# Patterns in Irish Voting, 1969 to 1973

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THE Irish General Election which was held on 18 June 1969, the Referendum on joining the EEC, held on 10 May 1972, the Referenda on (a) amending Article 44 of the Constitution, and (b) reducing the voting age to 18, which were both held on 7th December 1972, the General Election held on 28 February 1973, and the Presidential Election held on 30 May 1973, were unique on a number of counts.

The most important are—

(i) the constituency boundaries were unchanged throughout the period,

(ii) the first General Election was fought on strictly party lines, with three major political parties taking part,

(iii) the May 1972 referendum was bipartite, with the two largest political parties, FF and FG, favouring Ireland's joining the EEC.

(iv) in the December 1972 referenda the three major political parties favoured the two issues proposed.

(v) At the February 1973 General Election, the FG and Labour parties, while retaining their separate identities, fought the election on a coalition basis, with an agreed programme,

(vi) for the Presidential election, the electorate now included citizens over the age of 18 years. There were two candidates, one supported by FF, and the other by the National Coalition, which was now the Government.

FIG. 1

MAP OF CONSTITUENCIES
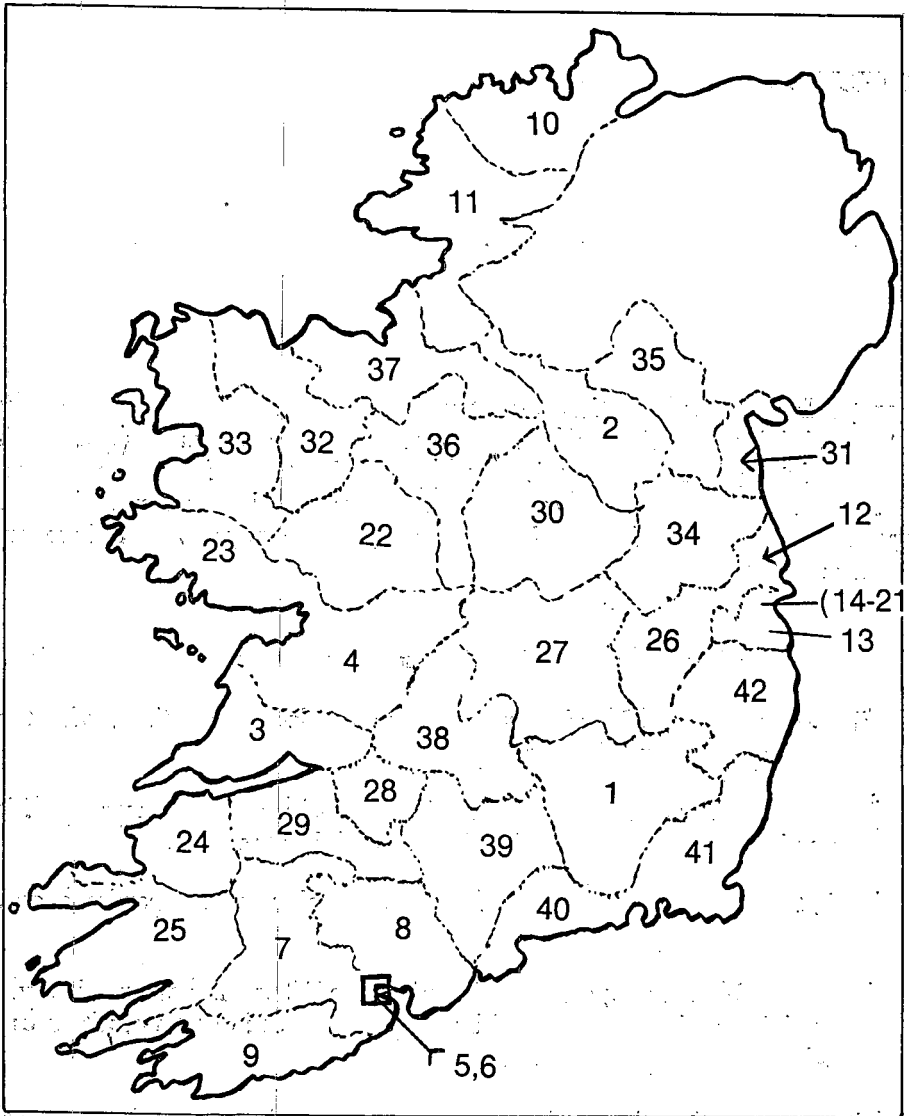
Some of the questions which may be asked are—

(1) What relationships exist between the votes cast for each of the parties in the general elections?

(2) Is there a recognisable pattern in the local variations of the proportion of total votes cast on each occasion (i.e., participation), and can this pattern be related to other recognisable patterns?

(3) Is there a pattern in spoiled votes?

(4) Can any patterns be recognised in the valid votes cast in the referenda and Presidential polls, and can they be related to party affiliations?

In the analysis which follows, except where otherwise stated, we deal with linear systems. Principal component analysis is used to analyse the separate classes—participation, spoiled votes, referenda and general election votes, in an attempt both to explain the variation in each group by a smaller number of variables, and to detect patterns in voting behaviour.

