

In this symposium Mogens Pedersen argues against measuring party system change by comparing static measures of "fractionalization," and proposes a measure based on changes in party strength from time 1 to time 2. Shankar Bose proposes a related measure of party system change that combines changes in strength with changes in party continuity over time. This article compares their measures as applied to data from ten party systems.

## A NOTE ON MEASURES OF PARTY SYSTEM CHANGE

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**T**he insightful articles by Pedersen and Bose in this symposium treat the measurement of system change in ways that sharpen our understanding of the measurement problem facing research on party systems. This article aims at contributing to that understanding by comparing the Pedersen and Bose measures, analyzing their properties, and suggesting that attention be given to longitudinal analysis of party systems over longer periods than they specifically address. First, let us review their contributions.

Pedersen argues that past research tended to compare "static" measures of system *states* at two points in time and thus ignored the *dynamics* of change, which presumably were the purpose of measurement. Reviewing the more common static measures of distribution of party strength at a given time, he shows quite convincingly that they fail to discriminate effectively among five typical patterns of party system change. He argues that patterns of change will be detected only by measures that are themselves dynamic, i.e., based on comparisons over time. Pedersen proposes a measurement approach which compares the percentage of vote obtained by party *i* at election *t* with the vote for the

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AUTHOR'S NOTE: *Robin Gillies read and improved this manuscript.*

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same party at election  $t - 1$ . His "aggregate volatility measure" ( $V_1$ ) does appear to distinguish appropriately among his five patterns of change.

Bose's article is narrower in focus. It implicitly assumes the importance of measuring the dynamics of change and concentrates on the "continuity" of the actors or parties across two elections. He proposes an index which measures *both* changes in strength over two time points (Pedersen's concern) *and* changes in the identity of the parties. His computational formula also provides for the exclusion of "unimportant" parties when measuring change, whereas Pedersen's appears to assume that all (or virtually all) the votes or seats are considered in calculating change (see his Note 5). When Bose's index is applied to hypothetical data, it too distinguishes among different patterns of change better than alternative static indices.

One might ask how the Pedersen and Bose measures would perform when applied to the same data sets, preferably genuine (rather than hypothetical) distributions of party strength. This comparison has been made for ten arbitrarily chosen distributions of seats held by parties in adjacent legislatures in the United States (1964-1965 and 1974-1975), Canada (1961-1962 and 1972-1973), France (1957-1958 and 1966-1967), the Netherlands (1976-1977), India (1976-1977), Burma (1957-1958), and Portugal (1973-1975). The data are reported in Table 1, along with preliminary calculations for computing Pedersen's and Bose's measures. A plot of Bose's scores against Pedersen's is given in Figure 1.

Because Bose measures "similarity" and Pedersen measures "aggregate volatility," the two should be negatively related—and indeed they are, as shown in Figure 1. The relationship is not perfect, however, and the two definitely tap somewhat different aspects of system change. Changes in party continuity, captured explicitly by Bose's measure, account for their major differences. All of the cases below the diagonal line (meaning that Bose's score indicates less stability than Pedersen's score) correspond to patterns of party *discontinuity*. Of course, this is precisely what Bose intended by including party continuity as a factor in his index. Concomitantly, Bose's formula (see its second term) guarantees that complete party continuity will increase the similarity score by always adding "1" to the sum before multiplying by 1/2. This results in the occurrence of cases *above* the diagonal line under conditions of party continuity. While the two formulas will yield identical (but inverse) results at the extremes of system instability and stability, Bose's has the general effect of producing higher values when party *identity* remains the same despite dramatic changes in party

**TABLE 1**  
**Distributions of Legislative Seats Among Mayor Parties in Selected**  
**Countries in Adjacent Years, Ordered by Pedersen's Measure**

