

**POLITICAL CONTEXT, ECONOMIC CONDITIONS AND  
ELECTORAL ACCOUNTABILITY IN CANADA, 1957-2000**

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## 1.0 Introduction

If an issue is important to the electorate and if the electorate believes the government has control over the issue, the principle of electoral accountability holds that the government's record on that issue will affect the electorate's opinion of the government and ultimately whether they vote for or against it. Evidence of electoral accountability in terms of the performance of the economy in Canada has been contradictory and weak. This study demonstrates that this confusion is a product of methodological flaws in its analysis. By correcting these errors, it is demonstrated that Canadian governments have been held accountable for the performance of the economy. Further, it is argued that these analytical flaws are not limited to the Canadian case and that all such public opinion, time-series research can benefit from the application of the methods developed here.

In his opening to *The Responsible Electorate*, V.O. Key argues that voters are not fools.<sup>1</sup> They are rational and the political institutions that they have developed are also rational. In fact, Key depicts the electorate as a great god – "a rational god of vengeance and reward."<sup>2</sup> In this role, voters assess the past performance of the incumbent government and depending upon their assessment use the electoral system to punish or reward it by voting for or against its return. Through this mechanism, governments in democratic systems are held accountable for the outcomes of their actions and policies. This is the principle of electoral (or democratic) accountability and it is the philosophy which forms the basis of my examination of the extent to which the Canadian electorate held the federal government accountable for the performance of the national economy from 1957 to 2000.

Since the work of Key, a great deal of theorising on the issue of economic performance and electoral accountability has been advanced and a vast number of studies have been undertaken. For example, in 2000 Michael Lewis-Beck and Mary Stegmaier reviewed over 150 major books and articles on the economic determinants of electoral outcomes. In their summary of the literature Lewis-Beck and Stegmaier conclude that overall:

Economics and elections form a tight weave. When anchoring economic threads snag, governments can fall....For all democratic nations that have received a reasonable amount of study, plausible economic indicators, objective or subjective, can be shown to account for much of the variance in government support....Among the issues on the typical voter's agenda, none is more consistently present, nor generally has a

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<sup>1</sup> V.O. Jr Key, *The Responsible Electorate: Rationality in Presidential Voting, 1936-1960* (Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 1966) 7.

<sup>2</sup> V.O. Jr Key, *Politics, Parties, and Pressure Groups*, Fifth ed. (New York: Thomas Y. Crowell Company, 1964).

stronger impact, than the economy. Citizen dissatisfaction with economic performance substantially increases the probability of a vote against the incumbent.<sup>3</sup>

Lewis-Beck and Stegmaier reviewed only one Canadian study but there is every reason to believe that economic conditions are as important to voters in Canada as anywhere else. More than most issues, the economy has been consistently identified as important by the Canadian electorate. In 1968, high taxes, high prices and inflation topped the list of the most urgent problems facing the country, as identified by voters.<sup>4</sup> Unemployment was an important issue during the 1972 election, as was inflation during the 1974 election and energy pricing in 1980.<sup>5</sup> In 1984, unemployment was again a major concern and received a great deal of media coverage, as did the economy as a whole.<sup>6</sup> In the 1988 election, free trade policy was the main issue. Unemployment and deficit and debt reduction dominated the issue agenda in 1993, as did jobs in the 1997 election.<sup>7</sup> Even in a time of comparative prosperity and economic stability, such as during the 2000 election campaign, news articles about unemployment, debt and tax reduction were still prominent.<sup>8</sup>

Despite the evidence of the importance of the economy as an issue and further evidence that the Canadian electorate believes that the federal government has control over the domestic economy, findings regarding the impact of economic conditions on the support for Canadian federal governments/parties have been largely inconclusive and inconsistent.<sup>9</sup> While there is general agreement that economic issues may matter on some occasions, there is little agreement

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<sup>3</sup> Michael S. Lewis-Beck and Mary Stegmaier, "Economic Determinants of Electoral Outcomes," *Annual Review of Political Science* 3 (2000): 211.

<sup>4</sup> The Gallup Report, April 6, 1968

<sup>5</sup> William P. Irvine, "An Overview of the 1974 Federal Election in Canada," in *Canada at the Polls: The General Election of 1974*, ed. Howard R. Penniman (Washington D. C.: American Enterprise Institute for Public Policy Research, 1978), Jon H. Pammett, "The People's Verdict," in *The Canadian General Election of 2000*, ed. Jon H. Pammett and Christopher Dornan (Toronto: The Dundurn Group, 2001). However, in 1974 the Liberals attempted to divert attention from inflation to leadership issues (Frederick Fletcher, "The Mass Media in the 1974 Canadian Election," in *Canada at the Polls: The General Election of 1974*, ed. Howard Penniman (Washington, D. C.: American Enterprise Institute for Public Policy Research, 1978), 243-89.).

<sup>6</sup> Alan Frizzell and Anthony Westell, *The Canadian General Election of 1984: Politicians, Parties, Press and Polls* (Ottawa: Carlton University press, 1985) 62.

<sup>7</sup> Pammett, "The People's Verdict."

<sup>8</sup> Christopher Dornan and Heather Pyman, "Facts and Arguments: Newspaper Coverage of the Campaign," in *The Canadian General Election of 2000*, ed. Jon H. Pammett and Christopher Dornan (Toronto: The Dundurn Group, 2001).

<sup>9</sup> Key studies include: (Harold D. Clarke and Gary Zuk, "The Politics of Party Popularity: Canada 1974-1979," *Comparative Politics* (1987), Kristen Monroe and Lynda Erickson, "The Economy and Political Support: The Canadian Case," *The Journal of Politics* 48 (1986).), (Lynda Erickson, "Ccf-Ndp Popularity and the Economy," *Canadian Journal of Political Science* 21, no. 1 (1988), Richard Johnston, "Business Cycles, Political Cycles and the Popularity of Canadian Governments, 1974-1998," *Canadian Journal of Political Science* 32, no. 3 (1999).)

over which economic issues matter, how much they matter, when they matter, or in what way they matter.

This study demonstrates that the Canadian findings are inconsistent not because the principle of electoral accountability does not hold, rather the "spotty" results are the product of methodological difficulties. In general, the analysis of electoral accountability has suffered from a number of shortcomings. First, the technical foundations have been inadequate – the statistical tools utilised to examine the dynamics of government and party support have been problematic, and at times inappropriate. Second, studies of electoral accountability have only been weakly grounded in historical political context. Consequently, our comprehension of why electoral accountability is more effective in some times and places than in others has been restricted. These problems are not limited to Canadian research but their consequences do seem more evident.

This study corrects these problems by employing a state-space model estimated using Bayesian analysis to separate and explicitly model the multitude of dynamic components (stationary and non-stationary) comprised by public opinion towards governments and parties over time. This allows for the estimation of economic electoral accountability, properly controlling for the political context in which economic conditions are translated into government and party support. The state-space approach also provides a sophisticated method by which to cope with noisy public opinion data, containing errors that correlate with time. Further, a modified Box-Jenkins approach is used to determine the appropriate lag structure for the measures of economic conditions. These and other issues particular to the Canadian setting are dealt with in this study. The result is a properly specified model of public opinion which demonstrates how economic conditions have translated into party and government support in Canada between 1957 and 2000, and how different economic variables have mattered to different degrees at different times. My findings support some of the claims of some Canadian popularity research but overturn many others. I demonstrate that economic conditions do play an important role in shaping party popularity and certainly since 1984, Canadian federal governments have been held accountable for key economic conditions such as economic growth and inflation. I also reveal a number of before undiscovered dynamics within popularity, such as the persistence of an inter-election popularity cycle.

## 2.0 Modelling Government Support

A number of modelling techniques have been utilised in the search for the impact of the economy on public opinion regarding the government. Government support models fall into two broad categories – voting models and popularity models. In voting models, the dependent variable is the electorate's vote decision. These models are alternatively estimated using aggregate, objective electoral outcomes or individual level survey data as their unit of analysis. The first uses time-series modelling techniques and the second cross-sectional. In the time-series case, aggregate measures of economic performance such as inflation, changes in unemployment, and economic growth are usually used, although increasingly more subjective measures based on aggregated survey responses are being utilised. In the cross-sectional case, measures of economic performance are based on individual level survey responses to questions regarding the voters' perceptions of the economy.

Time-series studies are often argued to be superior to cross-sectional studies. "With the national economy being the focus of attention, the most telling variance is the movement of national aggregates over time"<sup>10</sup> and time-series models have the advantage of being able to examine the impact of variables that vary over time (e.g., the economy) but are constant across the electorate during any one election. Furthermore, Lewis-Beck and Eulau stress the importance of keeping the historical context in mind.<sup>11</sup> This also requires the long-term perspective of time-series analysis.

It is also argued that when examining the impact of the economy on public opinion, aggregate level studies have an advantage over those at the individual level because by using objective, aggregate measures of economic conditions they avoid the endogeneity problem inherent in using individual level subjective measures. This is the problem of subjective perceptions of the economy being in part determined by partisan preferences<sup>12</sup> – e.g., an individual that prefers the Conservative party may have a more positive view of the economy if the incumbent government is Conservative rather than Liberal. Objective economic indicators

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<sup>10</sup> H. Brandon Haller and Helmut Norpoth, "Reality Bites: News Exposure and Economic Opinion," *Public Opinion Quarterly* 61, no. 4 (1997): , 557.

<sup>11</sup> Michael Lewis-Beck and Heinz Eulau, "Economic Conditions and Electoral Behaviour in Transnational Perspective," in *Economic Conditions and Electoral Outcomes: The United States and Western Europe*, ed. Michael Lewis-Beck and Heinz Eulau (New York: Agathon Press, Inc., 1985), 11.

<sup>12</sup> Geoffrey Evans and Robert Andersen, *The Political Conditioning of Economic Perceptions: Evidence from the 1992-97 British Electoral Cycle*, vol. 2004-W9, *Nuffield College Politics Working Paper* (Oxford: University of Oxford, 2004).

are also superior because individual economic measures produced by surveys contain a degree of measurement error.<sup>13</sup>

The disadvantage of time-series voting models is a relatively small T value (allowing for very few degrees of freedom), constrained by the number of elections that occur during any particular time period. With the accumulation of cross-sectional studies over time, researchers may be able to combine the cross-sectional and time-series approaches by pooling individual level cross-sectional data sets over time and combining them with aggregate measures of economic performance. Such studies have the potential to be very powerful but pose the researcher with serious data management and statistical modelling issues.

When examining the degree of public support for the government, aggregate level voting models benefit from the fact that they use the most direct measure – electoral outcomes. However, since elections are relatively rare and measuring public opinion based on their outcomes is insensitive to specific government initiatives, academics regularly rely upon public opinion measures. In such models, government or party support (the dependent variable) is operationalised as ‘popularity’ defined as the electorate's response to a survey question inquiring into their hypothetical vote preference or their approval of the government's performance. Such popularity models are also referred to as popularity functions. An economic popularity function is an equation describing the translation of economic conditions into government or party popularity. These models are estimated using aggregate survey response data and objective measures of macro-economic performance measured over multiple time points (typically, on a monthly or quarterly basis).

Popularity models have the advantage over voting models of examining objective economic measures and public opinion over time while not being so limited by a small degree of freedom. Moreover, voting studies can only consider the electorate's response to government policy outcomes and actions during elections. This response is of course vitally important. However, a great deal of change in government policies and policy outcomes occurs between elections. Popularity studies (particularly those that measure public opinion on a monthly basis) are able to detect the impact of these changes in policy outcomes on public opinion. For all these reasons, a decision was made to use popularity rather than voting models in this study.

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<sup>13</sup> At the same time, it is necessary to avoid ecological fallacy when examining results from aggregate level research.

It is important to note that while voting and popularity models are usually considered alternative approaches to examining government support, they actually may measure different phenomenon.<sup>14</sup> Voting data focus exclusively on the election, while popularity data include both election and inter-election periods. Consequently, these two forms of analysis are not examining the exact same thing and differential findings can be expected as a result of differences in the focus of study as well as due to differences in technical considerations.<sup>15</sup> Given this, it is fair to question the validity of using popularity as a diagnostic for electoral outcomes.