There are 42 constituencies in the country. Twenty-six are three member, fourteen are four member, and two return five members. Twelve of the constituencies may be classed as urban. Ten of these are in Dublin city and county, two in Cork city, and between them elect 42 members to the 144-member Dáil. All election and referendum data are published by constituencies. The locations of the rural constituencies are shown in Fig. 1, and the index to the constituency numbers is given in Table 1 columns 1 and 2.

Participation

First we consider the percentages of electors who voted on each of the four polling days, and the variables will be taken in the calendar order of their occurrence, i.e., June 1969, May 1972, December 1972 and February 1973.

Table 1 shows in columns 3, 4, 5, 6, the percentage of electors who voted in each constituency on the four occasions, and in columns 7, 8, Z_1 and Z_2 values derived from a principal component analysis.

At the foot of the table the means are given for each poll. The difference between the first and last poll means is not significant, but the differences between the referendum means and the general election means are significant. The variances do not differ significantly.

The correlation matrix for participation in the four polls is—

1	·72756	·51421	·92040
	1	·90183	·84011
		1	·66815
			1

TABLE 1: *Participation in four polls*

	Constituency		Participation in four polls			Values of	
						Z_1	Z_2
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Carlow-Kilkenny	79·8	74·6	55·2	79·8	1·00	−·33
2	Cavan	81·1	74·3	54·0	78·2	·87	·00
3	Clare	73·3	67·4	47·6	73·1	−·94	−·27
4	Clare-Galway	77·3	72·1	52·6	76·3	·22	−·50
5	Cork City NW	75·2	70·1	48·2	75·6	−·38	·03
6	Cork City SE	76·8	75·4	53·9	79·5	·76	−·79
7	Mid Cork	82·4	77·3	56·3	82·7	1·67	·06
8	North East Cork	79·3	76·6	55·8	80·6	1·22	−·62
9	South West Cork	80·4	74·3	53·3	80·4	·96	·25
10	North East Donegal	77·6	65·6	43·4	76·4	−·76	1·96
11	Donegal-Leitrim	72·6	67·9	46·2	74·0	−·91	·06
12	North Co. Dublin	75·6	68·7	48·7	76·5	−·35	·26
13	South Co. Dublin	73·8	72·7	55·5	76·8	·31	−1·85
14	Dun Laoghaire-Rathdown	72·3	72·6	56·0	75·6	·06	−2·28
15	Dublin Central	68·5	62·7	42·9	66·0	−2·44	−·71
16	Dublin North Central	72·5	68·2	49·4	71·2	−·98	−1·07
17	Dublin North East	76·5	73·4	52·9	78·4	·45	−·60
18	Dublin North West	71·8	67·0	46·7	72·2	−1·19	−·44
19	Dublin South Central	70·5	67·5	48·7	70·3	−1·27	−1·38
20	Dublin South East	68·8	68·0	50·8	68·1	−1·40	−2·42
21	Dublin South West	72·9	65·5	45·0	73·1	−1·25	·34
22	North East Galway	77·3	69·3	47·8	77·0	−·21	·77
23	West Galway	70·2	62·0	42·7	69·9	−2·08	·20
24	North Kerry	78·9	67·2	43·0	76·2	−·59	2·12
25	South Kerry	79·5	66·9	43·2	76·2	−·56	2·23
26	Kildare	77·4	70·0	50·5	76·6	−·02	·16
27	Laois-Offaly	80·3	74·2	55·0	80·5	1·05	−·07
28	East Limerick	80·7	72·6	54·5	79·8	·87	·18
29	West Limerick	81·6	74·1	56·5	80·5	1·21	−·09
30	Longford-Westmeath	80·3	70·7	49·4	78·0	·27	1·04
31	Louth	80·0	72·2	50·4	79·0	·50	·77
32	East Mayo	74·3	66·9	46·2	75·0	−·84	·48
33	West Mayo	73·5	63·6	44·3	74·3	−1·30	·92
34	Meath	79·9	73·4	49·7	79·4	·57	·81
35	Monaghan	81·4	73·8	47·3	78·3	·48	1·40
36	Roscommon-Leitrim	79·7	70·7	51·3	77·1	·27	·46
37	Sligo-Leitrim	79·4	70·4	48·8	77·5	·11	·95
38	North Tipperary	83·8	76·7	58·1	82·4	1·80	·02
39	South Tipperary	81·6	76·6	58·6	81·0	1·56	−·67
40	Waterford	79·4	73·9	56·3	78·8	·93	−·61
41	Wexford	78·2	72·2	52·3	77·2	·34	−·17
42	Wicklow	76·0	71·1	52·0	75·9	−·01	−·60

	Mean	76·99	70·75	50·45	76·56		
	Variance	15·250	15·009	20·455	13·585		
	Standard Deviation	3·906	3·874	4·523	3·686		

The principal component analysis yields the following eigenvalues—

$$3{\cdot}29470, \qquad {\cdot}59279, \qquad {\cdot}05907, \qquad {\cdot}05344.$$

On applying Bartlett's test of significance Bartlett [1] to the differences between the four eigenvalues, we obtain $\chi^2 = 114$, with 6 degrees of freedom (d.f.), which is significant at the ·001 level. On removing the first eigenvalue, we obtain $\chi^2 = 75$ with 3 d.f., which is also significant at the ·001 level. Taken together, the first two eigenvalues explain 97·2 per cent of the variance, which is satisfactory.