		Values for Use in Formulas by:		Pedersen <sup>a</sup>	Bose <sup>b</sup>
<u>United States</u>		<u>1964</u>	<u>1965</u>		
	Democrats	.59	.68	.09	.59
	Republicans	<u>.41</u>	<u>.32</u>	<u>.09</u>	<u>.32</u>
		1.00	1.00	.18	.91
<u>United States</u>		<u>1974</u>	<u>1975</u>		
	Democrats	.56	.67	.11	.56
	Republicans	<u>.44</u>	<u>.33</u>	<u>.11</u>	<u>.33</u>
		1.00	1.00	.22	.89
<u>Canada</u>		<u>1972</u>	<u>1973</u>		
	Conservatives	.27	.41	.14	.27
	Liberals	.59	.41	.18	.41
	New Democrats	.07	.12	.05	.07
	Social Credit	<u>.05</u>	<u>.06</u>	<u>.01</u>	<u>.05</u>
		.98	1.00	.38	.80
<u>France</u>		<u>1966</u>	<u>1967</u>		
	MRP	.08		.08	
	Radicals	.08		.08	
	Socialists	.14	.16	.02	.14
	Gaullists	.48	.43	.05	.43
	Communists	.09	.15	.06	.09
	Democratic Center		.08	.08	
	Republican		<u>.09</u>	<u>.09</u>	
		.87	.91	.46	.66
<u>Canada</u>		<u>1961</u>	<u>1962</u>		
	Conservatives	.77	.44	.33	.44
	Liberals	.19	.37	.18	.19
	New Democrats	.03	.07	.04	.03
	Social Credit		<u>.11</u>	<u>.11</u>	
		.99	.99	.66	.66
<u>France</u>		<u>1957</u>	<u>1958</u>		
	MRP	.13	.11	.02	.11
	Radicals	.15	.07	.08	.07
	Socialists	.18	.08	.10	.08
	Gaullists	.03	.36	.33	.03
	Communists	<u>.25</u>	<u>.02</u>	<u>.23</u>	<u>.02</u>
		.74	.64	.76	.31

			Pedersen <sup>a</sup>	Bose <sup>b</sup>
<b>The Netherlands</b>				
	<u>1976</u>	<u>1977</u>		
Catholic Peoples	.18		.18	
Labor	.29	.35	.06	.29
Liberal	.15	.19	.04	.15
Anti-Revolutionary	.09		.09	
Chris. Hist. Union	.05		.05	
Communist	.05	.01	.04	.01
Democrats 66	.04	.05	.01	.04
Chris. Dem Appeal		.33	.33	
	<u>.85</u>	<u>.93</u>	<u>.80</u>	<u>.49</u>
<b>India</b>				
	<u>1976</u>	<u>1977</u>		
Congress	.70	.28	.42	.28
Janata		.55	.55	
	<u>.70</u>	<u>.83</u>	<u>.97</u>	<u>.28</u>
<b>Burma</b>				
	<u>1957</u>	<u>1958</u>		
AFPFL	.60		.60	
Stable AFPFL		.40	.40	
Clean AFPFL		.22	.22	
NUF	.18	.18	.00	.18
	<u>.78</u>	<u>.80</u>	<u>1.22</u>	<u>.18</u>
<b>Portugal</b>				
	<u>1973</u>	<u>1975</u>		
National Union	1.0		1.0	
Socialist		.47	.47	
Popular Democratic		.32	.32	
Communist		.12	.12	
Social Dem. Center		.06	.06	
	<u>1.00</u>	<u>.97</u>	<u>1.97</u>	<u>.00</u>

a. Pedersen's Aggregate Volatility ( $V_t$ ) =  $\frac{1}{2} \cdot TNC_t$  (Total Net Change)

$$TNC_t = \sum_{i=1}^n \Delta p_{i,t}$$

Where:  $p_{i,t}$  = proportion of seats won by party  $i$  at election  $t$

$$\Delta p_{i,t} = p_{i,t} - p_{i,t-1}$$

Pedersen's  $V_t$  for the U.S. in 1964-1965 is thus simply:  $.18 \div 2 = .09$

b. Bose's Profile Similarity Index applies set theory in a formula with two major terms. The first calculates changes in strength between  $t_1$  and  $t_2$ , while the second calculates party continuity from  $t_1$  to  $t_2$ . Strictly speaking, the set-theoretic idea

