fortran language to implement this statistical procedure. The software can be run in windows environment and provides estimates of the candidates' positions in the recovered axis, where the origin is the mean voter ideal point. In evaluating the statistical validity of the maps we should expect a high proportion of the variance to be explained by the regression. Also, if additional information is in the data set, for example information about anticipated voter choice or self identification with the political left or right, then we can evaluate the adequacy of the maps using discrete choice testing (see Dow (1998a).

V. CANDIDATES AND RESULTS

1. Introducing the Candidates

Before discussing the results, we briefly introduce the canidates evaluated by the voters.

Let us start with Ricardo Lagos (RL). RL is the current president of Chile. He has a dual membership in The Socialist Party (PS) and The Party for Democracy (PPD). The PS is the traditional socialist party with a leftist vision of the economy and the role that the government should play in it. The PPD is a very young party that has emerged as the progressive party of Chile.[12] Its roots are in the left, but in recent years this party has positioned itself more into the right of the economic dimension. Guido Girardi (GG) is the president and main leader of the PPD.

Patricio Aylwin (PA), Eduardo Frei (EF) and Andrés Zaldívar (AZ) are the leaders of the Christian Democratic Party (PDC). The first two were presidents of Chile (Aylwin from 1990 to 1994 and Frei from 1994 to 2000), while AZ is the majority leader of the Senate. Christian Democrats are associated with the center of the political spectra.

On the right we find Sebastián Piñera (SP), a successful entrepreneur and the president of National Renewal (RN), the center-right party of Chile. Joaquín Lavín (JL) is the natural leader of the right. He belongs to the Independent Democratic Union Party (UDI), the party in Chile farthest to the right. JL lost the last election by a short margin, receiving 48.69 percent of the vote. Finally, Augusto Pinochet (AP) ruled Chile from 1973 to 1990 after a coup that overthrew the socialist president Salvador Allende in September of 1973.

---

12   A faction of the center-left coalition that wants to be differentiated from the traditional left uses the term "progressive" in Chile. They claim to support the idea of a free market economy with limited government intervention.

Before going into the results, it is worthwhile to mention the parties' expected position in our analisys when we consider their political history. We expect the order to be from left to right: the PS, PPD, PDC, RN and UDI. We should also expect the candidates associated with these parties to be spread in the same order, namely RL, GG, PA, EF, AZ, AP, SP, JL.

2. Spatial Map Results with all the candidates

We now analyze the results obtained from the April 2001 data. Table 1 contains the recovered spatial points of the candidates in the two spatial dimensions after applying the Cahoon-Hinich methodology.

TABLE 1. Recovered Spatial Points

Candidate and Party	Position in the first dimension	Position in the second dimension
PA (PDC)	4.18	-3.57
AP (Indep.)	8.62	1.76
RL (PPD and PS)	4.76	-4.06
AZ (PDC)	7.59	-3.86
JL (UDI)	9.9	-0.46
SP (RN)	9.79	-0.2
GG (PPD)	8.58	-3.77
EF (PDC)	3.66	-2.6

In strict rigor, additional information is required in the data set (in the form of issue data) to uncover the axes. However, previous studies of elections have consistently shown that the horizontal axis is the classical economic left-right dimension, while the vertical axis identifies reform versus status quo (see Enelow and Hinich 1984 and 1994). Since we lack issue data in this case, we are going to stand on the shoulders of previous studies. Thus, we can label the recovered axes accordingly.
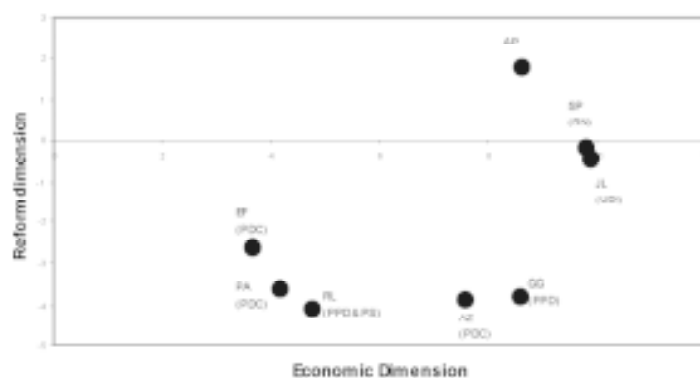
FIGURE 1. Recovered Spatial Map