The normalised eigenvectors for the first two eigenvalues are—

$$\xi_1 = \quad {\cdot}48116, \qquad {\cdot}52719, \qquad {\cdot}46700, \qquad {\cdot}52198$$

$$\xi_2 = -{\cdot}59955, \qquad {\cdot}29029, \qquad {\cdot}66578, \qquad -{\cdot}33617$$

The proportions of the variance which these two eigenvectors explain for each variate are given by $\Sigma_i \lambda_i l_{ij}{}^2$ where $i=1, 2;$ and $j=1, 2, 3, 4$ and $(l_{ij})=\xi_i$.

This gives the following proportions—

for λ_1	·76276,	·91570,	·71854,	·89767
for λ_2	·21308,	·04995,	·26276,	·06699
total	·97584	·96565	·98130	·96466

As the elements of the first eigenvector are all positive, the general factor explained by λ_1 may be identified with a tendency for each constituency to participate at roughly the same level above or below the national average. In the case of the second eigenvector, the first and last elements are of opposite sign to the other two, and may be interpreted as explaining a difference in the attitude to the two general elections *vis-à-vis* the referenda polls.

On Fig. 2, Z_1 has been entered for all but the urban districts of Dublin and Cork. The zero contour of the Z_1 surface shows that negative Z_1 values are confined mainly to the Dublin area, and to constituencies in the west of the country. Similarly Fig. 3 shows the geographical distribution of Z_2. In this case there is no negative value north of a line from Dublin city to Galway city, while all the negative values (plus some positive ones) lie to the south of this line.

When Z_1 and Z_2 are entered on a Z_1Z_2 diagram, as in Fig. 4, in which each point is labelled with its constituency index number, the arrangement appears to be related to both the geographical distribution of the constituencies, and to a clustering due to their economic character. Thus urban constituencies are mainly in the SW quadrant, while the western maritime constituencies are in the NW quadrant. A comparison of the Z_1Z_2 diagram and the map of the constituencies shows that any transformation which would bring the former into a one to one

FIG. 2

Z_1 for Participation in Four Polls
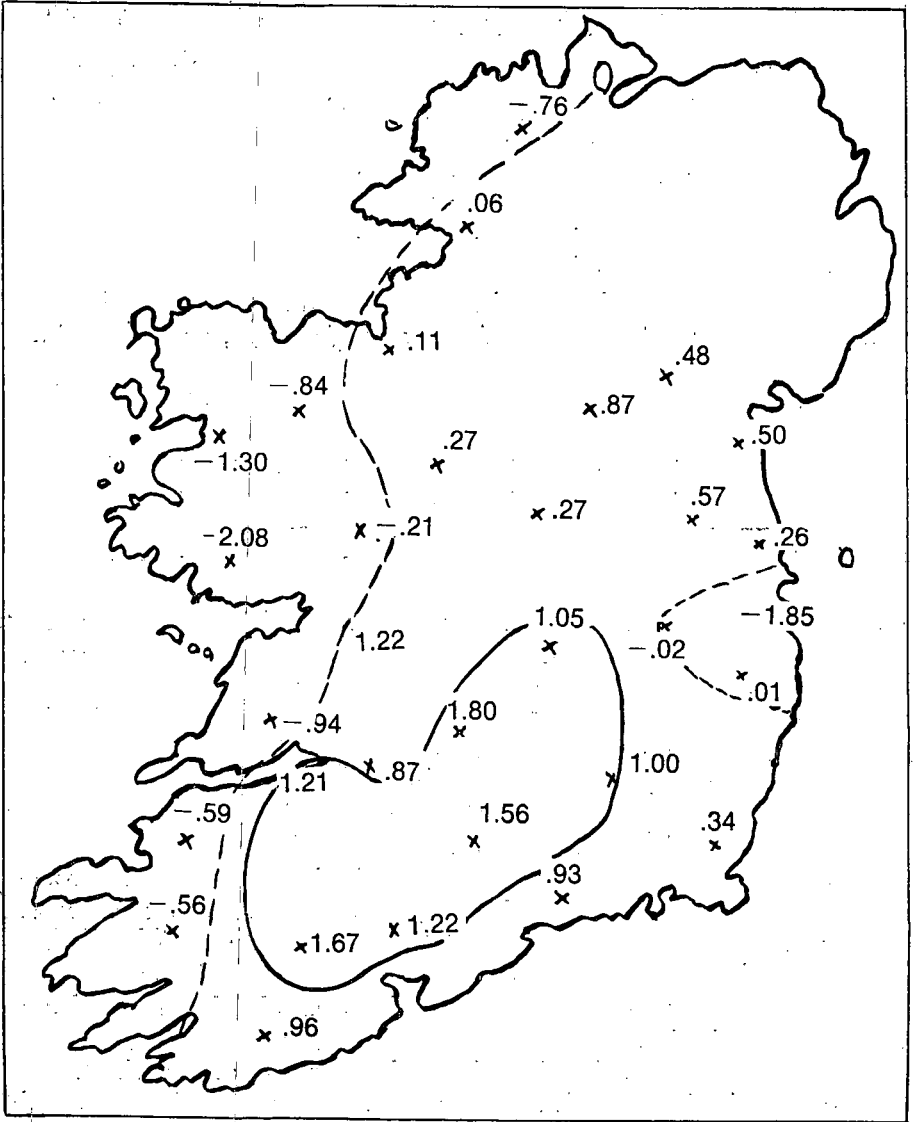
FIG. 3