Canadian popularity studies, unlike US studies which use approval questions, build popularity time-series constructed from survey responses to vote intention questions. Therefore, the distinction between the dependent variables examined in popularity studies and voting studies is small, although not insignificant. It is still quite plausible that vote intention questions between elections tap a different phenomenon than vote intention questions near elections. However, we know that measures of popularity based on vote intention questions near elections are very good predictors of electoral outcomes.<sup>16</sup> This suggests that while it is important to recognise that the dynamics of popularity may vary depending on the proximity of an election, popularity close to elections is certainly a valid diagnostic for government electoral support and popularity between elections is a valid diagnostic for the type of government support that occurs when an election is not near. While the latter type of government support is not equivalent to electoral support, it is still important to understand. Vote decisions are not based purely on the events of the week leading into an election. Nathaniel Beck uses a rational choice perspective of elections to describe how popularity studies may be used to understand how economic conditions affect US Presidential electoral outcomes. "If we think of elections as a principal-agent situation,

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<sup>14</sup> Kramer makes this point particularly emphatically (Gerald H. Kramer, "The Ecological Fallacy Revisited: Aggregate- Versus Individual-Level Findings on Economic and Elections, and Sociotropic Voting," *The American Political Science Review* 77, no. 1 (1983).)

<sup>15</sup> (Helmut Norpoth, "The Economy," in *Comparing Democracies: Elections and Voting in Global Perspective*, ed. Lawrence LeDuc, Richard Niemi, and Pippa Norris (Thousand Oaks, California: Sage Publications, 1996), 317.), (Lewis-Beck and Eulau, "Economic Conditions and Electoral Behaviour in Transnational Perspective," 3, Lewis-Beck and Stegmaier, "Economic Determinants of Electoral Outcomes.") & (Martin Paldam, "How Robust Is the Vote Function?: A Study of Seventeen Nations over Four Decades," in *Economics and Politics: The Calculus of Support*, ed. Helmut Norpoth, Michael Lewis-Beck, and Jean-Dominique Lafay (Ann Arbor, Michigan: The University Of Michigan Press, 1991).)

<sup>16</sup> Nathaniel Beck, "The Economy and Presidential Approval: An Information Theoretic Perspective," in *Economics and Politics: The Calculus of Support*, ed. Helmut Norpoth, Michael Lewis-Beck, and Jean-Dominique Lafay (Ann Arbor, Michigan: The University Of Michigan Press, 1991).

where voters (principals) are choosing an agent to run the country, then the popularity polls are a measure of whether the principals wish to retain the agent at any given time."<sup>17</sup>

### 3.0 Economic Popularity Literature

While most government popularity studies find that economic conditions are important in some way, the range of variation between these studies in terms of the results and the different statistical methodologies applied is great.<sup>18</sup> Britain is responsible for a greater proportion of the significant economic popularity studies than is the case with voting studies, which are more popular in the US. The earliest US research on popularity functions was done by J. Mueller.<sup>19</sup> However, Lewis-Beck and Stegmaier identify the earliest published popularity function ever as being C.A.E. Goodhart and R.J. Bhansali's British case in 1970.<sup>20</sup> Goodhart and Bhansali examine monthly measures of British government popularity between 1947 and 1968. They find that levels of unemployment and the rate of inflation influence the government's political popularity. They also find that the strength of the impact of these economic conditions had increased over the time period under study. Further, they find that government popularity may follow what they call a "natural path" between elections.<sup>21</sup> Such a path includes honeymoon effects, trending downwards after the honeymoon and trending upwards leading into an election. Overall, this suggests that popularity follows an inter-election cycle. This cycle is part of the political context in which economic conditions are translated into government support. Goodhart and Bhansali attempt to control for this inter-election "natural path" through the application of dummy and index variables.

It is commendable that Goodhart and Bhansali so early on recognised the need to control for the political context in which economic popularity operates, even if the methods by which this was done were fairly crude. The reason that it is so important is that the dynamics in government popularity produced by this political context creates the problem of nonstationarity within the data. This is a very challenging statistical problem which is discussed further in section 4.2 but in short, unless it is properly addressed, the statistical techniques used to model popularity are inappropriate, unreliable and highly susceptible to spurious correlation.

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<sup>17</sup> Ibid.

<sup>18</sup> Lewis-Beck and Stegmaier, "Economic Determinants of Electoral Outcomes."

<sup>19</sup> Ibid.

<sup>20</sup> C.A.E. Goodhart and R.J. Bhansali, "Political Economy," *Political Studies* 18, no. 1 (1970).

<sup>21</sup> Ibid.



Given its severity, it is surprising that many studies since are no more sophisticated in tackling this problem. Most studies will typically use crude time-indices to control for trending before and/or after elections. Beyond this, many very recent studies hardly address the issue of nonstationarity produced by political contextual forces at all. This can have drastic consequences for the findings of these studies. For example, examining British government monthly popularity data between 1974 and 1997, David Sanders finds no evidence to indicate that objective macro-economic measures had any direct effect on government support.<sup>22</sup> However, Sanders includes only event dummies to control for political context. Further, while he uses the differenced form of unemployment and inflation to correct for nonstationarity in these economic variables, the issue of potential nonstationarity in the popularity data is not fully considered. Political contextual factors which exhibit as trending, cycling and shifts in baseline support are left completely unaddressed.<sup>23</sup> Sanders' modelling techniques are technically inappropriate and fail to fully take into account the dynamics of the political context in which economic conditions are translated into public opinion. This puts his findings into doubt. This particular study also demonstrates a further shortcoming of much of the popularity research. Economic variables are entered into Sanders' model at lags of 0, 1 and 2. This is done without any particular justification. A much more purposive technique is required to determine the lags at which economic variables should enter into a popularity model.

There are a few studies which have begun to take the necessary steps towards addressing these important methodological issues. Paul Whiteley, in "Inflation, Unemployment and Government Popularity: Dynamic Models for the United States, Britain and West Germany," examines the impact of economic conditions on monthly measures of government popularity in the United States, Britain and West Germany.<sup>24</sup> Whiteley uses a process developed by Box and Jenkins to specify the popularity functions. This allows him to account for autocorrelation and trending in the independent and dependent variables through the appropriate differencing of these variables. It also allows him to determine the lag structure of the independent variables.<sup>25</sup> Unfortunately, the Box-Jenkins approach is not always able to fully account for the

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<sup>22</sup> David Sanders, "The Real Economy and the Perceived Economy in Popularity Functions: How Much Do Voters Need to Know? A Study of British Data, 1974-97," *Electoral Studies* 19 (2000).

<sup>23</sup> Ibid.

<sup>24</sup> P. Whiteley, "Inflation, Unemployment and Government Popularity: Dynamic Models for the United States, Britain and West Germany," *Electoral Studies* 3, no. 1 (1984).

<sup>25</sup> Ibid.

nonstationarity produced by the cycling within popularity as identified by Goodhart and Bhansali. The Box-Jenkins approach eliminates cycling by differencing the data by the cycle length. The cycling is the product of the inter-election cycle and in the US case, where elections are evenly spaced, the Box-Jenkins approach is appropriate. In the case of Parliamentary governments with unevenly spaced elections, the Box-Jenkins approach is unable to cope with nonstationarity produced by cycling. There is no way to difference the data in order to eliminate it.

Clarke, Stewart and Zuk use the Box-Jenkins approach in their examination of party popularity in Britain between 1979 and 1983.<sup>26</sup> They apply this approach to an ARIMA model of popularity. They also include a number of sophisticated political event variables controlling for the effects of strikes, internal party disputes, leadership popularity, etc. Norpoth does the same for presidential popularity in the US from 1961 to 1980.<sup>27</sup> In fact, Norpoth goes one further than Clarke *et al* by explicitly exploring the appropriate structure for the error process in the model, settling on a first order moving average process. Norpoth notes that there is resistance to using approaches such as that of Box-Jenkins because it is felt that the procedure for eliminating the nonstationarity in popularity produced by political contextual forces may throw out real economic effects – that is, "the baby may be thrown out with the bathwater."<sup>28</sup> He further notes that this is particularly problematic with data that is noisy, such as popularity data produced by public opinion polls. Consequently, he finds it necessary to aggregate his time-series to the quarterly rather than monthly level.

Norpoth is correct to identify the potential problems produced by the noise (sampling error) inherent in measures of popularity. In fact, the problem is even larger than he identifies. As this study demonstrates, the error within popularity time-series also tends to trend, cycle and generally be correlated with time. This is yet another source of nonstationarity. The methods developed in this study explicitly account for the dynamics of measurement error within popularity. It does so by using the state-space approach to modelling popularity. It is this approach that is the basis of the Kalman filter. The Kalman filter is recommended by Donald

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<sup>26</sup> Harold D. Clarke, Marianne C. Stewart, and Gary Zuk, "Politics, Economics and Party Popularity in Britain, 1979-83," *Electoral Studies* 5, no. 2 (1986).

<sup>27</sup> Helmut Norpoth, "Economics, Politics, and the Cycle of Presidential Popularity," in *Economic Conditions and Electoral Outcomes: The United States and Western Europe*, ed. Michael Lewis-Beck and Heinz Eulau (New York: Agathon Press, Inc., 1985).

<sup>28</sup> *Ibid.*

Green, Alan Gerber, and Suzanna De Boef to reduce sampling error in public opinion time-series such as popularity and by Nathaniel Beck to do the same in modelling US presidential popularity.<sup>29</sup>

This study goes far beyond the Kalman filter. It uses the state-space approach to reduce sampling error, to account for errors correlating with time and to control for nonstationary dynamics within popularity produced by political contextual forces by explicitly modelling them. The use of the state-space approach as it is developed in this study is uniquely able to properly account for the unevenly spaced inter-election cycling. The Box-Jenkins technique is modified so that it can be applied to the modelling of the impact of economic conditions on party popularity through the state-space approach. In this way, the proper lag structure of economic variables is determined. Special attention is also paid to the structure of the error process in the state-space model as was done by Norpoth using ARIMA modelling.

### **3.1 Economic Determinants of Party Popularity in Canada**

Over the past 10 to 15 years, there has been a real decline in the volume of economic popularity studies coming out of Britain and the US. To the extent that economic popularity research has been conducted in Canada, it only really began in the mid to late 1980s. Despite the recentness of this research, it has done no better at addressing the methodological issues inherent to popularity time-series research than that from the US or Britain. If anything, it has dealt even more poorly with these issues. This may explain why the inconsistency in the estimated impact of economic conditions on government/party support is even more evident in Canadian popularity studies than elsewhere.

There are really only four major studies of Canadian party or government popularity worth noting. Of these studies, one found no economic effects for the PC or Liberal party between 1954 and 1979;<sup>30</sup> another found no economic effects for either party between 1974 and 1979;<sup>31</sup> and a third found economic effects for the party in government between 1974 and 1993 but not after.<sup>32</sup> The economic effects determined by this last study include the seemingly

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<sup>29</sup> (Donald Green, Alan Gerber, and Suzanna De Boef, "Tracking Opinion over Time: A Sampling Method for Reducing Sampling Error," *Public Opinion Quarterly* 63 (1999).) and (Nathaniel Beck, "Estimating Dynamic Models Using Kalman Filtering," *Political Analysis* 1 (1990).)

<sup>30</sup> Monroe and Erickson, "The Economy and Political Support: The Canadian Case."

<sup>31</sup> Clarke and Zuk, "The Politics of Party Popularity: Canada 1974-1979."

<sup>32</sup> Johnston, "Business Cycles, Political Cycles and the Popularity of Canadian Governments, 1974-1998."

perverse finding that rising inflation helped the party in government. The fourth study worth noting found varying economic effects for the NDP opposition between 1954 and 1984.<sup>33</sup> All of these studies control for various specific political events, such as the FLQ crisis, leadership conventions, and elections. Only one attempts to address the issue of nonstationarity by using a Box-Jenkins-Tiao models of party popularity similar to that of Whiteley.<sup>34</sup>

#### **4.0 Building an Economic Popularity Model**

When building economic popularity models, there are at least three dimensions to consider. These are time, target, and orientation.<sup>35</sup> Time refers to retrospective versus prospective economic considerations; target refers to the distinction between egocentric and sociotropic economic considerations; and orientation refers to whether the impact of economic conditions is incumbent oriented or party oriented. These dimensions have been a source of important debate and must be addressed before any economic popularity model can be considered.

##### **4.1 Time, Target and Orientation**

The first of these debates (retrospective versus prospective considerations) stems from the difference between Key's and Downs' views of voters. Key depicts them as rational gods, looking back at the past performance of the incumbent, and punishing or rewarding them accordingly.<sup>36</sup> Downs' depiction is also of a rational being but one that looks to the future, carefully calculating the gains and losses likely to occur with each potential government, and voting to maximise the outcome.<sup>37</sup> In this way, Key's voters are retrospective and Downs' are prospective. Traditionally, retrospective evaluations have been considered likely to be more important than prospective evaluations. Given the general lack of political or economic sophistication within the electorate, it was thought that it was more likely that voters engaged in the easier task of evaluating the past and present performance of the economy under the current government rather than the more difficult task of assessing the likely future performance of the economy under alternative governments.