Figure 1 is the recovered spatial map associated to table 1. It shows that all of the Concertación's candidates (EF, PA, RL, AZ, and GG) locate to the left of the Alianza's candidates (SP, JL, AP).[13] This

13   The Alianza is the center-right coalition composed by National Renewal and the Democratic Independent Union (RN and UDI). Even though AP does not belong to any particular party, he is associated with the right.

result is consistent with the left-right dimension in Chile. Also the position of the candidates in the second dimension shows that voters clearly perceive all the candidates of the Alianza as the reformist cadidates.[14]

We find some surprises in the relative position of the candidates within the coalitions.

Within the Alianza coalition, JL is correctly located to the right of SP, since the UDI is perceived as the far right party of Chile. The position of AP in the first dimension is also correct since he does not participate in any political party, though voters know that he belongs to the political and economic right. AP's position in the second dimension is also very representative of the Chilean case. In Chile the political class has been under severe criticism since the return of democracy in 1990. Unfulfilled expectations and empty promises have generated a lack of confidence toward the political class as a whole. This may be the reason why voters assign AP such a particular position in the second dimension. Remember that AP does not belong to the traditional political class, and his military government was not associated with the corruption problems most Latin American governments had in the past. Therefore, voters see him as the most able candidate to fight corruption and other pathologies associated with any coalition that has been in power for some time (twelve years to be precise). Hence he is perceived as the reformist candidate.

In the Concertación coalition, results turn out to be a little unexpected. First, the three Christian Democrats are spread across the first dimension in different positions. In particular, EF locates to the left of RL, which is a surprise since RL belongs to the leftist Sociaist Party (PS). On a second thought, we should remember that RL also belongs to the young PPD party, which, as we said before, has located itself in a very pro-market position usually associated with the right. We claim that the influence of the PPD in the political atmosphere has driven Lagos to his position in the first dimension. Notice that RL has appointed in the two most important economic secretaries, the Ministerio de Hacienda (Ministry of Finance) and the Ministerio the Economía (the Ministry invoved in the micro-level problems), two pro-market technocrats.

The position of all Concertación's candidates in the second dimension is similar; none of them can provide a significant change or reform. They are all seen as continuation of the status quo.

GG's position deserves special attention. He is the leader of the PPD party. His position in the reform dimension is the expected position for a candidate of the Concertación coalition; however, his position in the first dimension is close to the candidate son the right. This result is consistent with the pro-market argument already given; voters visualize GG almost as a rightist candidate in the left-right economic dimension.

---

14   The reformist candidates provide a change from the status quo. This change can be thought of as a way to get rid of all
     the vicious practices associated with any incumbent government (e.g. corruption).

FIGURE 2 shows the candidates along with voters' position in the recovered map.

FIGURE 2. Spatial Map with Voters
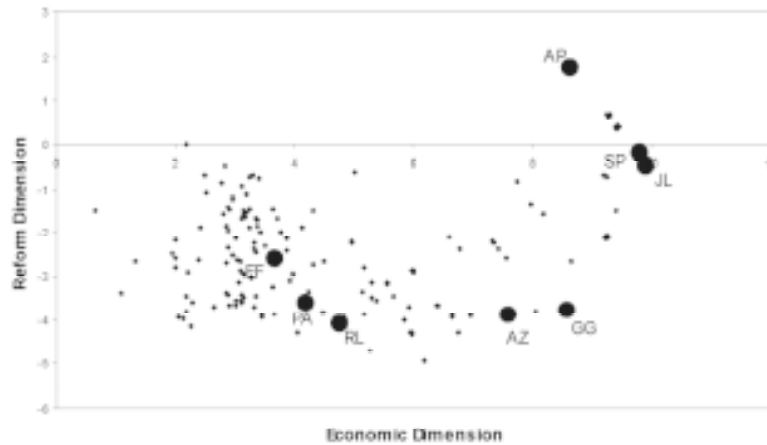
A high proportion of the voters' ideal points are closest to EF's position. This suggests that if an election were held with all these candidates, EF would probably win.