Z_2 for Participation in Four Polls
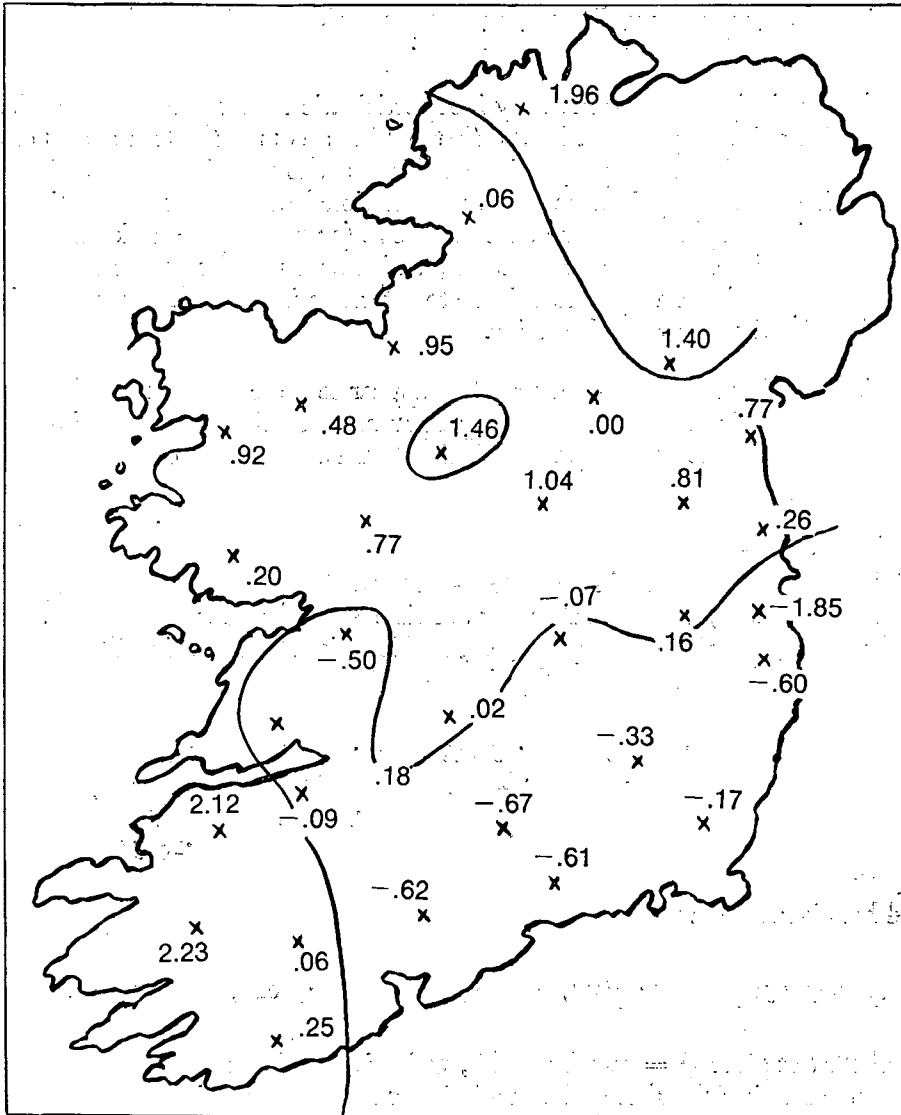
correspondence with the mean centres of the constituencies would have to be non linear. As the distribution of urban constituencies presents a special problem in this regard, a linear model has been fitted to the 33 mainly rural constituencies, i.e. omitting 7 Dublin and 2 Cork city constituencies. The linear model is a translation and rotation of axes. The multiple correlation coefficient between Z_1 and geographical position, i.e., latitude and longitude, is ·568, and between Z_2 and geographical position ·560. Both values are significant at the ·01 level.

The following conclusions are indicated:

(1) A principal component analysis of participation shows the presence of two behavioural patterns. In the first, which accounts for 82 per cent of the total variance, the proportion of electors who vote in each constituency is seen to vary in accord with the national average, each constituency being roughly the same amount above (or below) the national average each time. In the second pattern, which accounts for 15 per cent of the total variance a separate attitude to referenda is revealed, by comparison with that for general elections.