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<sup>33</sup> Erickson, "Ccf-Ndp Popularity and the Economy."

<sup>34</sup> Clarke and Zuk, "The Politics of Party Popularity: Canada 1974-1979."

<sup>35</sup> The first two dimensions are identified by Lewis-Beck and Stegmaier. They also identify a third dimension which is different from that discussed here. Their third item is context. (Lewis-Beck and Stegmaier, "Economic Determinants of Electoral Outcomes.")

<sup>36</sup> Key, *Politics, Parties, and Pressure Groups*.

<sup>37</sup> Anthony Downs, *An Economic Theory of Democracy* (New York,: Harper, 1957).

This traditionally held view has been challenged by those such as Michael MacKuen, Robert Erikson and James Stimson who argue that voters are more like sophisticated forward-looking bankers than self-interested peasants.<sup>38</sup> This has been argued to be particularly true in information rich, developed countries.<sup>39</sup> However, Norpoth convincingly demonstrates that retrospective economic evaluations are more important than prospective evaluations in US presidential popularity.<sup>40</sup> He does note though that this may in part be a consequence of the way in which presidential popularity is measured through approval rather than vote intention questions. The former is more susceptible to influence by retrospective considerations than the latter. Where vote intention questions are used to measure popularity (such as in Canada) prospective evaluations may play a greater role. Even if this is true though, Norpoth demonstrates that prospective evaluations themselves are largely a reflection of past and current economic conditions.<sup>41</sup> This suggests that using retrospective measures in popularity models does not completely restrict voters to retrospective considerations. This is consistent with the arguments made by Downs and many others that voters use past economic conditions in a prospective way.<sup>42</sup> Voters use the past performance of the economy under a particular party to predict how the economy will perform under the same party in the future. It is for these reasons and the fact that there are few monthly measures of prospective economic considerations at the aggregate level and that electoral accountability (the focus of this study) is primarily a retrospective exercise that retrospective economic conditions are used in this study.

The second debate (egocentric versus sociotropic considerations) is over whether voters take into account their own personal financial situation (egocentric considerations) and/or the financial situation of the economy as a whole (sociotropic considerations) when making a vote choice. As noted, there are important differences between voting and popularity studies. However, the literature from voting studies can be very useful when building popularity models. In particular, the individual level, cross-sectional literature provides important insights into the debate regarding egocentric versus sociotropic economic considerations. In his examination of

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<sup>38</sup> Michael B. MacKuen, Robert S. Erikson, and James A. Stimson, "Peasants or Bankers? The American Electorate and the Us Economy," *American Political Science Review* 86 (1992).

<sup>39</sup> Jeffrey E. Cohen, "Economic Perceptions and Executive Approval in Comparative Prospective," *Political Behavior* 26, no. 1 (2004).

<sup>40</sup> Helmut Norpoth, "Presidents and the Prospective Voter," *The Journal of Politics* 58, no. 3 (1996).

<sup>41</sup> Ibid.

<sup>42</sup> For a good example see: Henry Chappell, Jr and William Keech, "A New View of Political Accountability for Economic Performance," *The American Political Science Review* 79, no. 1 (1985).

presidential and congressional elections between 1956 and 1980, Kiewiet finds larger effects for national economic conditions than personal economic conditions.<sup>43</sup> Similarly, Donald Kinder and Roderick Kiewiet demonstrate that sociotropic economic considerations affect congressional voting, presidential voting and party ID, while egocentric considerations have virtually no affect.<sup>44</sup> They also make the important point that sociotropic economic evaluations are not simply a proxy for personal economic problems. In the US and Britain, there is actually very little connection between the two.<sup>45</sup>

Since these studies, it has been generally accepted that sociotropic considerations are much stronger and override any personal (egocentric) considerations. According to Lewis-Beck and Stegmaier's overview of the literature, most individual level studies find "strong collective effects and weak to nonexistent personal economic effects."<sup>46</sup> Richard Brody makes the distinction between these considerations by arguing that voters are more *spectators* than *participants* in the economy when making their vote decision.<sup>47</sup> He argues that this is because personal economic problems are considered just that – personal. The role of the government in the economy is unlikely to be linked to them. Consequently, personal economic problems are unlikely to become politicised. Meanwhile, information regarding national economic considerations is received through the media. This information tends to come pre-politicised. Often economic information provided by the media is already linked to government activities.

Beyond the general acceptance that sociotropic considerations are more prevalent than egocentric considerations, in studies of electoral accountability it is sociotropic and not personal economic considerations that are theorised to drive government support. Furthermore, this study utilises popularity models and these models by their aggregate nature are designed to estimate the impact of sociotropic considerations. For all these reasons, it is the impact of sociotropic economic considerations that are modelled in this study.

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<sup>43</sup> D. Roderick Kiewiet, *Macroeconomics and Micropolitics* (Chicago: The University Of Chicago Press, 1983).

<sup>44</sup> Donald R. Kinder and D. Roderick Kiewiet, "Sociotropic Politics: The American Case," *British Journal of Political Science* 11, no. 2 (1981).

<sup>45</sup> Ibid. and James E. Alt, *The Politics of Economic Decline* (Cambridge: Cambridge University Press, 1978).

<sup>46</sup> Lewis-Beck and Stegmaier, "Economic Determinants of Electoral Outcomes." However, Haller and Norpoth show that personal financial experiences have a greater impact on broader economic judgments for people sheltered from mainstream news information. Haller and Norpoth, "Reality Bites: News Exposure and Economic Opinion," 570.

<sup>47</sup> Richard Brody, *Assessing the President: The Media, Elite Opinion, and Public Support* (Stanford, California: Stanford University Press, 1991).

The third debate (incumbent versus party oriented effects) hinges on two different ways in which a voter may translate economic conditions into a vote preference. One possibility is that when the economy is doing well, the electorate is more likely to support the incumbent government. Conversely, when the economy is doing poorly (whether in terms of inflation , GDP, unemployment or otherwise) the electorate is less likely to support the incumbent government. This outcome is based on a *reward-punishment hypothesis* and would be an incumbent oriented effect.<sup>48</sup> This is the purest form of the electoral accountability principle as stated by Key.

Alternatively, economic effects may be party oriented. This outcome is based on a *differential partisan capability hypothesis* and there are two possible variations.<sup>49</sup> The first is based on a *clientele hypothesis*. When the economy is doing poorly in some regard (for example, high unemployment) there may be a particular party that is viewed as best able to handle this particular economic problem. In this case, the electorate would be more likely to support that party regardless of whether it is the incumbent or not.<sup>50</sup> The second variation is based on a *salient goal hypothesis*. Again, a particular party may be viewed as best able to handle a particular economic problem. However instead of being rewarded whenever this economic issue arises as a problem, this is the issue for which that party is most held accountable. Consequently, if the party is in government when the economic issue they are believed to be best able to handle becomes a problem, they will be punished. Moreover, they will be punished much more harshly than any other party which is not believed to have any particular skill at dealing with the specific economic problem would have been.<sup>51</sup> Both of these outcomes are party oriented effects.

Based on the considerations of this third debate, this study models the impact of economic conditions on government support using party popularity models, rather than government popularity models. Government popularity models model the impact of economic conditions on the popularity of the party in government regardless of what that party is. Party popularity models model the impact of economic conditions on each party separately regardless of whether or not they are in government or opposition. If voters respond to economic conditions

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<sup>48</sup> Sanders, "The Real Economy and the Perceived Economy in Popularity Functions: How Much Do Voters Need to Know? A Study of British Data, 1974-97."

<sup>49</sup>Fredrik Carlsen, "Unemployment, Inflation and Government Popularity - Are There Partisan Effects?," *Electoral Studies* 19 (2000).

<sup>50</sup> Ibid.

<sup>51</sup> Ibid.

in a party oriented rather than an incumbent oriented way then the impact of economic conditions on one party in government will differ (possibly have a completely different direction of impact) from the other. This is argued to be the case even in the two-party system in the US.<sup>52</sup> In Canada, where it has been argued that the Liberal party has ‘owned’ a number of economic issues, the potential for such party oriented effects is substantial.<sup>53</sup> Furthermore, in a party system where the two major parties do not completely dominate and where support for different third parties rises and falls significantly, the popularity of one major party will not be a mirror reflection of the other. For these reasons, it is necessary to model the popularity of each major party separately – in this case, the popularity of the Liberal and Progressive Conservative parties.

#### **4.2 Addressing Nonstationary in Government and Party Popularity**

The various aggregate popularity time-series used in this study cover the period from 1957 to early 2000. They were constructed from individual level survey data collected by the Canadian Institute of Public Opinion (CIPO or Gallup Canada). The CIPO surveys are the most consistent measure of Canadian government/party popularity publicly available. For more than 50 years Gallup has been asking Canadians: "If a federal election were held today, which party's candidate do you think you would favour?" Government popularity is defined as the percentage that indicate they would vote for the party in government. Party popularity is defined as the percentage that indicate they would vote for a particular party. (For the purposes of this study, the calculation is made excluding those that indicate they do not know for whom they would vote.) Since the early 1970s, Gallup has run surveys with a vote intention question at least monthly. Before this time, such survey results are available on a less consistent but still highly regular basis.

Figure 1 is a plot of Liberal and Conservative party popularity from 1957 to 2000. Many economic popularity studies use and focus on government popularity. This is done because the electoral accountability debate is ultimately about support for the governing party. As explained, I find it prudent to model the popularity of the Liberal and Conservative parties separately.

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<sup>52</sup> Brody, *Assessing the President: The Media, Elite Opinion, and Public Support*.

<sup>53</sup> Éric Bélanger, "Issue Ownership by Canadian Political Parties 1953-2001," *Canadian Journal of Political Science* 36, no. 3 (2003).



However when discussing the problems of past research, it is useful to also have a picture of government popularity in mind. This is presented in figure 2.<sup>54</sup>

When examining time-series data (such as government and party popularity) it is necessary to account for statistical challenges, such as autoregression and nonstationarity in the series. With the exception of those studies that use the Box-Jenkins approach, the studies conducted thus far fail to really consider the problem of nonstationarity. The best they do is attempt to control for nonstationarity produced by trending by using arbitrary time-count variables. They account for first-order autoregression through methods such as Cochrane-Orcutt or by including a lagged dependent variable. These methods can be effective but only to the extent that the time-series data is stationary (or at least, weak stationary). A time-series process  $(y_1, y_2, \dots, y_T)$  is said to be weak stationary if:

- 1)  $E(y_1) = E(y_2) = \dots = E(y_t) = \mu$  ;
- 2)  $Var(y_1) = Var(y_2) = \dots = Var(y_t) = \sigma^2$  ;
- 3)  $Cov(y_t, y_{t-1}) = Cov(y_t, y_{t-\tau}) = \gamma_\tau$  ;

where  $\mu$  and  $\sigma^2$  are the mean and variance of  $(y_1, y_2, \dots, y_T)$ .  $\gamma_\tau = Cov(y_t, y_{t-\tau})$  is called the autocovariance at lag  $\tau$ . Just as the autocovariances only depend on the lag, so do the

$$\text{autocorrelations } \rho(\tau) = \frac{\gamma_\tau}{\sigma^2} = \frac{\gamma_\tau}{\gamma_0}.$$

The first condition for weak stationarity will be violated if the mean of the time-series is correlated with time – that is, the series trends up or down. The second condition will be violated if the variances are correlated with time. This may occur if the underlying variance of the process and/or the variance in the measurement process itself changes over time. The third condition will be violated if the autocorrelations are correlated with time. This will occur in data that contains cycles.

The Canadian government popularity time-series is at times clearly subject to each of these violations. Examining figure 2, we see a general downward trend from around 1970 until 1993 when government popularity surges to near record heights. Furthermore, an inter-election cycle appears present from 1975 on, although the post-1993 cycle differs from that before it. Such trending and cyclicity are violations of the first and third conditions of weak stationarity.

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<sup>54</sup> Figure 2-2 uses Kalman filtered data, making the earlier period of the time-series easier to interpret by including interpolated values for the months in which no poll was reported. A. C. Harvey, *Time Series Models*, 2nd ed. (Cambridge, Mass.: MIT Press, 1993).