We can also see that voters want reform from the status quo (the status quo is the actual president of Chile, RL) but not as much reform as the Alianza's candidates provide.

## 3. Spatial Map Results with Selected Candidates

In the previous analysis we studied spatial maps with the eight main chilean political figures. In this section we obtain spatial maps with only seven of these candidates. We remove Augusto Pinochet (AP) from the analysis for two reasons. First, the Cahoon-Hinich methodology does not prevent the construction of spatial maps using candidate with no possibility of becoming president, any candidate with thermometer scores can be included in the analysis.

AP is, with no doubt, one of the most important political figures of chilean history. However, today he is in his eighties and has complicated health problems; he will probably not play an important role in future politics. Therefore, if we want to study only political figures with a chance of becoming president, AP should be removed from the analysis.

Second, AP's position is an outlier in th second dimension; we think that it would be interesting to see what would happen with the spatial maps after removing the outlier.

FIGURE 3 shows the candidates' position in the recovered map after removing AP from the sample.

FIGURE 3. Spatial Map w/o A
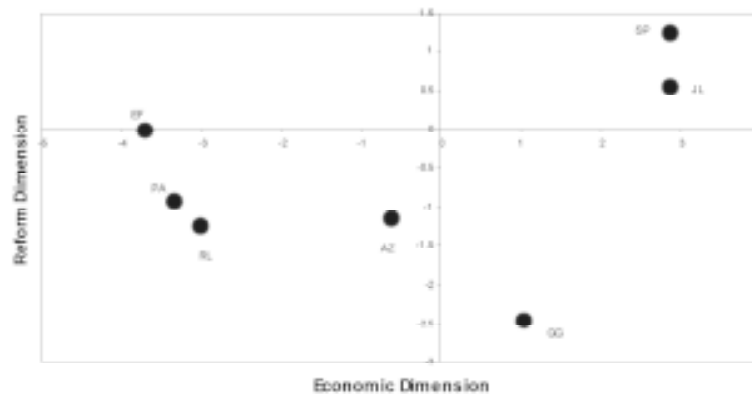
The inclusion of AP does not make a big difference in the spatial map. All of the Concertación's candidates are located to the left of the Alianza's candidates. Again, GG's position in the first dimension is close to the Alianza's candidates. Also, the rightist candidates represent the possibility of reform of the status quo.

We can conclude that, even though the location of AP is considered an outlier (especially in the second dimension) and he is not a viable candidate for the presidency in the future, removing him from the sample does not change the conclusions previously achieved.[15]

VI. COMPARATIVE ANALYSIS

One of the goals of this paper is to look for insights of change in the chilean political spectra since the return of democracy in 1990. Fortunatel, we have the study of González (2000) that uses chilean data collected in 1989. González found that the first dimension (economic left-right dimension) is a perfect representation, with the exception of the Communist Party, of Chilean Politics. His results locate the PS to the far left, followed from left to right by the PPD, the PDC, the RN, and the UDI (see González [2000: pp 94]. González's work shows that in 1989 voters were able to distinguish the parties' attitude toward the economy and the role that the government should play in it. This was consistent with the classical left-right economic dimension.

Let us remember that those were days of radicalism and confrontation, not only because of the election that was taking place, but also because of the different views chileans had of the past. The political position of a person was more than that. It was a determinant of a number of aspects of

15   Again, a high proportion of voters' ideal point are closest to EF, therefore, independence of irrelevant alternatives is not
      violated.

life. Someone claiming to feel represented by the UDI was probably someone conservative in the moral side (e.g antiabortion, against the possibility of legal divorce)[16]. A devout catholic that goes to church regularly, member of the upper social class of Chile[17] who strongly believes in the concept of a free market with minimal government intervention. If someone felt close to the Socialist Party (PS), on the other hand, he was probably liberal in the moral side, not so close to the Catholic Church (e.g. Ricardo Lagos is agnostic), from the middle or middle-lower social class, and a strong supporter of government intervention in the economy. The same logic applies to the people who claim to be represented by the other parties.