*strength*. In fact, under the condition of no change in party identity, the index has a lower bound of .5, as calculated for this extreme example:

	<i>Time 1</i>	<i>Time 2</i>
Party A	.49	.01
Party B	.49	.01
Party C	.01	.49
Party D	.01	.49

Pedersen's measure, for the same data, would yield a nearly perfect volatility score of .96. The shaded areas in Figure 1 indicate in a rough way the boundaries of the possible covariation between Pedersen's and Bose's measures.

The effect of party continuity on Bose's score can be seen in another feature of Figure 1. Note the vertical line joining the two points for

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does not apply to the first term, for there is no assurance that the elements of strength are identical across time. This ecological problem is skirted by reinterpreting  $\cap$  below as the "minimum proportion of votes won" in  $t_1$  and  $t_2$ . The formula is

$$\text{Profile Similarity} = \frac{1}{2} \left[ \frac{v_1 \cap v_2}{v_1 \cup v_2} + \frac{n_1 \cap n_2}{n_1 \cup n_2} \right]$$

Where:  $v_{1,2}$  = the proportion of votes or seats at times 1 and 2

$n_{1,2}$  = the number of parties at times 1 and 2

$\cap$  = intersection of  $v_1, v_2$  and of  $n_1, n_2$ —meaning the minimum proportion of votes won by each party at both times and the number of parties that existed at both times

$\cup$  = union of  $v_1, v_2$  and of  $n_1, n_2$ —meaning the sum of  $v_1 + v_2$  less  $v_1 \cap v_2$  and the sum of  $n_1 + n_2$  less  $n_1 \cap n_2$ .

The first term uses the totals in the columns for each country. For the U.S.:

$$\frac{.91}{1.0 + 1.0 - .91} = \frac{.91}{1.09} = .835$$

The second term divides the  $n$  of parties continuing at both times by the sum at  $t_1$  and  $t_2$  less the  $n$  at both times. In the U.S. case, this is simply:

$$\frac{2}{2 + 2 - 1} = 1$$

Bose's index requires summing both terms and dividing by 2:

$$\frac{.835 + 1}{2} = .92$$

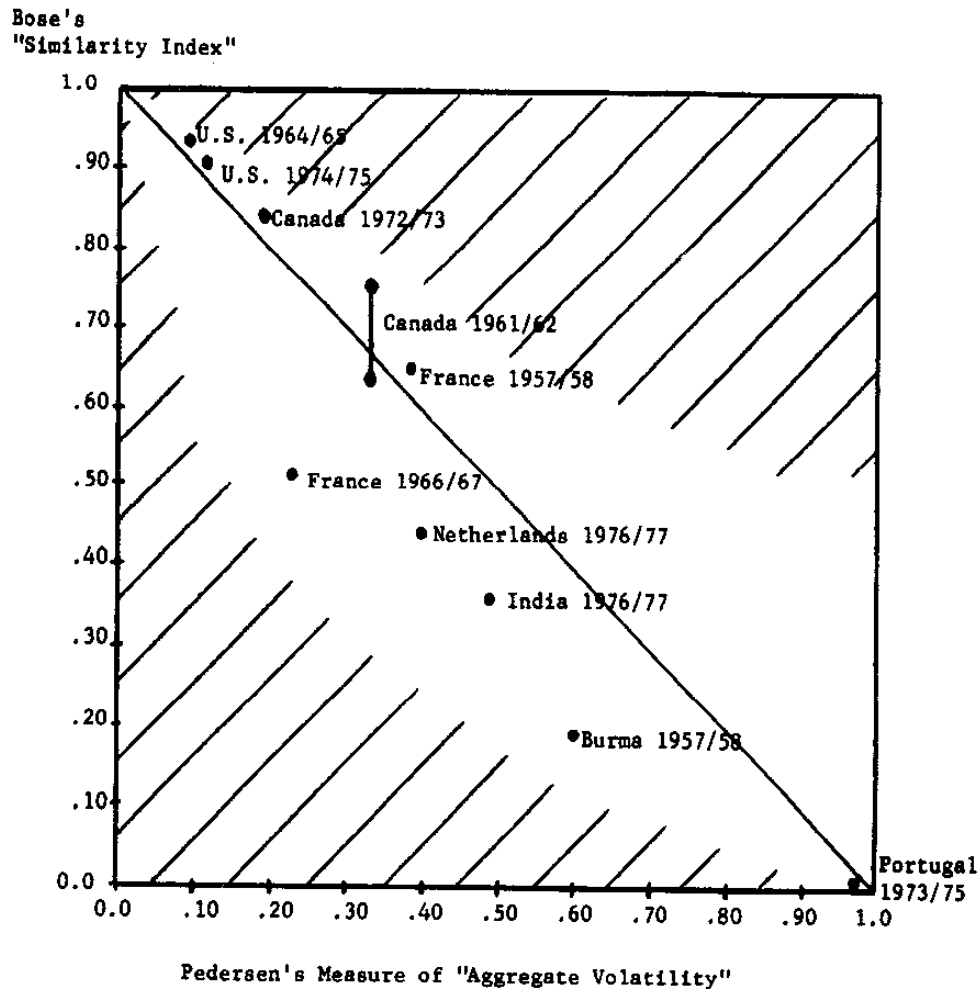


Figure 1: Plot of Bose's Similarity Scores Against Pedersen's Aggregate Volatility Scores for Ten Party Systems

Canada in 1961-1962. The Social Credit Party in 1961 had no representation in the federal parliament, although the party existed outside parliament. If Bose's index is calculated allowing for Social Credit Party continuity, Canada's score is above the diagonal; if continuity is not allowed, Canada's score is below. Should the absence of Social Credit Party representation in 1961 be regarded as a lack of continuity?

There is merit in Bose's argument that measures of system stability should assess the continuity of parties over time. As to *how much* weight should be given to actor continuity, the issue is open to theoretical and empirical investigation. Bose's index gives equal weights to continuity and to changes in strength. Pedersen's measure allows for continuity

*only* indirectly in calculating differences in strength. The appropriateness of the weightings cannot be determined by comparing the measures or by simply "eyeballing" the function as done here. The decision should be made after creating and testing theories about party systems. Such theories, for example, might specify the effect of social cleavages on party system instability, or the effect of system instability on economic development. The conceptual and operational issues in these two approaches to measuring instability should be sharpened and resolved through such theory-oriented empirical research.

There is, however, a special problem attending the assessment of party continuity that troubles any such effort. As already referred to in the case of Canada, it is the problem of determining what constitutes a "party" in computing continuity. Bose suggests excluding parties with less than 2% of the vote (see his footnote 5). The effect of such a rule would depend on party politics at the time.

Consider the data in Table 1. One party alone in multiparty India in 1976 accounted for 70% of the legislative seats, while five parties in France in 1958 accounted for only 64%. Alternative decisions about which parties to include and exclude would have produced quite different scores on Bose's index. However, they would have relatively little effect on Pedersen's measure, for minor parties tend to evidence little change and thus contribute little to his measure of instability.

Although these articles advance our understanding of measuring party system change, they stop short of the major concern in the longitudinal analysis of system change. Granted that we must begin with the dynamics of change from time 1 to time 2, we seldom limit attention to changes between two time points and instead seek measures of system instability over a *series* of time points. While there are more advanced techniques of time series analysis for assessing system instability (Shamir, 1979), they do not generate easily interpretable summary statistics for descriptive purposes. The Pedersen and Bose measures, however, can themselves be averaged over time to describe system instability in the long run.