That the second condition of weak stationarity is violated is suggested by Johnston's observation that there appears to be three distinct time periods since World War II, in which the dynamics of government popularity are unique.<sup>55</sup> The earliest period extends back before the beginning of our time-series to the end of the War and ends during the mid-seventies (shortly after the 1974 election). The second period continues from the mid-seventies until the 1993 election and the most recent period picks up from there. Johnston describes the first period as exhibiting no special inter-election rhythm. In the second, he notes a consistent cycle. Each election is followed by a honeymoon period in which popularity increases. Subsequently, popularity drops below the level of the government's election return and bottoms out. Popularity then begins to recover as the government enters the next election. Underlying these cycles is a long downward trend. In the third period (after 1993), this downward trend ceases and government popularity surges up beyond the 50 percent level. According to Johnston, this level of popularity is largely sustained for the entire period except during election campaigns when popularity temporarily spikes downwards to produce a vote return within the forties.<sup>56</sup>

The second condition of weak stationarity is also likely violated by the fact that the measurement error component of our model's error term may be correlated with time. Since 1974, Gallup has regularly used sample sizes of just over 1000 respondents. Before that time, many of the Gallup poll results used much smaller sample sizes (although, sometimes much larger). Moreover, the fifties and sixties component of the time-series contains a number of missing values at the monthly level of measurement. This means more values in an analysis must be interpolated. These interpolated values will, of course, contain greater errors than those which were directly measured.<sup>57</sup> These circumstances could possibly produce greater variances in the earlier part of the time-series, compared to the later. A trend which runs counter to this but which may also produce complications is the increasing number of respondents since the early 1990s (except during election months) that indicate they do not know for whom they would vote. Since the measure is of decided voters, the increase in "don't know" respondents may produce greater variances in the latter part of the time-series, compared to the earlier.

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<sup>55</sup> Johnston, "Business Cycles, Political Cycles and the Popularity of Canadian Governments, 1974-1998."

<sup>56</sup> Ibid.

<sup>57</sup> Aggregating the data to a quarterly level does not solve this problem. Quarterly measurements made later in the time-series will still be more accurate and have smaller variances than those earlier in the time-series.

A further complication with measurement error is that spikes in measurement accuracy occur around elections. This is produced by the combination of two phenomena. Leading into an election, there is an increase in the number of polls, while at the same time the number of undecided voters drops significantly. It is generally known that non-response rates are greater between elections than closer to them.<sup>58</sup> These non-response rates can be substantial, ranging from 25 to 30 percent between elections and dropping down to around 10 to 20 percent during elections. This has the potential to actually produce a cycling in the measurement accuracy and possibly even contribute to cycling in the popularity series, violating both the second and third conditions of weak stationarity.

My earlier work demonstrates that Canadian government and party popularity do exhibit each of these dynamics and do violate all three conditions of stationarity.<sup>59</sup> Furthermore, it is demonstrated that the popularity timeseries are fractionally integrated. A fully integrated public opinion process is one in which all shocks carry over from one period to next. The value of the time-series at any time  $t$  is equal to the sum of all previous shocks in addition to the current shock. A fully integrated process within party popularity may represent permanent shifts in baseline support. In a stationary process a shock to the time-series will decay over the following periods. The speed at which the shock decays depends upon the degree of memory in public opinion. Because all shocks decay, the value of the time-series tends towards some equilibrium value. A stationary process within party popularity may represent the temporary and decaying impact of events such as changes in economic conditions. A time-series process which contains both integrated and stationary components is called fractionally integrated.<sup>60</sup> Fractional integration is a lesser problem than straightforward nonstationarity but it is a complication that ought to be addressed.

Overall, the evidence suggests great potential for the violation of the stationarity assumption in time-series models of Canadian popularity data. The problem of non-stationarity produced by inter-election cycles and trending at least has not gone unnoticed and various solutions have been employed. As mentioned, the most advanced has been to use the Box-

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<sup>58</sup> Howard Rae Penniman and American Enterprise Institute for Public Policy Research., *Canada at the Polls, 1979 and 1980 : A Study of the General Elections, Aei Studies*. (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1981).

<sup>59</sup> Mark Pickup, "Economic Performance and Electoral Accountability: The Economy and Party Popularity in Canada, 1957-2000" (paper presented at the 2004 Canadian Political Science Association meeting, Winnipeg, 2004).

<sup>60</sup> Christopher Wlezien, "An Essay on 'Combined' Time Series Processes," *Electoral Studies* 19 (2000).

Jenkins approach. However, this solution to cycling and trending, is to eliminate them through differencing. While this can be a statistically acceptable procedure, it does not allow us to examine these components. In public opinion series, these components are not only statistical challenges they are also substantively interesting. Trending and cycling are very real dynamics within public opinion, with important political origins and consequences – simply eliminating them forfeits the possibility of understanding them. Therefore, the Box-Jenkins approach is inadequate if we wish to fully understand the dynamics of public opinion. Moreover if cycling is driven by the timing of elections (as it appears to be), it will not have a constant frequency. In which case, differencing the series will not eliminate the cycle and this nonstationary component will remain.

US and European studies will often control for the election cycle, by employing an arbitrary election cycle count variable and a length in office trending variable.<sup>61</sup> The difficulty with including an election count variable is that it is arbitrary. This is evident in the wide variety of count variables employed in different studies.<sup>62</sup> Samuel Kernell argues that such variables do nothing but measure time and are inappropriately used in such models.<sup>63</sup> Moreover, these counts usually only take into account the election period and do not account for the potential cyclicity of the data during times far from an election. As we shall see, this can be misleading.

None of these methods are able to control for variances in measurement error. Nor do they account for the problem that popularity is likely a fractionally integrated process. So, what is the solution to nonstationarity? In order to truly understand the dynamics of public opinion, it is necessary to model explicitly the various components of which it comprises. In addition to the cycling and trending components, it is necessary to separately model shifts in baseline support (e.g., those produced by political events) and shocks/deviations (e.g., those produced by changing economic conditions) with decaying effects. At the same time, this has to be done in a way that accounts for the non-stationarity in the measurement error component of the popularity time-series and the changing dynamics of popularity overtime.

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<sup>61</sup> Michael Lewis-Beck, *Economics and Elections* (Ann Arbor: University of Michigan Press, 1988).

<sup>62</sup> Ibid.

<sup>63</sup> Samuel Kernell, "Explaining Presidential Popularity. How Ad Hoc Theorising, Misplaced Emphasis, and Insufficient Care in Measuring One's Variables Refuted Common Sense and Led Conventional Wisdom Down the Path of Anomalies," *The American Political Science Review* 72, no. 2 (1978).

## 5.0 The State-Space Party Popularity Model

This study suggests an inductive approach, which provides a great deal of flexibility in modelling different types of effects. It is also a structural approach in that it builds models which explicitly include components representing the various dynamics of public opinion. The basis of the methodological option proposed is to express the time-series model in state-space form and include shocks, cycling, trending, baseline shifts and measurement error components. The proposed state-space model for Liberal party popularity is as outlined below. This equation is for the Liberal party only and for illustrative purposes it is the one described below. It is important to keep in mind though that an equivalent equation was used for the PC party. As will become evident, the dynamics for each party can be quite distinct from each other.

### Liberal Popularity State-Space Equation

$$LIBVOTE_t = \alpha_t + B_t + cyc_t + v_t$$

$$\alpha_t = \rho\alpha_{t-1} + \gamma_1 LIB_t + \gamma_2 PC_t + \varepsilon_t^\alpha$$

$$B_t = \beta_1 LIB_t + \beta_2 PC_t + \tau_1 libtrend_t + \tau_2 pctrend_t + \varepsilon_t^B$$

$$cyc_t = \Theta_1 \sin(\lambda\theta) LIB_t + \Theta_2 \cos(\lambda\theta) LIB_t + \Theta_3 \sin(\lambda\theta) PC_t + \Theta_4 \cos(\lambda\theta) PC_t + \varepsilon_t^{cyc}$$

where

- $t = 1, \dots, T$  at monthly increments;
- $\varepsilon_t^\alpha \sim (0, \sigma_{\varepsilon_t^\alpha}^2)$ ,  $\varepsilon_t^B \sim (0, \sigma_{\varepsilon_t^B}^2)$ ,  $\varepsilon_t^{cyc} \sim (0, \sigma_{\varepsilon_t^{cyc}}^2)$ ,  $v_t \sim (0, \sigma_{v_t}^2)$  and  $COV(\varepsilon_t, v_t) = 0$
- $\sigma_{v_t}$  is the standard deviation of the estimated sampling error calculated as  $\sqrt{p_t(1-p_t)/N_t}$ , where  $p_t$  is the proportion of valid respondents supporting the government at time =  $t$  and  $N_t$  is the sample size. The sample size is calculated as the number of decided voters polled in each survey. If more than one poll was performed in any given month, the individual responses were combined and overall aggregate popularity values were calculated. The sample sizes in these cases would be the total number of decided voters obtained from combining the polls.<sup>64</sup>
- $\lambda$  is the frequency (1/wavelength) of the popularity cycle and is defined by the length of the inter-election period, varying from one election to the next
- $\gamma_1, \gamma_2, \beta_1, \beta_2, \tau_1, \tau_2, \Theta_1, \Theta_2, \Theta_3$  and  $\Theta_4$  are parameters to be estimated.

<sup>64</sup> Including the separate measurement error term ( $v_t$ ) is closely related to Nathaniel Beck's use of the Kalman filter to estimate presidential popularity. Beck, "Estimating Dynamic Models Using Kalman Filtering."

- *PC* and *LIB* are dummy variables. *PC* is 1 when the Conservatives are in government and 0 otherwise. *LIB* is 1 when the Liberals are in government and 0 otherwise. The *PC* and *LIB* dummy variables allow for the dynamics of Liberal popularity to depend on whether the PCs or Liberals are in government – that is, whether the Liberals are in government or opposition.<sup>65</sup>

In the state-space model, empirical values of party popularity (*LIBVOTE*) are considered the sum of structural elements  $B_t$ ,  $cyc_t$ , and  $\alpha$  and measurement error  $v_t$ .  $LIBVOTE_t$  is the time series that we observe and therefore the equation describing it (first line of the Liberal popularity state-space model) is called the *observation equation*. The sum of the three structural components (second, third and fourth lines of the Liberal popularity state-space model) represents the state of the system, or more precisely the state of Liberal party popularity. These components cannot be directly observed but in order to understand the dynamics of popularity we need to infer their behaviour. We can estimate the precision of each observation within the  $LIBVOTE_t$  time series. This precision is the inverse of the variance of the measurement error term. Given the precision of each observation and given the hypothesised structure of the structural components, Bayesian methods can be used to estimate the parameters of the structural components, such that they maximise the likelihood of each observation being made. Because the model contains a memory component and because a Bayesian approach is being taken, the estimation also maximises the likelihood of each observation being made given all other observations that were made – that is, the estimation of the state of popularity at a particular time  $t$  takes into account the estimated state of popularity at all other time points, giving greatest weight to those time points closest to  $t$ . This can be done because we know that Liberal party popularity in a given month is not independent of Liberal party popularity in the months immediately preceding it. This is particularly useful for those months in which surveys contain few valid respondents or no survey at all was conducted and popularity has to be interpolated.<sup>66</sup> Once the parameters of the structural components are estimated, the behaviour of the various dynamics of popularity can be understood.

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<sup>65</sup> Both Liberal and PC can appear together because there is no constant in the  $\alpha$  component.

<sup>66</sup> Simon Jackman, "Estimation and Inference Via Bayesian Simulation: An Introduction to Markov Chain Monte Carlo," *American Journal of Political Science* 44 (2000). Missing values are handled by using interpolation and then assigning large standard errors to the interpolated value. Within the Bayesian framework, this allows the surrounding time points which have more certain measurements to be used to fill in for the missing data.

Each of the structural components represent different dynamics. The  $cyc_t$  component explicitly accounts for any inter-election cycling that may exist within the Liberal popularity series. Estimated parameters  $\Theta_1$  and  $\Theta_2$  can be used to calculate the cycle amplitude =  $\sqrt{\Theta_1^2 + \Theta_2^2}$  and phase =  $\cos^{-1}(\frac{\Theta_1}{\text{amplitude}})$  for the Liberals when they are in government. Parameters  $\Theta_3$  and  $\Theta_4$  can be used to calculate the cycle amplitude and phase for the Liberals when they are in opposition. The component  $\alpha$  captures the effects of variables (presently unmeasured) not related to baseline shifts or cycling. These effects would produce deviations (shocks) in popularity from its baseline. The  $\rho$  term represents and controls for the first order autoregression [AR (1)] within party popularity and determines the length of time an event which produces a deviation from baseline and modelled through the  $\alpha$  component continues to have an effect on popularity. The fading impact of these events describes a stationary process. Ultimately, it is through the  $\alpha$  component that economic conditions will enter into the state-space model. Economic effects are modelled this way because they are expected to have long-term effects which are cumulative but not permanent. In other words, the electorate responds to the state of the economy over the long-term but a party is not punished or rewarded for the state of the economy in any given month forever after.