(2) The first two sets of vector values appear to be related to both the socio-economic character and to the geographical location of the constituencies. A test of the latter hypothesis is significant at the ·01 level.

Spoiled Votes

The five polls are taken in the order—the 1969 General Election, the May 1972 EEC Referendum, the December 1972 Article 44 Referendum, the Votes at 18 Referendum, and the February 1973 General Election. The matrix of the correlations between the percentages of spoiled votes is:

1,	−·03778,	−·15827,	−·13047,	·63501,
	1	·62882,	·63242,	·23340
		1	·99080,	·10577
			1	·14154
				1

and has eigenvalues:

$$2·56751, \qquad 1·64704, \qquad ·46673, \qquad ·31020, \qquad ·00853.$$

Bartlett's test gives $\chi^2 = 197$ for 10 d.f., which is significant at the ·001 level. The test on removing the first and second eigenvalues in succession gives $\chi^2 = 159$ with 6 d.f., and 103 with 3 d.f. respectively. It was not thought necessary here (or elsewhere in this paper) to test for the significance of the fourth eigenvalue since three explained so much of the variance, and are significant at the ·001 level.

FIG. 4

Z₁ Z₂ for Participation in Four Polls   1969-1973
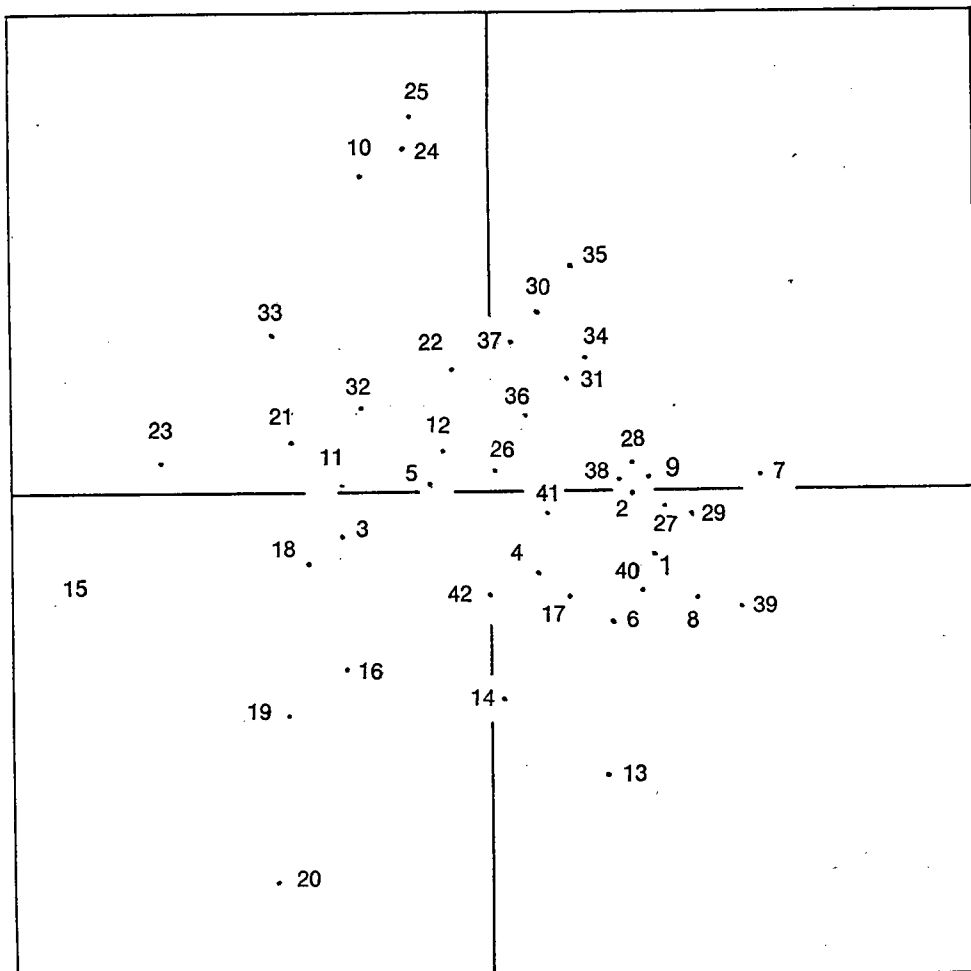
The corresponding eigenvectors are:

—·06438,	·50559,	·59880,	·60082,	·14386.
·70970,	·06636,	—·08672,	—·05938,	·69336.
·21085,	—·82643,	·36593,	·36758,	—·05951.

The proportions of the variances explained by each of the three eigenvectors are:

·01063,	·65631,	·92061,	·92682,	·05315
·82978,	·00725,	·01239,	·00581,	·79181
·02075,	·31877,	·06250,	·06306,	·00165.

The explanation of the eigenvectors is that the first component, to which 51 per cent of the variance can be attributed, is almost completely taken up with the pattern of spoiled votes in the three referenda, the second with the pattern in the two general elections, while the third is almost completely concerned with explaining one third of the variance of the EEC poll.