Now let us take a look at the results obtained from the 1989 data.

Figure 4 (figure 3.5 from González [2000]) contains the spatial map using the 1989 data. Figure 5 contains the recovered spatial map for the candidates and parties attached to them using the 2001 data.[18]

FIGURE 4. Spatial map with 1989 Data
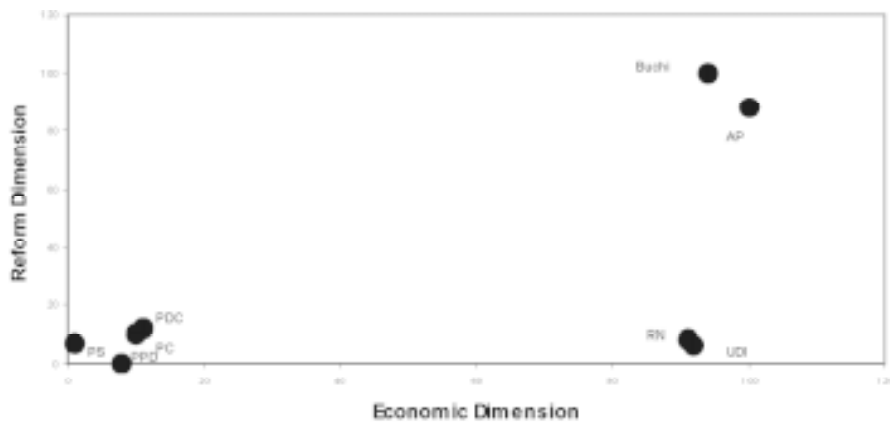
The map for 1989 is, to some extent, similar to the one obtained in 2001 in the first dimension. RN and UDI are far away to the right from the Concertación's parties. All the Concertación's parties are close to each other. However, important differences arise in this first dimension. First, looking at the data of 1989, we can see the radicalism experienced in Chile in those years. Voters perceived the two coalitions as completely different regimes. On the one hand, the Concertación's parties were seen as the leftist parties. They were expected to implement leftist economic policies; on the other hand, RN and UDI were perceived as a completely different story. They were the rightist pro-market oriented parties. As we can see, the two coalitions represented totally different ideas of

---

16   Chile does not have a divorce law.
17   In the last years UDI has penetrated into the lower class electorate.
18   The scale used to construct the maps is not important. It depends on the range of the thermometer scores. The relative position of the candidates in the spatial dimensions is important.

economic policies. In 2001 this is not the case; the candidats associated with the parties are spread across the first dimension even though we can still separate the Concertation's candidates from the Alianza's candidates with a vertical line. In 2001 they seem to converge to a policy position not very different between the two coalitions.

The second difference between the maps is the relative position of the PPD in 1989 and today's position of GG (president of the PPD). We can say that, even though voters still recognize clearly the difference in the left-right economic dimension represented by candidates of the different coalitions, the PPD shows a totally new location in the first dimension of the spatial map. In 1989, the PPD was correctly perceived as a socialist party, which is exactly where this party originated in 1987. By 2001, however, it had succeeded in locating itself to the right of all other Concertación's parties, adding a key differentiating factor for future elections.

The second dimension represents a puzzle from a comparative point of view. In 2000, the Alianza's candidates were correctly perceived as the reformist candidates able to deliver a change from the status quo. Recall that the Concertación has been in power since March of 1990. Voters know that JL and SP are the ones that represent "the change".[19]

In 1989, the Concertation's candidates were supposed to represent the change, since AP had been in power for more than 16 years. However, this is not exactly what the second dimension shows in 1989. How can we explain this? One can reconcile this apparent inconsistency by recognizing that the second dimension of the spatial map is not as stable as the first dimension. The first dimension is always the left-right economic and political dimension of any polity. The second dimension might have different interpretations depending on the particular characteristics of the election. For example, González (2000) claims that given the particular characteristics of the 1989 election, and based on issue data, the second dimension represented the "pro and antiPinochet cleavage" (González 2000: pp 90).