$B_t$  is a measure of base-line support for the party excluding cycling. Political variables producing shifts in base-line support will eventually enter through this term. This component includes two constants ( $\beta_1$  and  $\beta_2$ ). The first relates to the popularity of the Liberals in government and the second to the popularity of the Liberals in opposition. The magnitude of these constants reflects the underlying support with which the Liberals begin their term in government or opposition. The dynamics modelled by the  $B_t$  component can be designed to contain memory or not. If they are designed to contain memory, they are modelled as an integrated process. Such dynamics would represent an immediate shift in popularity in response to the occurrence of some political event. This shift remains for the duration of the event or forever after. In other words, the impact of the event becomes fully integrated. This is generally the type of effect that political events such as national crises are expected to have on popularity. Popularity responds immediately to the crisis and that response is sustained for the duration of the event but once it is over, popularity almost immediately returns to previous levels.

The proposed method of separately modelling integrated and stationary processes is an alternative solution to the problem of fractional integration within the popularity time-series than those suggested by Christopher Wlezien or Janet Box-Steffensmeier & Andrew Tomlinson.<sup>67</sup> It needs to be noted that if fully integrated processes contained in the popularity series are not explicitly modelled in the  $B_t$  component, they are likely to be captured by the residuals of the  $\alpha$  component. This is because while the  $B_t$  component can be used to model fully integrated political dynamics, this is done through the way in which the political variables are constructed. The component itself is not fully integrated. It contains no memory term whatsoever. Therefore, the  $\alpha$  component may remain somewhat fractionally integrated if all integrated processes are not explicitly modelled.

The impact of two different forms of trending can be calculated by the  $\gamma$  and  $\tau$  terms.  $\tau_1$  and  $\tau_2$  measure long-term trending in the government popularity series, depending upon whether the Liberals are in government or opposition. The trend is modelled simply as a linear increase or decrease in popularity. The trend would generally be expected to be negative for the Liberals in government. This is based on the idea that a government is formed through a coalition of interests. The longer a party is in power, the harder it becomes to hold this coalition together.

Parameters  $\gamma_1$  and  $\gamma_2$  measure memory-based, short-term trending for the Liberals in government and opposition. The  $\gamma_1$  parameter captures trending for the Liberals in government. It is theoretically based on the notion that a party may gain or lose popularity by virtue of the fact that it is in government. On one hand, the party in government may be unable to avoid decisions that are inherently unpopular. On the other hand, it may have the resources to implement popular programs, which the other parties do not have. This trending component assumes that the impact of these actions produces a shift in popularity only so long as they are remembered. This memory is measure by  $\rho$ . Unlike the long-term trending, short-term trending is not ever-increasing or decreasing. Eventually, the shift in popularity produced by recent actions will be offset by the diminishing impact of past actions, as they are forgotten. The total drift that would occur in a party's popularity due to these actions if they were to remain in government

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<sup>67</sup> (Janet Box-Steffensmeier and Andrew Tomlinson, "Fractional Integration Methods in Political Science," *Electoral Studies* 19 (2000), Wlezien, "An Essay on 'Combined' Time Series Processes.")



indefinitely is calculated as  $\gamma_1 / (1 - \rho)$ . This value is the equilibrium level for the short-term trend – the total increase or decrease in popularity produced by the short-term trend when the Liberals are in government.  $\gamma_2$  is the equivalent trend for the Liberals in opposition.

The sum of  $B_t$ ,  $cyc_t$  and  $\alpha$  (the state of Liberal party popularity) represents “filtered” values of Liberal party popularity, in that they exclude  $v_t$ , the “noise” produced by survey measurement error.<sup>68</sup> Including the measurement error term and estimating its standard deviation based on the number of valid respondents each month allows us to explicitly account for the variations in measurement accuracy produced by fluctuating sample sizes, previously described – that is, increased accuracy over time with rising numbers of polls, decreased accuracy over time with increasing numbers of undecided voters, spikes in accuracy near and during election months and cycling accuracy between elections.

Finally, in order to account for the potential of three distinct government popularity periods, the time-series models for both the Liberal and PC parties are estimated separately for each of the three periods suggested by Johnston - 1957 to 1975, 1979 to 1993 and 1993 to 2000. The model for the second period has to start in 1979. This is a consequence of including the memory-based, short-term trending term. It requires that the time-series begin the month after an election and the first election to follow the one held in 1974 occurred in 1979.

Before considering the economic and political event variables to be included in the party popularity models, it is useful to estimate the state-space model as it is presented above to get a sense of the extent to which the proposed components capture the dynamics of party popularity. Figures 3 & 4 plot the predicted popularity of the PC and Liberal parties based on the deterministic parts of the estimated party popularity models – that is, the cycling, trending, and baseline components. As can be seen, many of the largest movement in party popularity are predicted by these components. However, there is clearly still a great deal of residual movement to be explained. Part of this movement will of course be measurement error but a great deal of it can be attributed to economic conditions and political events not explicitly included in the model so far.

An approximation of the degree of movement that may be explained by such factors can be obtained by comparing the residual movement not explained by the cycling, trending and

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<sup>68</sup> Harvey, *Time Series Models*.

baseline components and that which cannot be attributed to measurement error to the total variance of the original popularity time-series. These values are presented in Table 1. For the Liberal party, the percentage of the total variance that remains to be explained is 52, 62 and 47 for the first, second and third periods respectively. For the PC party, it is 19, 26 and 55 percent. It is within this remaining movement that we expect to find the impact of economic conditions.

Specifically, it is within the residual movement of the PC and Liberal party popularity  $\alpha$  components that we expect to find the impact of economic conditions. This residual movement is plotted in figure 5. Notice these plots have the appearance of residuals from stationary processes, in that they appear to describe white noise processes. That the residuals are a white noise process can be confirmed by applying the Q-test to them. The results of these tests are presented in figure 6 along with the autocorrelation (AC) & partial autocorrelation (PAC) functions for the  $\alpha$  component residuals. The null hypothesis is that the residuals are white noise. We are unable to reject the null for the models from any of the three periods. Based on this evidence, the  $\alpha$  is a stationary process, meaning that the nonstationarity in the popularity time-series, produced by political contextual variables and correlated measurement error, has been removed and so it is appropriate to model the impact of economic conditions through it. This is the first time that the statistical problems posed by the inter-election cycle or measurement errors correlating with time has been adequately addressed. Furthermore, this approach provides one of the most sophisticated methods to date to account for the fact that popularity contains both stationary and integrated processes.<sup>69</sup>

## 5.1 Economic Variables and the $\alpha$ Component

The economic variables examined in this study are the three most commonly used and are generally found to have the greatest impact on public opinion. These are inflation, changes in real per capita GDP (change in real income or 'economic growth') and unemployment levels.

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<sup>69</sup> As indicated, it is through the  $\alpha$  components which have had the inter-election cycles removed that the impact of economic conditions will be estimated. Consequently, it would be fair to ask whether the inter-election cycle was itself not in part a product of economic forces. This may be true and would be consistent with a political business cycle hypothesis. Because the cycle is explicitly modelled by the state-space approach, this hypothesis can be explored. This highlights just how powerful the state-space approach can be. Even if the Box-Jenkins approach could contend with a cycle with an uneven frequency, it would control for it by simply eliminating it. In which case, there would be no hope of understanding what drives the cycle. The exploration of the estimated cycle is a task to be carried out another day. For now, the stage has been set to consider the impact of economic conditions on party popularity through the  $\alpha$  component.

Inflation is the year-over-year change in the consumer price index, GDP is year-over-year percentage change in real personal income per capita and unemployment is the monthly percentage, seasonally adjusted. Changes in real per capita GDP and levels of unemployment were only measured quarterly up until 1976. After 1976 they were measured monthly, as was inflation throughout the 1957-2000 period. This in part determined the endpoint for the first period. Having a single economic indicator measured on two different timescales would have complicated things more than was necessary. As it is, the fact that the first period contains quarterly economic measurements, while the second and third only contain monthly measurements, may result in weaker estimated economic effects for the former.

In the model of the impact of economic conditions, an interaction term between changes in real GDP and inflation is included. This is done for theoretical reasons. It is quite possible that in the minds of the electorate, the gains or losses in popularity produced by changes in real income are mediated by the degree of concurrent inflation. For example, when inflation is high the popularity gains to be made by a party in government from economic growth may not be as great as when inflation is more moderate. It is important to note that this interaction does not represent a real economic interaction between changes in real GDP and inflation. The interaction is hypothesised to be purely within the opinions of the electorate. If this were an economic rather than a public opinion model, the structure would certainly be different.

Many economic popularity models include economic variables with a one-month lag. This is one of the most popularly employed lag structures. The lag structure simply refers to the lag at which each economic variable enters into the model. It is a choice based upon theoretical considerations but is rarely empirically substantiated. Despite the popularity of the one-month lag, analysts such as Paul Whiteley have argued that a systematic approach is required to determine the appropriate lag-structure. The Box-Jenkins approach is a well tested method for doing just this for ARIMA models.<sup>70</sup> This approach is adapted here for the state-space model.

The first step in the Box-Jenkins approach is to determine the univariate model for all time series. In this case that would be for the party popularity and economic variables. If nonstationarity is evident then the series is differenced appropriately. This strategy is appropriate for the economic variables but cannot be applied to the party popularity time series. As noted before, if nonstationarity is in part produced by cycling with an inconsistent frequency (based on

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<sup>70</sup> Richard McCleary et al., *Applied Time Series Analysis for the Social Sciences* (London: Sage Publications, 1980).

the timing of elections), differencing the series will not correct the problem. Fortunately, the state-space approach allows us to extract the stationary component of party popularity in which we expect to find the effects of economic conditions. This is the  $\alpha_t$  component. It is this component that we utilise rather than the differenced popularity series usually used in the Box-Jenkins approach. This is the first way in which the model construction method used here differs from the traditional Box-Jenkins approach. Once the transfer function is determined for each stationary economic series, it can be inverted and applied to both the economic series and the  $\alpha_t$  component of the party popularity series. The resulting series are referred to as prewhitened. The cross-correlation function between each prewhitened series (economic and popularity) is calculated in order to identify potential lags at which each economic series should enter the popularity model. These potential lags are tested by including them in the appropriate state-space popularity model. A degree of trial and error is required here.

Having identified the appropriate lag structure, the model is estimated and the resulting residuals are examined. If the residuals are not white noise, an appropriate model for the noise component may be identified. If this is necessary, the model is reestimated and the residuals are examined again. The method employed here deviates from the Box-Jenkins approach in a second way. Once the Box-Jenkins models have been identified, they are compared against models including economic models with a simple one-month lag. Then the statistically significant elements of the one-month lag models are combined with those from the Box-Jenkins models. The state-space models are reestimated and the results are compared to determine the optimal model. Once the appropriate models have been identified, the model residuals can be cross-correlated with the prewhitened economic variables to identify any lagged relationships which might have been missed.

## **5.2 Political Event Variables and the B Component**

The influence of economic conditions on party popularity does not occur in a political vacuum. Cross-national studies have found that economic effects are unstable in some countries and some time periods.<sup>71</sup> It has been argued that this is because contextual factors can affect the

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<sup>71</sup> Christopher Anderson, "Economic Voting and Political Context: A Comparative Perspective," *Electoral Studies* 19 (2000), Norpoth, "The Economy," 301.

relationship between economic performance and vote decision.<sup>72</sup> For the purposes of this study, it is important to consider those contextual factors that may impact party popularity and alter the logic of economic popularity within each period. Surveying the relevant literature, it would seem that any model measuring changes in party popularity over time should include variables that can measure and control for the impact of election campaigns and party leadership effects. Other political variables, such as the impact of unique political events, should also be tested. Moreover, the varying impact of economic conditions under minority versus majority governments ought also be considered. These things are done in this study.