The geographical variation of Z_1 and Z_2 shows a coherent spatial pattern, as for participation. In the present case the multiple correlation coefficient of the 33 constituencies with latitude and longitude is ·720 for Z_1 and ·500 for Z_2. The first is significant at the ·01 level, the second at ·05.

The following conclusions are indicated:

(1) A principal component analysis reveals two major factors which between them account for 84 per cent of the total variance. The first eigenvector is almost completely taken up with explaining the votes spoiled in the three referenda. The second eigenvector accounts for approximately 80 per cent of the variance of spoiled votes in each of the general elections.

(2) The vector values derived from the first two eigenvalues are, as for participation, significantly related to geographical location.

Valid Referenda Votes

We first take the three referenda "Yes" votes, and consider the relationships between them in the order—EEC, Article 44, Votes at 18.

The correlation matrix is:

I	·31302,	·50791.
	I	·85401.
		I

This has eigenvalues 2·09754,   ·76415,   ·13831.

On applying Bartlett's test, $\chi^2 = 58$ with 3 d.f, and $\chi^2 = 15·7$ with 1 d.f. Both results are significant at the ·001 level. The two eigenvalues account for 92 per cent of the variance.

As in the two previous cases, the Z_1 values have a multiple correlation coefficient of ·732 with latitude and longitude, which is significant at the ·01 level. When plotted on a map the Z_2 negative values are seen to be confined to two narrow sectors, one on the east and the other on the west, and they may be confined within the opposite sectors of two intersecting straight lines, with 10 of the 11 negative values in these areas. This accounts for the fact that the multiple correlation of Z_2 with latitude and longitude does not reach a significant level. However, when the ratio of males to females is entered against each point on the Z_1Z_2 diagram and contoured, the resulting surface resembles a cone. A rough test of this hypothesis is obtained by taking an assumed centre and fitting a right circular cone $Z_1^2 + Z_2^2 = k \, (\text{ratio})^2$ to the data. The correlation coefficient between the right and left hand sides of this equation is ·55, which is significant at the ·01 level. (It is of interest also that the male/female ratio correlates highly with county income. The correlation between personal income for 1969 (Ross 1972) and census data for 1971 is $-·868$.)

We conclude that the valid referenda votes have a pattern related significantly to both geographical position and to a socio-economic measure for each constituency.

Two General Elections

In 1969 the parties in order of voting strength were Fianna Fail (FF), Fine Gael (FG), Labour (L), and other lesser groups, plus some independent candidates. The three major parties contested seats in all the 42 constituencies, each party having independent policies. In 1973, however, Labour did not contest all constituencies, and fought the election in partnership with FG on an agreed coalition policy. This National Coalition replaced FF as the Government.

The fact that Labour contested all constituencies in 1969, but not in the previous or in the succeeding general elections makes a comparison of its performance difficult. Undoubtedly the extra constituencies contested in 1969 had a bias, as not only party strength but also organisation and exposure of the electorate to party ideas were all below the general average in these areas. The same is true *a fortiori* for smaller parties and for the independents in both elections. For these reasons the analysis has been restricted to a comparison of the performances of FF and FG in the two general elections. The variable is the proportion of first preference votes cast in each constituency.

In the order FF 69, FG 69, FF 73, FG 73, the correlation matrix is:

I	·17095	·76535,	·03707.
	I	·11539,	·84035.
		I	·02313.
			I

Turning first to partial correlations,

$$r_{31 \cdot 24} = ·75701, \quad \text{and} \quad r_{42 \cdot 13} = ·84715.$$

The multiple correlation coefficients for FF and FG 1973 differ little from the above, which are all significant at the ·001 level.

The eigenvalues are

$$1·98344, \qquad 1·63127, \qquad ·23867, \qquad ·14657.$$

Bartlett's test gives $\chi^2 = 81$ for 6 d.f. for all the eigenvectors, and $\chi^2 = 64$ with 3 d.f. on removing λ_1. Both values are significant at the ·001 level.

The eigenvectors are

$$·45978, \qquad ·57370, \qquad ·43743, \qquad ·51782.$$
$$·53374, \qquad -·40765, \qquad ·55486, \qquad -·49099.$$

The proportions of the variances which these eigenvectors explain are:

$$·41931, \qquad ·65283, \qquad ·37954, \qquad ·53185$$
$$·46472, \qquad ·27108, \qquad ·50222, \qquad ·39325.$$

The first eigenvector indicates that on the average half of the total variance is due to a factor in which the proportions of the votes for both parties at the two elections increase or decrease together. This rather unexpected result indicates the extent to which both parties suffer (or gain) jointly due to the intrusion (or withdrawal) of other contestants. The second eigenvector, which accounts for about 41 per cent of the total variance, is devoted to the competition between the two parties.

The correlations between party votes and participation in each election, in the same order as for the correlation matrix, are ·198, ·326, ·125, ·141. Only one of these, that between F.G. 1969 and participation in that election, reaches the ·05 level of significance.