Such an assessment for party systems in 53 countries from 1950 to 1978 was made using what amounts to Pedersen's formula for total net change. The percentage of seats held by a party in one year was subtracted from the percentage held in the next year. The absolute values of these differences for each pair of adjacent years from 1950 through 1978 were summed over all 28 pairs to give a measure of aggregate change for each party. The individual party scores were

transformed into system scores by summing across all parties in the country. Dividing the result by 28 (the number of year-pairs involved in the calculation) yielded a measure of the average percentage change in the distribution of party seats from year to year.

The complete results are reported elsewhere (Janda, 1980). Figure 2 shows selected plots of party legislative representation over time. As can be seen, smooth plots are associated with low instability scores and wild plots with high instability scores. The average country in our sample had a score of 10, indicating an *annual* shift (*not* election to election) of ten percentage points in party representation in the legislature. The most stable party systems were found in Eastern Europe, and no change in party representation was experienced at all in Albania. The United States was somewhat below the mean level of party instability, while Canada was ranked among the highest.

These data on system instability, like the Pedersen and Bose measures, have no theoretical significance by themselves. Their significance remains to be established through imaginative longitudinal research on the causes and consequences of party system instability. Such research requires dynamic measures of change as argued by Pedersen and Bose.



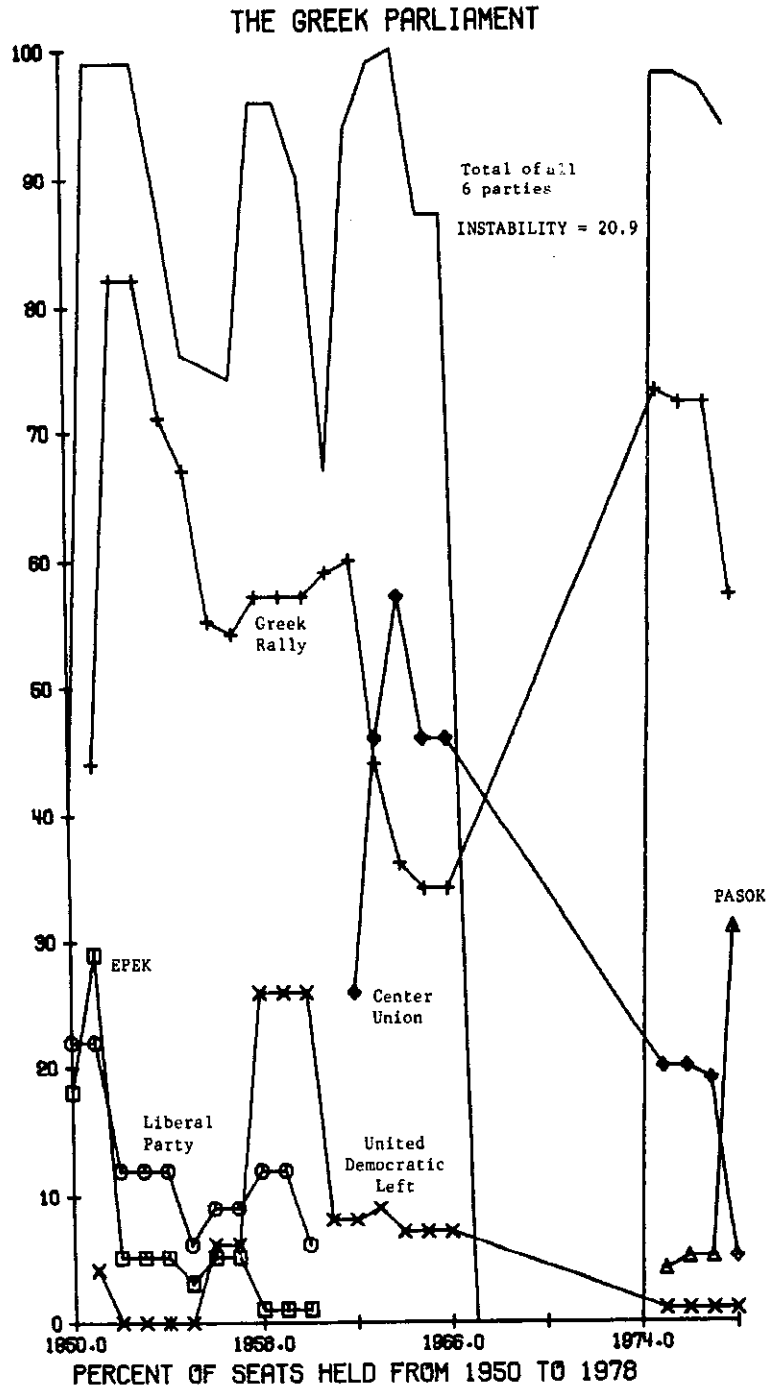
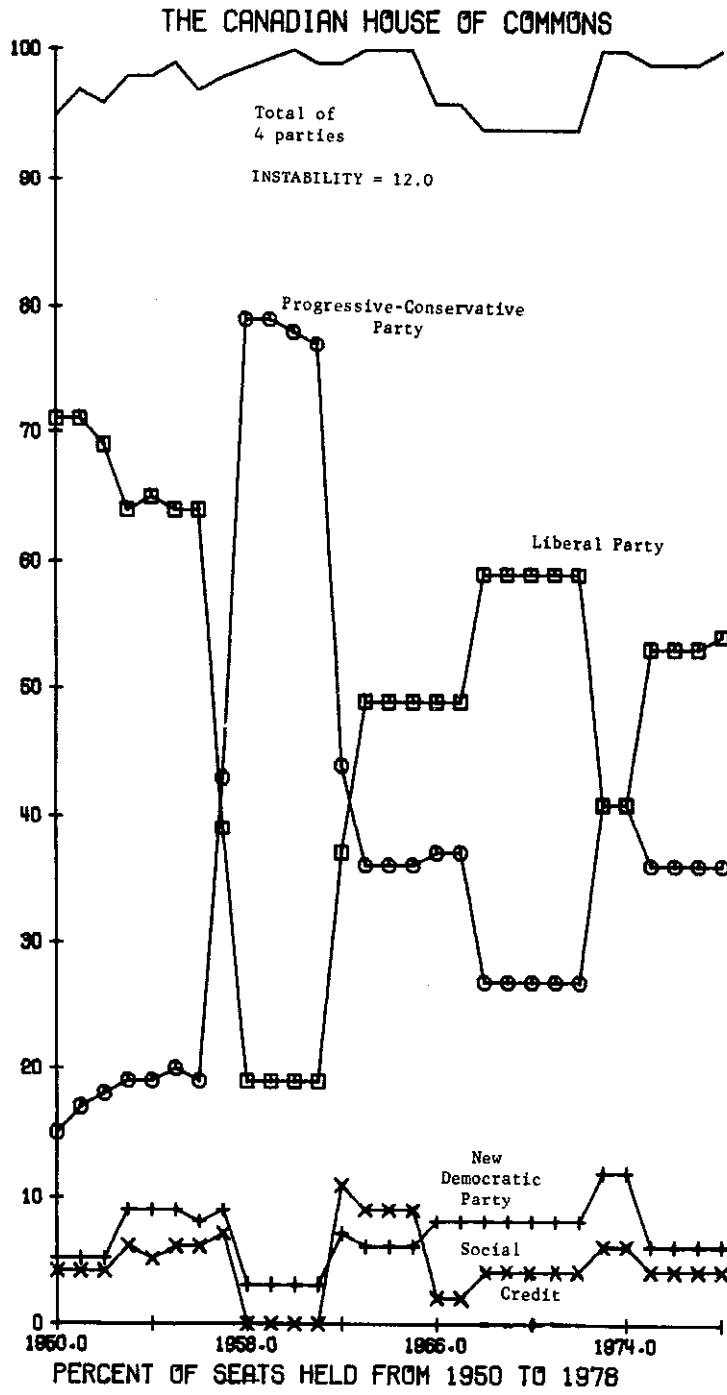
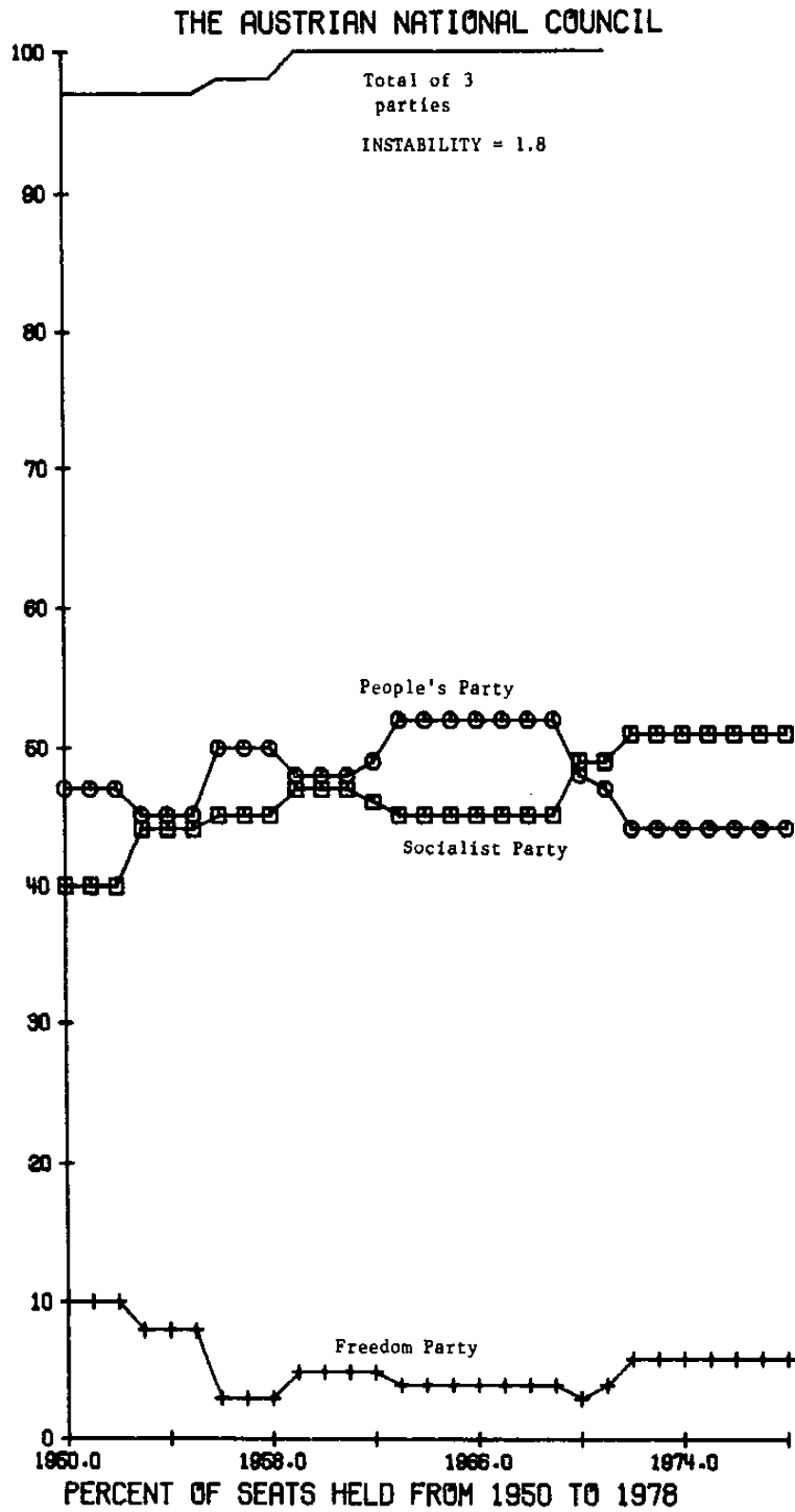


Figure 2: Party Instability in Selected Countries, 1950-1978





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