The Pinochet factor was so important in that election that it was reflected in the second dimension. We claim that only in normal circumstances –like the ones given in April of 2001– the second dimension can be interpreted as the reform dimension.[20]

VII. COMMENTS OF GENERAL INTEREST

Even though the Chilean case is interesting in itself (Angell [1990], Caviedes [1991], Dow [1998a and 1998b], Fleet [1985], Scully [1992], Valenzuela and Valenzuela [1995]), we can draw some ideas of general interest that go beyond this particular case. First, a country with a long democratic tradition –as the case of Chile– that is interrupted by a military coup, should not take too long to recover its democratic spirit. In particular, Latin American countries that experienced military governments during the seventies and the eighties should be able to reinstate democratic competition without becoming nations of enemies.

---

19   Actually "the Change" was the slogan that JL used in his presidential campaign in 1999.

20   Another example in which the second dimension took a particular meaning is the 1993 Canadian general election. In that election the issue of "Quebec Sovereignty" arose in the middle of the campaign and became the second most important factor for voters in that particular election (see Hinich and Munger [1997]).

Second, Hinich, Kmelko and Ordeshook (1999) uncover the existence of an important second dimension for the case of Ukraine, this dimension is related to the concept of reform. Here we also find the existence of this second dimension, we have keep in mind that Chile is a classical example of an heterogeneous polity,[21] with a wide variety of parties with real chances of wining elections, voters perceive the differences across the parties and the possibility of reform. This may be the case of most developing countries, in these countries we do not find consensus about what are the best policies to implement or even what is the best model of society that we want to build. This generates the wide offer of parties found in these kinds of polities.

VIII. CONCLUSIONS

Much has been written about Chile's political spatial characteristis at the end of the military regime. The polarization and radicalization of the chilean society has been represented in the estimated spatial maps of previous studies using data from 1989. We have constructed spatial maps of Chile's political spectra usin data from April 2001, with some surprising results.

Although all the Alianza's candidates are correctly located to the right of the Concertación's candidates in 2001, the two coalitions do not appear very different for voters in the left-right economic dimension. The candidates are evenly spread over the first dimension. We claim that this is the result of twelve years of democratic government. During this time voters got to know the parties better. They put behind the radicalism, and now they understand what political preference is not a choice of black or white, but a wider array of possibilities. The new position of the PPD (represented by its president Guido Girardi) was also a surprise. This party has located itself in a very pro-market position, which has been reflected in the spatial maps. This strategic position has surprisingly driven Lagos to the right of two Christian Democrats candidates. This would have been unthinkable twelve years ago.

Finally, it is important to mention that these conclusion should be considered carefully. We stated earlier that a national survey is required to form a definite opinion on the matter, and since our data is a sample of a representative middle class district, we have to consider the conclusions of this paper, at least for now, as insights into national results.

REFERENCES

ALDRIDGE, J. AND R. MCKELVEY. 1977. "A Method of Scaling with Applications to the 1968 and 1972 Presidential Elections". *American Journal of Political Science Review* 71: 111-30.

ANDERSON, THEODOE. 1984. *An Introduction to Multivariate Statistical Analysis*. 2d. Ed. New York. John Wiley and Sons.

ANGELL, A. 1990. "The Chilean Elections of 1989". *Electoral Studies* 3, 241-245

BLACK, DUNCAN. 1958. *The Theory of Committees and Elections*. Cambridge, England. Cambridge University Press.

CAHOON, LAWRENCE. 1975. "Locating a Set of Points Using Range Information Only. *Ph.D. Dissertation. Carnagie-Mellon University.*

---

21 The US is a more homogeneous case. Two big parties are the only contenders and even though they differ in some aspects, we can consider them very similar for international standards.

CAHOON, LAWRENCE, MELVIN J. HINICH AND PETER ODERSHOOK. 1978. "A Statistical Multidimensional Scaing Method Based on The Spatial theory of Voting". *In Graphical Analysis Representation of Multivariate Data*. (Editors) P.C. Wang. Academic Press, New York.

CAVIEDES, C. 1991. *Elections in Chile: The Road Toward Redemocratization*. Lynne Rienner, Boulder, C.