The mean percentages for the parties, with the standard deviations are:

$$1969: \quad FF \ 46·06 \ (6·640); \quad FG \ 34·25 \ (8·243);$$
$$1973: \quad FF \ 46·71 \ (6·352); \quad FG \ 35·16 \ (7·470).$$

Comparison of Referenda and General Elections

The relationship between the EEC "Yes" votes and the votes for the four parties taken in the order of the previous section is shown by the correlation matrix:

I	·46028,	·78726,	·37627,	·65182.
	I	·17095,	·76565,	·03707.
		I	·11539,	·84035.
			I	·02313.
				I

The eigenvalues are

   2·76664,   1·63887,   ·27414,   ·19826,   ·12209.

Bartlett's test shows that λ_1 and λ_2 are significant with $\chi^2 = 128$ for 10 d.f. and $\chi^2 = 75$ for 6 d.f. respectively. The eigenvectors are:

       ·55539,   ·33664,   ·52039,   ·30525,   ·46350
      −·04034,   ·59032,   −·32642,   ·60975,   −·41418.

The variance explained by the first eigenvector is distributed as follows—

     ·85340,   ·31354,   ·74923,   ·25611,   ·59436,

i.e., 85 per cent of the variance of the EEC vote is associated with 31 per cent of FF 1969 variance, 75 per cent of FG 1969 variance, 26 per cent of FF 1973 variance, and 59 per cent of FG 1973 variance. The stronger association of the EEC vote with FG is well shown. Although the second eigenvalue is significant, its eigen-vector has no interest in the present context, as it is almost completely involved in explaining the contrast between FF and FG in the two general elections.

   The multiple correlation coefficient of EEC "Yes" on the other four variables is ·85688, which is significant at the ·001 level. The partial correlations are, in order:

             ·32553,   ·55326,   ·10332,   ·09211.

The first partial correlation is significant at the ·05 level, the second at the ·001 level, while the remaining two are not significant. Eliminating the 1973 variables, the multiple correlation based on the 1969 FF and FG votes is ·85384.

   For the Article 44 Referendum, the matrix of correlations is obtained by substituting

        1,   ·21452,   ·42694,   ·05662,   ·32411

for the first row in the matrix for the EEC votes. The two largest eigenvalues are 2·23030 and 1·65437, and are significant. ($\chi^2 = 89$ for 10 d.f. and $\chi^2 = 63$ for 6 d.f.).

   The eigenvectors are—

     ·41450,   ·35906,   ·57812,   ·30654,   ·52066.
    −·12006,   ·60359,   −·28805,   ·63187,   −·37285.

In this case also the second eigenvector is mainly concerned with the relationship between the political parties in the two elections.

   C

The distribution of the variances explained by the first eigenvector is—

$\cdot38318$, $\cdot28753$, $\cdot74541$, $\cdot20958$, $\cdot60451$.

Only 38·3 per cent of the variance of the Article 44 vote is associated with the two parties in this eigenvector, and, as in the case of the EEC referendum, is associated with a greater proportion of the FG variance than that for FF. The multiple correlation coefficient is ·47489, which is significant at the ·05 level. The partial correlations do not reach a significant level. The multiple correlation referred to FF and FG for 1969 is ·45047.

For the Votes at 18 Referendum, the first row of the correlation matrix is—

I, $\cdot43274$, $\cdot37202$, $\cdot29944$, $\cdot24596$,

and the two largest eigenvalues are 2·32907 and 1·63929. Bartlett's test gives $\chi^2 = 92$ for 10 d.f. and $\chi^2 = 62$ for 6 d.f., both of which are significant. In the first eigenvector the elements are all positive and vary between ·41 and ·48, i.e., they are roughly equal. The second eigenvector is again taken up with explaining the relationship between the parties. The multiple correlation coefficient based on the two elections is ·53191, which is significant at the ·205 level. However, the partial correlation coefficients do not reach a level of significance. The multiple correlation coefficient with the 1969 FF and FG votes is ·52804.

The three referenda and the party performances were also examined in a 7×7 matrix. Designating the variables as follows—1 = EEC referendum, 2 = Article 44, 3 = Votes at 18, 4 = FF 1969, 5 = FG 1969, 6 = FF 1973, 7 = FG 1973, the multiple correlations are—

$$R_1 = \cdot98967, \quad R_2 = \cdot93327, \quad R_3 = \cdot94027.$$

The partial correlations with the party votes are—

$R_{14} = \cdot28711$, $R_{15} = \cdot65849$, $R_{16} = -\cdot05762$, $R_{17} = \cdot15380$,
$R_{24} = \cdot13592$, $R_{25} = \cdot44969$, $R_{26} = -\cdot23312$, $R_{27} = \cdot11344$,
$R_{34} = -\cdot03352$, $R_{35} = -\cdot41261$, $R_{37} = \cdot18326$, $R_{37} = -\cdot13555$.

Where, for example, R_{12} is used instead of the more cumbersome $r_{12 \cdot 34567}$. The ·05 significance level is ·325, and the ·01 level is ·418.

A consistent picture emerges from the foregoing analysis. The correlation between the referenda issues and the two major parties is strongest with the 1969 party votes. The multiple correlations based on the 1969 General Election differ so little from those based on both general elections that the suggestion of a change in the electorate between the date of the last referendum and the 1973 General Election is offered as a possible explanation.