### 5.2.1 Election Campaigns

It has been noted elsewhere that government popularity deviates from the inter-election cycle during election campaigns.<sup>73</sup> Incumbent governments have increasingly experienced downward turns in their popularity during the campaign period. The media is the likely source of this phenomenon. Johnston has argued that trends within party popularity during election campaigns can be tied to media effects.<sup>74</sup> John Zaller, with his "receive, accept and sample" theory of mass opinion formation describes a process by which information, such as that provided by the media, can influence public opinion.<sup>75</sup> Thomas Patterson and John Zaller have both noted an increase over time in the negativity of the media toward politicians during election campaigns.<sup>76</sup> Zaller attributes this to "the escalating struggle between politicians and journalists to control the content of political communication."<sup>77</sup> If these things are true – events within the media can affect public opinion during election campaigns, and media coverage of politicians has become increasingly negative – we have a potential explanation for the increasingly consistent downward trend in government popularity during elections.

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<sup>72</sup> Anderson, "Economic Voting and Political Context: A Comparative Perspective.", Paldam, "How Robust Is the Vote Function?: A Study of Seventeen Nations over Four Decades.", G. Bingham Powell, Jr. and Guy D. Whitten, "A Cross-National Analysis of Economic Voting: Taking Account of the Political Context," *American Journal of Political Science* 37, no. 2 (1993). Powell and Whitten, 1993 (see Lewis-Beck, 209).

<sup>73</sup> Monroe and Erickson control for months in which elections occur in their longitudinal analysis of party support, for this very reason. Monroe and Erickson, "The Economy and Political Support: The Canadian Case."

<sup>74</sup> Richard Johnston, *Letting the People Decide: Dynamics of a Canadian Election* (Montreal: McGill-Queen's University Press, 1992).

<sup>75</sup> John Zaller, "The Rule of Product Substitution in Presidential Campaign News," in *Election Studies: What's Their Use?*, ed. Elihu Katz and Yael Warshel (Colorado: Westview Press, 2001).

<sup>76</sup> Thomas Patterson, *Out of Order* (New York: Knopf, 1993), Zaller, "The Rule of Product Substitution in Presidential Campaign News."

<sup>77</sup> Zaller, "The Rule of Product Substitution in Presidential Campaign News."

The negative impact that elections have on incumbent government popularity is clearly evident in figure 2 for the 1993, 1997 and 2000 elections. By examining the popularity data for the eight weeks leading into each election since 1965 (figure 7), we see these election campaigns produce a drop of approximately 14 percent and that such a drop has often occurred.<sup>78</sup> In fact, only two of the eleven elections held since 1965 did not witness a downturn in popularity for the incumbent government – Prime Minister Charles Joseph Clark's minority government leading into the 1980 election and Prime Minister Pierre Elliott Trudeau's minority government leading into the 1974 election. The ability of the Liberal government in 1974 to produce favourable media coverage, despite a potentially hostile press, has been attributed to their campaign strategy.<sup>79</sup> The net loss of popularity for the incumbent government in the remaining elections ranged from 3 percent during the 1968 and 1988 elections to 20 percent during the 1984 election. Elections are generally negative events for the incumbent government, and have become much more so in recent years.

In order to test the theory that elections increasingly produce a negative shock for the incumbent government's popularity, both Liberal election and Progressive Conservative election dummy variables were added to the economic popularity models. The Liberal election variable takes on a value of 1 for any month in which an election is held and the Liberals are the incumbent government. The PC election variable does the same for any month in which an election is held and the PCs are the incumbent government.

### **5.2.2 Leadership Effects**

Those who have attempted to model the impact of economic conditions on party popularity and electoral outcomes have argued for the inclusion of a variety of variables controlling for potential leadership effects. Nadeau and Blais include a "party leader from Quebec" variable in their model of election outcomes in Canada.<sup>80</sup> They note that past research has demonstrated a substantial boost in popularity for the Liberal party when the party leader comes from Quebec.<sup>81</sup>

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<sup>78</sup> Johnston shows this to have also been true during the 1957, 1962 and 1963 elections. Richard Johnston, "Capturing Campaigns in National Election Studies," in *Election Studies: What's Their Use?*, ed. Elihu Katz and Yael Warshel (Boulder, Colorado: Westview Press, 2001).

<sup>79</sup> Fletcher, "The Mass Media in the 1974 Canadian Election," 243-88.

<sup>80</sup> Richard Nadeau and Andre Blais, "Explaining Election Outcomes in Canada: Economy and Politics," *Canadian Journal of Political Science* 26, no. 4 (1993).

<sup>81</sup> Vincent Lemieux and Jean Crete, "Quebec," in *Canada at the Polls, 1979 and 1980*, ed. H.R. Penniman (Washington: American Enterprise Institute, 1981).

Their own analysis demonstrates that the transition from a Quebec Liberal leader and non-Quebec PC leader to a non-Quebec Liberal leader and a Quebec PC leader in 1984 precipitated a substantial loss for the Liberals.<sup>82</sup>

Monroe and Erickson suggest that support will rally around the party in government, regardless of economic conditions, during the six months following a change of Prime Minister or a change in government.<sup>83</sup> The six months following a change in government is the equivalent of a honeymoon effect and as shall become apparent is already accounted for by the cycling component. A change in Prime Minister not related to a change in government is not accounted for and should be examined. In fact, the effect of a change in leadership of any party – governing or not – should be considered.

Richard Johnston argues that shifts in popularity due to changes in leadership are less about the actual change and more about the increased media coverage produced by the leadership convention.<sup>84</sup> He cites evidence from the US which demonstrates that presidential leadership conventions increase the volume of media coverage of a party and makes the tone more positive.<sup>85</sup> Accordingly, Johnston recommends controlling for the period during which a leadership convention is held, rather than the period following a change in leadership.

These three potential leadership effects were tested using various dummy variables. The "Leader from Quebec" variable simply takes on a value of 1 when the leader of the party is from Quebec and 0 otherwise. The "New Leader" variable is coded as 1 for the six months following the selection of a new party leader and 0 otherwise.<sup>86</sup> The "Leadership Convention" variable is coded as 1 for the months following the resignation of the party leader and preceding the selection of a new leader at a leadership convention.<sup>87</sup>

### 5.2.3 "Rally around the Flag" Events

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<sup>82</sup> Nadeau and Blais, "Explaining Election Outcomes in Canada: Economy and Politics."

<sup>83</sup> Monroe and Erickson, "The Economy and Political Support: The Canadian Case."

<sup>84</sup> Johnston, "Business Cycles, Political Cycles and the Popularity of Canadian Governments, 1974-1998."

<sup>85</sup> Thomas M. Holbrook, *Do Campaigns Matter?, Contemporary American Politics* (Thousand Oaks: Sage Publications, 1996).

<sup>86</sup> This is the construction used by Monroe and Erickson. Monroe and Erickson, "The Economy and Political Support: The Canadian Case."

<sup>87</sup> This is the construction used by Johnston. Johnston, "Business Cycles, Political Cycles and the Popularity of Canadian Governments, 1974-1998."

Beyond regularly occurring political events, there have been individual political crises that may have had an impact on the dynamics of party popularity. It is commonly argued that US presidents receive a substantial boost in popularity during times of international crises.<sup>88</sup> This is referred to as a "rally around the flag" effect. British studies argue that a similar effect is responsible for the finding that the Falklands War dwarfed economic effects for a time.<sup>89</sup> Within Canada, the FLQ crises and the initial election of the PQ in Quebec are considered to be two of the most important political crises.<sup>90</sup> Rather than being international crises, these were domestic and constitutional. It seems reasonable that just as Americans may rally around their president when the nation is under threat from external forces during times of war, Canadians may rally around their government when their nation is under threat from internal forces during times of constitutional crises. This rally could, in theory, boost government popularity and/or override economic considerations.

Brody identifies the US presidential rally phenomenon as a media effect produced by a lack of elite dissent<sup>91</sup> – that is, certain international crises change the political incentives of opinion leaders. When information is low and the public mood tends towards patriotism, most of the government opposition elite will choose to remain silent or be vaguely supportive of the President. Media coverage consequently contains an unusual volume of bipartisan support. It is this unusually unbalanced media coverage that produces a public opinion rally.

If it is crises which cause opposition leaders to lose their usual incentive to criticise the government that produce rallies, it seems plausible that in Canada certain constitutional crises qualify – possibly more than many international crises for Canada. The FLQ crisis is an obvious candidate. To test and control for the impact of the FLQ crisis on party popularity, a media count variable was constructed based on the number of pages of the *Globe and Mail* per month that contained either "Front de Libération du Québec" or "FLQ." This variable is designed to measure the extent to which the FLQ crisis was being covered by the media each month and therefore could potentially influence public opinion. Using media counts is similar to how rally around the flag effects are operationalised in some US studies. The count was actually restricted to the 1970-1972 period in which mention of the FLQ would have definitely been about the crisis in

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<sup>88</sup> Brody, *Assessing the President: The Media, Elite Opinion, and Public Support*.

<sup>89</sup> For example Norpoth, 1987 (see Lewis-Beck 205).

<sup>90</sup> Monroe and Erickson, "The Economy and Political Support: The Canadian Case."

<sup>91</sup> Brody, *Assessing the President: The Media, Elite Opinion, and Public Support* 45-78.



Quebec. It is unnecessary to control for the impact of the initial election of the PQ in Quebec, as other Canadian studies do. This event occurred in 1976, which falls within the 76-79 gap between the first and second periods analysed.

Unlike economic effects, political context variables do not enter into the model through the  $\alpha$  component. Political events such as election campaigns, the FLQ crisis and changes in leadership are proposed to impact party popularity as immediate shifts in baseline support that last as long as the event. Hence, they enter the model through the B component, which is structured to model these types of effects. The state-space model including economic and political event variables appears as follows:

#### **Liberal Popularity State-Space Equation**

$$LIBVOTE_t = \alpha_t + B_t + cyc_t + v_t$$

$$\alpha_t = \rho\alpha_{t-1} + \gamma_1 LIB_t + \gamma_2 PC_t + GOV * ECONEFFECTS + OPP * ECONEFFECTS + \varepsilon_t^\alpha$$

$$B_t = \beta_1 LIB_t + \beta_2 PC_t + \beta_3 PCELEC + \beta_4 LIBELEC + \beta_4 LEADER + \beta_5 FLQ + \varepsilon_t^B$$

$$cyc_t = \Theta_1 \sin(\lambda\theta) LIB_t + \Theta_2 \cos(\lambda\theta) LIB_t + \Theta_3 \sin(\lambda\theta) PC_t + \Theta_4 \cos(\lambda\theta) PC_t + \varepsilon_t^{cyc}$$

where

- *ECONEFFECTS* are the economic models determined by the modified Box-Jenkins approach.
- *PCELEC* and *LIBELEC* are election dummy variables as described above and *LEADER* is one of the three leadership effect dummy variables, also described above.
- *FLQ* is the FLQ media count variable.

The *GOV* and *OPP* dummy variables allow for the impact of economic conditions on party popularity to vary across the party's position as government or opposition. In terms of economic effects, this is clearly necessary if they are incumbent oriented. If this is the case, good economic performance will benefit the Liberals when they are in government and hurt them when they are in opposition. The *GOV* and *OPP* dummies are also necessary if economic effects are party-salient goal oriented, although the economic issues that matter for the Liberals may differ from those that matter for the Conservatives. If economic effects are party-clientele oriented than the economic issues which the Liberals own should have a similar effect whether or not they are in

government, in which case the *GOV* and *OPP* dummies may be unnecessary. Whatever the case may be, the above party popularity equation is flexible enough to cope with any one of them. In fact, it gives us an opportunity to determine just how economic effects are oriented. By constructing *GOV* and *OPP* such that they are 0 the first month after a new party becomes the government allows for the probable fact that that a new party in government will not be held accountable for the condition of the nation (economic or otherwise) in the month of or previous to the election they just won.

In order to determine which political events are necessary to control for, the state-space model was first run excluding economic variables. The results of estimating these models are presented in tables 1 through 8. Tables 2 through 7 consider election and leadership effects only. Only one leadership variable was entered at a time in order to directly compare the competing theories of leadership effects. Tables 8 and 9 also include the impact of the FLQ crisis in the first period. Tables 10 through 14 provide the estimated economic and trend parameters for the economic popularity state-space models. Figure 8 presents the full results for the final party popularity state-space models.

## **6.0 Estimation Results and Discussion**

Examining tables 2 and 3, we see that during the 1957-1975 period, the PC and Liberal election variables fail to be significant for either PC or Liberal party popularity. Despite a lack of significance, the effect of elections on incumbent Liberal governments is estimated to be negative, regardless of the leadership variable employed. Similarly, the effect of elections on incumbent PC governments is also estimated to be negative. This is consistent with the notion that elections produce downswings in popularity for the incumbent party.