DAVIS, OTTO AND MELVIN HINICH. 1966. "A Mathematical Model of Policy Formation in Democratic Societies". *In Mathematical Applications in Political Science, II*. Ed. Joseph Benvd. Dallas. Southern Methodist University Press.

DOW, JAY. 1998a. "A Spatial Analysis of the 1989 Chilean Presidential Election". *Electoral Studies* 17: 61-76.

DOW, JAY. 1998b. "A Spatial analysis of Candidates Competition in Dual Member Districts: The 1989 Chilean senatorial election". *Public Choice* 97: 451-74.

DOWNS, ANTHONY. 1957. *An Economic Theory of Democracy*. New York. Harper and Row.

ENELOW, JAMES AND MELVIN J. HINICH. 1982a. "Non-Spatial Candidate Characteristics and Electoral Competition". *Journal of Politics 44: 115-30*.

ENELOW, JAMES AND MELVIN J. HINICH. 1982b. "Ideology, Issues and the Spatial Theory of Elections". *American Political Science Review* 76: 493-501.

ENELOW, JAMES AND MELVIN J. HINICH. 1984. *The Spatial Theory of Voting: An Introduction*. New York. Cambridge University Press.

ENELOW, JAMES AND MELVIN J. HINICH (Ed.). 1990. *Advances in The Spatial Theory of Elections*. New York. Cambridge University Press.

ENELOW, JAMES AND MELVIN J. HINICH. 1994. "A Test of the Predictive Dimension Model in Spatial Voting Theory". *Public Choice* 78: 155-69.

FLEET, M. 1985. *The Rise and Fall of Chilean Christian Democracy*. Princeton University Press, Princeton NJ.

GHOBARAH, HAZEM. 2000. *A Statistical Assessment of the Spatial Model of Ideology. Ph.D. Dissertation*. The University of Texas at Austin.

GONZÁLEZ, JORGE. 2000. *The Political Instinct: Th Role of Deception in Chilean Transition to Democracy. Ph.D. Dissertation*. The University of Texas at Austin.

HINICH, MELVIN J., VALERI KHMELKO AND PETER ODERSHOOK. 1999. "A Spatial analysis of Ukraine's 1998 Parliamentary election". *Post-Soviet Affairs* 15:149-85.

HINICH, MELVIN J. AND MICHAEL MUNGER. 1997. "New Issues and the Dynamic of Political Choice". *Working Paper. Mannheimer Zentrum fur Europaische Sozialforschung (MZES)*.

KADANE, J. B. 1972. "On the Division of the Question". *Public Choice* 13: 47-54

LIN,TSE-MIN, YUN-HAN CHU AND MELVIN J. HINICH. 1996. "Conflict Displacement and Regime Transition in Taiwan: A Spatial Analysis". *World Politics* 48: 453-81.

MAINWARING, SCOTT AND MARIANO TORCAL. 2002. "The Political Recrafting of Social Bases of Party Competition: Chile, 1973 -1995". *Forthcoming, the British Journal of Political Science.*

MORRISON, DONALD. 1976. *Multivariate Statistical Methods*. 2d. Ed. New York. McGraw-Hill.

PAPPI, FRANZ URBAN AND GABRIELLE ECKSTAIN. 1998. "Voters' Party Preference in Multiparty Systems and Their Coalitions and spatial Implications: Germany After the Unification". *Public Choice* 97: 229-55.

RUSK, J. AND H. WEISBERG. 1972. "Perception of Presidential Candidates". *Midwest Journal of Political Science* 16: 388-410.

SHEPSLE, K. 1972. "The Strategy of Ambiguity: Uncertainty and Electoral Competition". *American Political Science Review* 66: 555-68

SHEPSLE, K. AND B. WEINGAST. 1981. "Structure Induced Equilibrium and Legislative Choice". *Public Choice* 37: 503-19.

SCULLY, T. 1992. *Rethinking the Centre: Party Policies in Nineteenth and Twentieth Century in Chile.* Stanford University Press. Standford CA.

VALENZUELA, S. AND A. VALENZUELA. 1985. *Chile and the Breakdown of Democracy. In Latin American Politics and Development*, Ed. Wiarda, H. and H. Kline. estview Press, Boulder CO.