The 1973 Presidential Election

This election was held on 30 May 1973, with two candidates, Mr Erskine H. Childers nominated by FF, and Mr T. F. O'Higgins, a former FG minister nominated by the National Coalition.

On this occasion all citizens over the age of 18 were entitled to vote, and this resulted in an electorate of almost two million. The constituency boundaries were unchanged, but as the effects of the change of age structure of the electorate are unknown, this must be kept in mind when comparing the results with other polls.

Turning first to participation, it has a correlation of ·76936 with that in the February 1973 General Election. The correlation with the candidates votes did not reach a significant level.

For spoiled votes, the correlation with those in the February 1973 election is ·292, which is not significant. The correlations with Z_1 and Z_2 previously determined for spoiled votes are −·303, and ·562, and the latter is significant at the ·001 level. It is of interest that the higher correlation is with the pattern previously identified with general elections.

Taking the percentage of votes for Mr Childers and comparing it with the FF 1969, FG 1969, FF 1973 and FG 1973 votes in that order, the correlation matrix is—

$$
\begin{array}{ccccc}
1 & ·71135, & −·10661, & ·60537, & −·11051, \\
  & 1 & ·17095, & ·76535, & ·03707, \\
  &   & 1 & ·11539, & ·84035, \\
  &   &   & 1 & ·02313, \\
  &   &   &   & 1
\end{array}
$$

It is clear that the correlations with FG 1969 and FG 1973 are too small to be of importance. The multiple regression of Childers's (or O'Higgins's) votes on these two variables is ·11345, which is not significant. The correlations with FF 1973 and FF 1969 are the important ones, and give a multiple correlation coefficient ·71759. The partial correlation with FF 1973 (FF 1969 constant) is ·13430, which is not significant, and that with FF 1969 (FF 1973 constant) is ·54842, which is significant at the ·01 level. The difference between the two partial correlations is also significant. These results may be interpreted as indicating a swing back to the 1969 pattern of votes. It is important to note that the correlation +·54842 is obtained on comparing either (*a*) Mr Childers's votes with FF 1969 (FF 1973 constant) or (*b*) Mr O'Higgins's votes with FG+other non FF in 1969 (with FG+ Other 1973 constant). The fact that one candidate identified with one party only would mean that correlations with this party should be higher than for the party which has combined its forces with another. Again, what is surprising is the throwback to the 1969 General Election.

The conclusions are that participation, spoiled votes and valid votes all show a good correlation with the patterns in previous polls, and in particular with those for general elections rather than for referenda. The votes for the two candidates

correlate significantly higher with the 1969 general election results than with the February 1973 General Election pattern. A suggestion that Mr Childers captured the "feminine vote" has been tested in the only way possible, i.e., by comparison of his votes with the ratio of males to females. The correlation obtained is $+ \cdot 195$ which is not significant, and in addition is of the wrong sign.

A summary of some of the more common statistical measures for all polls is given in Table 2.

TABLE 2: *Summary of various measures for six polls*

| | 1969 Election | Referenda | | | 1973 Election | 1973 Presidential Election |
		EEC	Article 44	Votes 18		
Electorate	1,735,400	1,783,600	1,785,700	1,785,700	1,784,000	1,973,400
Participation (Per cent)	76·99	70·75	50·45	50·45	76·56	62·46
Spoiled Votes (Per cent)	1·20	·80	5·59	5·37	1·19	·58
S.D. of Participation (Per cent)	3·906	3·874	4·523	4·523	3·686	6·282
S.D. of Spoiled Votes	·260	·229	1·617	1·631	·269	·165
Referenda						
Per cent Voting "Yes"		83·31	84·38	84·66		
S.D. of "Yes"		4·399	4·539	3·880		
General Elections:						
Per cent Voting FF	46·06				46·71	
Per cent Voting FG	34·25				35·16	
S.D. for FF	6·640				6·352	
SD for FG	8·243				7·470	
Presidential Election:						
Votes for Childers						52·09
SD						3·948

Note.—The means have been derived from the sum of the percentages for the 42 constituencies, and differ from the means using total values.

Conclusions

Six Irish polls taken within a four year period have been examined and subjected to a principal component analysis. Participation, spoiled votes and valid preference votes have been examined separately. In each of these, recognisable patterns have been found. These patterns have spatial regularities, and are significantly correlated with latitude and longitude. A strong socio-economic factor also influences the spatial patterns, which differ for referenda as distinct from general elections.

These spatial regularities have a parallel in other studies. de Smet and Evalenko [5] have established significant correlations between socio-economic variables and voting behaviour in Belgium, while Jeppesen and Meyer [3] found that in rural areas of Denmark participation decreased with increasing distance from Copenhagen. Cox [2] has found concentric voting patterns for London. The approximate concentric voting pattern for referenda could be interpreted as diffusion, a concept which has been foremost in the work of T. Hägerstrand of Lund over the last twenty years.

The foregoing empirical analysis suggests that it should be possible to construct a model which would explain the large scale spatial regularities of Irish polls.

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