Tables 4 and 5 demonstrate the impact of election campaigns during the 1979-1993 period. Regardless of the leadership variable included in the model, elections produced downswings in popularity for PC incumbent governments. The magnitude of this effect is approximately 10 percentage points. During these same elections, the Liberal opposition gained over 6 percentage points in popularity. The remaining 3 to 4 points may have gone to the NDP. The Liberal incumbent governments, during this period, experienced an even larger election campaign downturn in popularity – approximately 12 percentage points. The PC opposition

during these elections gained over 6 percentage points, just as the Liberal opposition did during PC incumbent elections.

In the 1993-2000 period, no election was held with a PC incumbent government. Each election was held with a Liberal incumbent government. Table 7 illustrates an election effect of approximately negative 8 percentage points for Liberal governments. This is of a similar magnitude to PC governments in the previous period.

It would appear that since 1979, elections do produce a downswing in popularity for the incumbent government. Therefore, this is an important contextual variable to include in any economic popularity model. This view of campaigns as producing deviations from the inter-election popularity cycle, rather than as being part of it, is a different perspective than the norm. This demonstrates the problem with using arbitrary election count variables to control for cyclicity. An election count variable is more likely to capture the negative effect of campaigns than the long-term cycle in popularity, which we shall see is actually on an upswing just prior to the campaign. It is this second phenomenon that constitutes the cyclicity which must be controlled and not the first.

The impact of leadership effects, controlling for election effects, are now examined. For the 1957-1975 period, the PC party never had a leader from Quebec. It did experience a change in leadership. In 1967, the leadership of the PC party was transferred from John Diefenbaker to Robert Stanfield. The circumstances of this particular leadership convention drew a great deal of attention. It followed from open dissension within the party and a call for a leadership review by party president Dalton Camp – at the time, an unprecedented event. Whether measured as the effect of a new leader or as the media coverage of a leadership convention, the change in leadership substantially boosted PC party popularity – 10 to 15 percentage points (table 2). The largest leadership effect is that of the leadership convention. This variable should be retained in any future economic popularity model. During the same period, none of the leadership variables produced significant results for Liberal party popularity (table 3).<sup>92</sup>

During the 1979-1993 period, PC popularity was positively affected by having a new leader (table 4). This variable is in effect picking up on the increase in PC popularity produced by the transition from Joe Clark to Brian Mulroney and the transition from Brian Mulroney to

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<sup>92</sup> The relevant leadership transitions for the Liberals was from Louis St-Laurent to Lester Pearson and from Pearson to Pierre Trudeau.

Kim Campbell. The statistically significant effect is positive, as predicted and has a magnitude of roughly 4 percentage points. The impact of having a leader from Quebec is not statistically significant. This result fails to confirm the findings of Nadeau and Blais that transitioning to a party leader from Quebec could produce a 5 to 6 percent boost in popularity.<sup>93</sup> Rather, it suggests that the transition to any new leader could temporarily produce this result. For Liberal party popularity during this time, it is the occurrence of a leadership convention that positively impacts popularity (table 5) – 5.5 percentage points. The two leadership conventions held during this period produced first John Turner and second Jean Chrétien as leader of the Liberal party. For the second period overall, it would seem that economic popularity models for the PC party should include a control for a new leader and economic popularity models for the Liberal party should include a control for leadership conventions.

During the 1993-2000 period, the Liberals never experienced a change in leadership and they consistently had a leader from within Quebec – leadership was a constant. Therefore, there are no leadership effects to examine. For the PC party though, there was a change in leadership from Jean Charest to Joe Clark (a Quebec to non-Quebec leader). However, the impact of this change in leadership is not evident in the results presented in table 6. Overall, there are election effects but no leadership effects to control for in the third period. This is not to say that Chrétien's leadership of the Liberals was inconsequential. It may have been a very important factor in the difference between second and third period Liberal popularity dynamics. However, in the present setup period effects are endogenously control for through separate estimations. Only political contextual variables that change within a given period can be exogenously modelled.

It has been determined that election and leadership variables should be included in the 1957-1975 PC and Liberal economic popularity models. The additional inclusion of the FLQ variable in these models suggests that Canadians did rally around the Liberal government during the crisis (tables 8 and 9). Liberal party popularity increased approximately 0.2 percentage points per page of the *Globe & Mail* that the FLQ story appeared on, while PC party popularity dropped a little more than 0.1 percentage points per page. At the peak of the crisis in October 1970, with 146 pages of the newspaper mentioning the FLQ crisis in a single month, Liberal popularity was boosted 24.8 percentage points. This is consistent with the spike in Liberal popularity during

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<sup>93</sup> Nadeau and Blais, "Explaining Election Outcomes in Canada: Economy and Politics."

October 1970 evident in the plot of party popularity (figure 1). Clearly, the impact of the FLQ crisis should be controlled for in economic popularity models for this period.

The state-space model used in this study makes the structural assumption that economic conditions shift party popularity away from some underlying baseline support. At the same time, this baseline support is somewhat of a moving target. That is, it trends downwards or upwards over the time in which a party is in government or opposition and it cycles between elections. It is appropriate now to examine the structure of the cycling and trending components of the popularity models, controlling for political contextual variables.

Leaving cycling aside for the moment, the estimated state-space models are structured to allow two types of trending – linear long-term and equilibrating short-term. The popularity of PC governments underwent downward, long-term trending in both the first and second periods. This reflects the declining popularity of both the Diefenbaker and Mulroney governments over their terms in office (-0.43 percentage points per month for Diefenbaker and -0.19 percentage points per month for Mulroney), as they struggled to hold together Quebec/Western Canada coalitions. However, both first and second period PC governments experienced some initial benefit from being in office. Short-term trending produced an overall gain of 12 percentage points for Diefenbaker and 19 percentage points for Mulroney (table 10 and table 12).<sup>94</sup>

Although Liberal governments in the first period experienced no long-term trending, they did experience an initial gain of 11 percentage points (table 11). Liberal governments during the second period experienced positive long-term trending (0.22 percentage points per month) and negative short-term trending. The short-term trending produced an overall loss of 18 percentage points for each Liberal government (table 13). Clearly, the short-term loss dominated any long-term gains. This reflects the fact that each time Trudeau gained control of Parliament, he tended to take on controversial issues losing support for the Liberal party. Neither short-term nor long-term trending is apparent for the Liberal government or PC opposition in the third period (table 14).

The starting point for underlying baseline support (the constant within the baseline component) is largest for the Liberal governments in the third period (55.5 percent), followed by PC governments in the first period (49.5 percent) and Liberal governments in the second period

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<sup>94</sup> In order to calculate the effects of short-term trending, it is necessary to use the estimated values from the tables including economic variables (tables 9-13). The inclusion of these variables can alter somewhat the magnitude of estimated short-term trending, as economic conditions may account for part of the trending.

(46.9 percent). These reflect the initial popularity of the Chrétien, Diefenbaker and Trudeau governments respectively. The lowest starting point for underlying baseline support is not surprisingly for the PC opposition in the third period (around 8 percent).

Looking now at cycling, for all periods the cycling component are statistically significant. The amplitudes are clearly greatest for both parties within the second period. However, the amplitude of the cycle for the Liberal party in opposition during the second period is comparable to that of both parties in the first and third periods. Cycling amplitudes are somewhat larger for each party in the third compared to the first period. The largest cycle amplitude is found for the Liberal government in the second period. It is 9.6 percent, meaning that from peak to trough, the inter-election cycle shifts baseline popularity almost 20 percent. The smallest cycle amplitudes are for the Liberal party (within government or opposition) and the PC party (in opposition) within the first period – between 1 and 2 percent.

As explained, the wavelength of the cycle is set so that one complete cycle occurs per inter-election period. However, the elections do not necessarily fall on a peak or trough in the cycle. This is left to be estimated. As it turns out, elections generally fall on the upswing of the cycle some months before the cycle's peak. This is consistent with Johnson's description of the inter-electoral cycle apparent in the second period. The timing of elections for Liberal and PC governments within the first and second periods are between 10 and 20 percent away from the cycle's maximum (preceding it). In the third period, elections occur when the cycle is approximately 30 percent away from reaching its maximum. It is incorrect to assume that if an election occurs before popularity reaches a maximum in its cycle, the government would have received a greater proportion of the vote if the election was delayed. The rise in popularity subsequent to an election is probably a function of the election having occurred (a honeymoon). What is being described here is simply the position of elections along the popularity cycle, which may occur for a number of reasons.

With various relevant political contextual events controlled for, the role of economic conditions in party popularity can be examined. The estimated parameters are presented in tables 10 through 14. For PC party popularity during the 1957-1975 period, no significant role for economic conditions was found (table 10). This is true in both the Box-Jenkins model and the one-month lag model. As with the model excluding economic variables, it is necessary to determine the  $\alpha$  component is modelled as a stationary process. This again is done by applying

the Q-test to the residuals of the  $\alpha$  component. The Q-test for the residuals of the estimated  $\alpha$  component from the first period PC party popularity model suggests that they are a white noise process and that the estimated  $\alpha$  component is stationary. For Liberal party popularity during the 1957-1975 period, unemployment (lagged six months) has a positive impact on the popularity of the party in opposition (table 11). Again, the Q-test suggests the estimated residuals from the model forms a white noise process and that the potential for spurious correlation is minimal.

For PC government popularity in the second period, GDP, inflation and their intercept (all lagged 13 months) have statistically significant effects, with GDP being the largest. GDP and its intercept with inflation (only lagged one-month) also have statistically significant effects (table 12). The second period Liberal popularity model suggests a significant role for GDP and its intercept with inflation (lagged one month) for the party in opposition (table 13). No role for economic conditions in PC party popularity during the third period is found (estimated parameters not shown). As for Liberal governments between 1993 and 2000, both inflation and its intercept with GDP (lagged five months) are statistically significant (table 14). In each of these models, the Q-test for the residuals of the estimated  $\alpha$  components suggest that the estimated  $\alpha$  components are stationary processes.

The interaction between GDP and inflation make straight forward interpretation of the impact of these economic effects difficult. In order to get a picture of the magnitude of the impact of economic conditions on party popularity, the month-to-month immediate contribution of economic conditions is plotted in figures 9 through 11. This is the shift away from baseline support produced by changing economic conditions each month. It is important to note that the plotted values do not represent the total contribution of economic conditions in a given month, because the estimated models include first order autocorrelation terms. The residual impact of past economic effects will also contribute to popularity levels. Therefore, another perspective on the magnitude of economic effects is obtained by considering the shift that would be produced by economic conditions held at a constant level. For example considered the effect if the economic conditions that produced an initial 1 percent shift in second period Liberal popularity were held constant. Figure 12 plots the accumulating contribution of economic conditions if they are held at this constant level, given that the estimated AR(1) term is 0.83. This figure demonstrates that the contribution of economic conditions to popularity quickly reaches an

equilibrium. This equilibrium depends upon the degree of memory and the level of economic conditions. In this case, if the economic conditions that produced an initial 1 percent shift in Liberal popularity were held constant, eventually about 5.6 percent of each month's party popularity would be the consequence of these constant economic conditions. This 5.6 percent contribution (as an increase or decrease) would remain until economic conditions changed. In a model with a positive autoregressive term, considering only the immediate impact of economic conditions tends to underestimate their overall effect.

The dynamics of a series with a negative autocorrelation parameter, such as that for the Liberals in the third period, are somewhat different. Considering only the immediate monthly impact of economic conditions in models with negative autocorrelation terms tends to overexaggerate economic effects. Figure 13 plots the accumulating contribution of economic conditions if they are held at some constant level which produced an initial 1 percent shift, given the AR(1) parameter estimated for the third period, Liberal party popularity model (-0.035). It demonstrates that these constant economic conditions would eventually contribute only 0.97 of a percentage point of popularity each month. The dynamics of shifts in party popularity produced by economic conditions are different for the Liberals in the third period than those for the Liberal and PC parties in the second period. In both cases, economic conditions held at a constant level will eventually reach some equilibrium level of contribution. In the case of a positive AR term, that equilibrium will be greater than the initial shock. In the case of a negative AR term, the equilibrium will be less than the initial shock.

Keeping in mind the dynamics produced by the autocorrelation components of each model, it is time to now turn to the impact of economic conditions. In the first period, only Liberal opposition popularity was significantly affected by economic conditions. The Liberal opposition benefited from relatively high unemployment rates (six months prior). With rates hitting around 7 percent, the one month impact of unemployment is estimated to be around 2.5 percent. It was during 1958, 1960 and 1961 that unemployment hovered around the high of 7 percent and consequently it is from mid 1958 to mid 1959 and mid 1960 to mid 1962 that Liberal opposition popularity received this boost.

It is at this point that it is important to remember that this does not mean that only 2.5 percentage points of Liberal popularity were attributable to unemployment in a given month. There were also lingering contributions from the impact of unemployment in previous months, as



the Liberal party popularity model estimated for the first period has a positive AR(1) term. If unemployment remained at 7 percent throughout the entire period, 17 percent of popularity in a given month would be attributable to unemployment – this is quite a substantial contribution. More realistically, an average unemployment rate (5.5 percent for the period), would have a cumulative contribution of approximately 13.5 percentage points of Liberal opposition party popularity. Unemployment was at its lowest in 1957 and therefore during the first half of 1958, the Liberal opposition only received a one-month boost of 1.7 percentage points. While the Liberal party in opposition benefited from unemployment rates, the PC government was not penalised. This can be explained by and is consistent with the finding of Erickson, which suggests that NDP popularity was hurt by unemployment during this time.<sup>95</sup> When unemployment increased, popularity shifted from the NDP opposition to the Liberal opposition. No party has been affected by levels of unemployment since 1963.

During the second period, GDP significantly (statistically speaking) benefited the PC party while in government when accompanied by low inflation (1 and 13 months prior). In November of 1984, the PC opposition gained a modest 0.12 percentage points because economic growth was good (5 percent) a month earlier but inflation was not particularly low (4 percent). In August of 1990, the PC government suffered a 4 percentage point drop in popularity due to high inflation levels of 5.4 percent (13 months prior) and 4.1 percent (one month prior) and a poor growth in GDP of only 1.3 percent (13 months prior) and -1.2 percent (one month prior). In July of 1993, the effect of GDP and inflation again marginally benefited the PC government (0.5 of a percentage point) as both reached levels of about 1 percent (1 and 13 months prior). With average inflation levels being relatively high and GDP being only moderate, the PC government between 1984 and 1993 was primarily penalised for economic conditions. Average inflation was 4.0 percent and average economic growth was 1.1 percent. At these levels, PC popularity would take a hit of 4.5 percentage points in a given month or a cumulative hit of 16.8 percentage points.

Liberal governments experienced no clear economic effects in the second period but the popularity of the Liberal party in opposition was affected by GDP and inflation. Moderate levels of GDP hurt the Liberal opposition and high inflation made matters worse for the Liberals, not better. Inflation generally hurt both PC governments and concurrent Liberal oppositions. The Liberals in opposition experienced their worst drop due to economic conditions in February of

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<sup>95</sup> Erickson, "Ccf-Ndp Popularity and the Economy."

1991 – (-1.9 percentage points). This is a relatively small drop. The Liberals should have benefited from poor economic growth (-4.6 percent) at this time but were negatively affected by high inflation (6.9 percent) in the previous month.

Economic conditions helped the Liberal opposition most in September 1992. The Liberals experienced a one-month gain of 0.7 percentage points due to poor economic growth (-1.5 percent) and low inflation (1.1 percent). Overall, the impact of economic conditions on the popularity of the Liberals in opposition was small. Again, average inflation was 4.0 percent and average economic growth was 1.1 percent during this period. These economic conditions in any given month would produce a shift of approximately -0.55 percentage points in Liberal opposition popularity. This one month shift would translate into a cumulative impact of -3.2 percentage points.

Examining the second period as a whole, the Liberal government preceding 1984 escaped being punished for high inflation levels. Even during the negative growth of 1982, the Liberals escaped unharmed by economic conditions. After the 1984 election, Liberal opposition popularity was hurt marginally during good economic growth and helped marginally during poor economic growth (particularly in 1991). Although lower than before 1984, high inflation kept the PC government from really capitalising on good economic growth. At the same time, the Liberal opposition did not benefit from high inflation. This raises the question as to who may have benefited. Erickson's work suggests the NDP benefited from high inflation during the 1980s.<sup>96</sup> Her work only extends until 1984 but if this trend continued into the second half of the 1980s, this would explain where the popularity lost due to inflation by the PC government went.

During the 1993-2000 period, GDP and inflation didn't help Liberal governments any more than they did PC governments in the second period. For the most part, Liberal governments were penalised for inflation (five months prior). This effect was moderated by positive economic growth (also five months prior). The direction of the combined impact of these variables is consistent with expectations. In November of 1995 when growth in GDP five months earlier was around 1 percent and inflation was 2.6 percent, the Liberals were punished by approximately 7.3 percentage points. Over a year earlier, Liberals were only punished by 2 percentage point, with growth in GDP five months previous at approximately 2 percent and inflation lower than 0.2 percent. These effects are largely driven by changes in inflation. This is consistent with the

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<sup>96</sup> Ibid.

estimated magnitudes of the coefficients for the Liberal popularity model (table 14). As inflation increases, Liberal government popularity decreases. This is as expected. What is a little surprising, is that 0.2 percent inflation still wasn't low enough for the Canadian electorate – at least not with only 2 percent growth in GDP. It is surprising enough to suggest that the estimated impact of GDP and inflation is incorrect for low levels of inflation. This may have occurred because the impact of inflation may not be monotonic (at low levels inflation may have a much smaller effect if any) and yet the model estimates it as such. In terms of the overall magnitude of economic effects during this period, average growth in GDP was 2.7 percent and average inflation was 1.6 percent. In a given month, these economic conditions would produced a 4.2 percent decline in popularity. The cumulative impact of these average GDP and inflation levels in any given month is minus 4.1 percentage points.

Before discussing the impact of economic conditions on government support more generally, it is important to note that the economic popularity models were developed by treating the affect of economic conditions in majority and minority governments as equivalent. Minority governments have been formed in six elections since 1954 – these were in 1957, 1962, 1963, 1965, 1972, and 1979. We would expect economic voting to be suppressed by some degree during these minority governments because as Anderson has suggested, economic assessments have stronger effects on government popularity when the target of credit and blame is clear and sizeable.<sup>97</sup> In a minority situation, the government can feasibly argue when things go awry that they do not have complete control over their own policies. Alternatively when things go well, the opposition can (and likely will) argue that they are partly responsible for the outcome. Consequently, the target of credit and blame is obscured. The type of minority governments that have formed in Canada – those that must seek support from opposition parties to pass any legislation – are the truest form according to Bingham and Powell and should strongly disperse responsibility for economic outcomes.<sup>98</sup> Therefore, the assumption that economic effects in majority and minority governments differ must be tested. To do this the economic popularity models were rerun for the Liberal and PC parties, testing for economic effects only during majority governments. If economic effects are stronger during majority governments, then one would expect to see stronger relationships between economic variables and party popularity

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<sup>97</sup> Anderson, "Economic Voting and Political Context: A Comparative Perspective."

<sup>98</sup> Powell and Whitten, "A Cross-National Analysis of Economic Voting: Taking Account of the Political Context," 401.

within these models than those estimating effects for the entire period. Once run, the analysis did not find stronger effects for majority governments alone.<sup>99</sup> Economic effects do not appear to be suppressed for minority governments.

## 7.0 Conclusions

It is now possible to make some generalisations about the impact of economic conditions on government support. Figure 14 is a plot of the cumulative contribution of economic conditions to government party popularity from 1984 to 2000. This allows us to get a sense of the magnitude of the impact of economic conditions across this time span accounting for the effects of memory. This plot does not include the effect of economic conditions on the 1979-1980 Clark government. Given the brevity of this government, it is not clear if the estimated economic effects can be attributed to it as clearly as they can be to the 1984-1993 Mulroney governments.

Looking at the plot, it becomes clear that economic conditions had a greater cumulative impact on PC governments in the second period than on Liberal governments in the third. While the initial impact is of a similar magnitude to that of economic conditions in the third period, the shock to government popularity remains longer in the second. This produces a greater cumulative effect. Economic effects in the third period dissipate very quickly suggesting economic memory is shorter than in the second period.

Overall, the party in government is primarily punished for economic conditions rather than rewarded and the cumulative contribution of economic conditions to party popularity can be quite large. The greatest cumulative loss experienced by the PC government due to economic conditions was in August of 1990 – 14.6 percentage points. The greatest cumulative loss experienced by the Liberal government in the third period occurred in December of 1995 and was only 7.1 percentage points. Because these are cumulative effects, they do not suggest PC government popularity dropped by almost 15% or that Liberal government popularity dropped by over 7% in one month. Rather in these extreme months, PC government popularity was almost 15% lower and Liberal government popularity was over 7% lower than they would have been if economic conditions had no impact on the electorate's opinion of the governing party.

During the second period, the popularity of the PC government was more sensitive than the popularity of the Liberal party in opposition. This is consistent with the idea that it is the

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<sup>99</sup> Details of the analysis can be obtained by contacting the author at [mapickup@interchange.ubc.ca](mailto:mapickup@interchange.ubc.ca)

government that is being held accountable for the state of the economy. It also highlights the importance of considering the popularity of each party separately. The impact of the economy on the party of the official opposition is certainly not a mirror image of that for the governing party. This justifies the approach of examining and modelling the popularity of each party separately.

Considering all three periods, PC government popularity is more sensitive to inflation than Liberal government popularity. Conversely, the Liberal party has been more sensitive to levels of unemployment than the PC party – although, only in the first period and only when in opposition. Overall, GDP tends to benefit parties in government and hurt parties in opposition. Neither the Liberals nor the Conservatives – in opposition or government – have benefited from high levels of inflation.

Based on my findings, I agree with Johnston that economic growth (moderate as it was) was a positive force on the popularity of the Mulroney/Campbell government between 1984 and 1993. Unlike Johnston, I argue that Liberal governments in the late seventies/early eighties avoided being punished for poor economic conditions during this period.<sup>100</sup> On this, I am in agreement with the findings – or the lack of the findings – from the rest of the Canadian literature. In particular, those of Clarke and Zuk.<sup>101</sup> Furthermore, I do not agree with Johnston's somewhat perverse finding that governments benefited from inflation between 1974 and 1993.<sup>102</sup> Rather, I find that the PC government between 1984 and 1993 was penalised for inflation rates, just as it was rewarded for economic growth. I also find that both economic growth and inflation continued to have an impact on the Chrétien government's popularity, although in a somewhat more muted manner. Moreover, I argue that the electoral cycle so evident in the second period also operates in the first and third periods but with smaller amplitudes. That I find unemployment effects prior to 1963 is somewhat in disagreement with the findings of Monroe and Erikson which suggest that national economic conditions had no impact on support for either of the major political parties between 1954 and 1979.<sup>103</sup> However, the general conclusion that economic effects were weak prior to 1979 is substantiated.

This study built economic popularity models which rigorously minimised the potential of spurious correlation produced by the nonstationarity inherent in almost any party popularity

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<sup>100</sup> The differential effects of economic conditions on the Liberals and Conservative's during this period is a distinction that Johnson's method cannot make.

<sup>101</sup> Clarke and Zuk, "The Politics of Party Popularity: Canada 1974-1979."

<sup>102</sup> Johnston, "Business Cycles, Political Cycles and the Popularity of Canadian Governments, 1974-1998."

<sup>103</sup> Monroe and Erikson, "The Economy and Political Support: The Canadian Case."

time-series and explicitly models the impact of some of the political contextual events which may in part contribute to this nonstationarity. Based on the findings of this study, there is little question that the economy matters to party popularity. Even more importantly, it is clear that many governments have been held accountable for economic conditions. In particular, PC governments from 1979 to 1980 and 1984 to 1993 and Liberal governments from 1993 to 2000 have been held accountable for economic growth and/or inflation levels. It is also evident that the impact of economic conditions on the popularity of the party in opposition is not a mirror reflection of their impact on the party in government and that economic effects for Liberal governments differ from economic effects for PC governments. They appear to be party-oriented.

What still remains to be answered is why some governments seem to have escaped judgment for growth in GDP, inflation levels and unemployment levels – specifically, Diefenbaker's PC government and Pearson and Trudeau's Liberal governments. During Diefenbaker's government, the Liberal party in opposition benefited from high unemployment rates but the PC government was not penalized. During Pearson and Trudeau's governments neither the popularity of the Liberals in government or the PCs in opposition was affected by economic conditions. The issue of why some governments are not held accountable for economic conditions is a task for another study– as is the question of why the dynamics of economic popularity vary so much between periods. In these future studies, the analytical framework established in this study will be invaluable.

# Figures

Figure 1: Progressive Conservative and Liberal Party Popularity, 1957-2000

### Liberal and PC Popularity 1957-2000

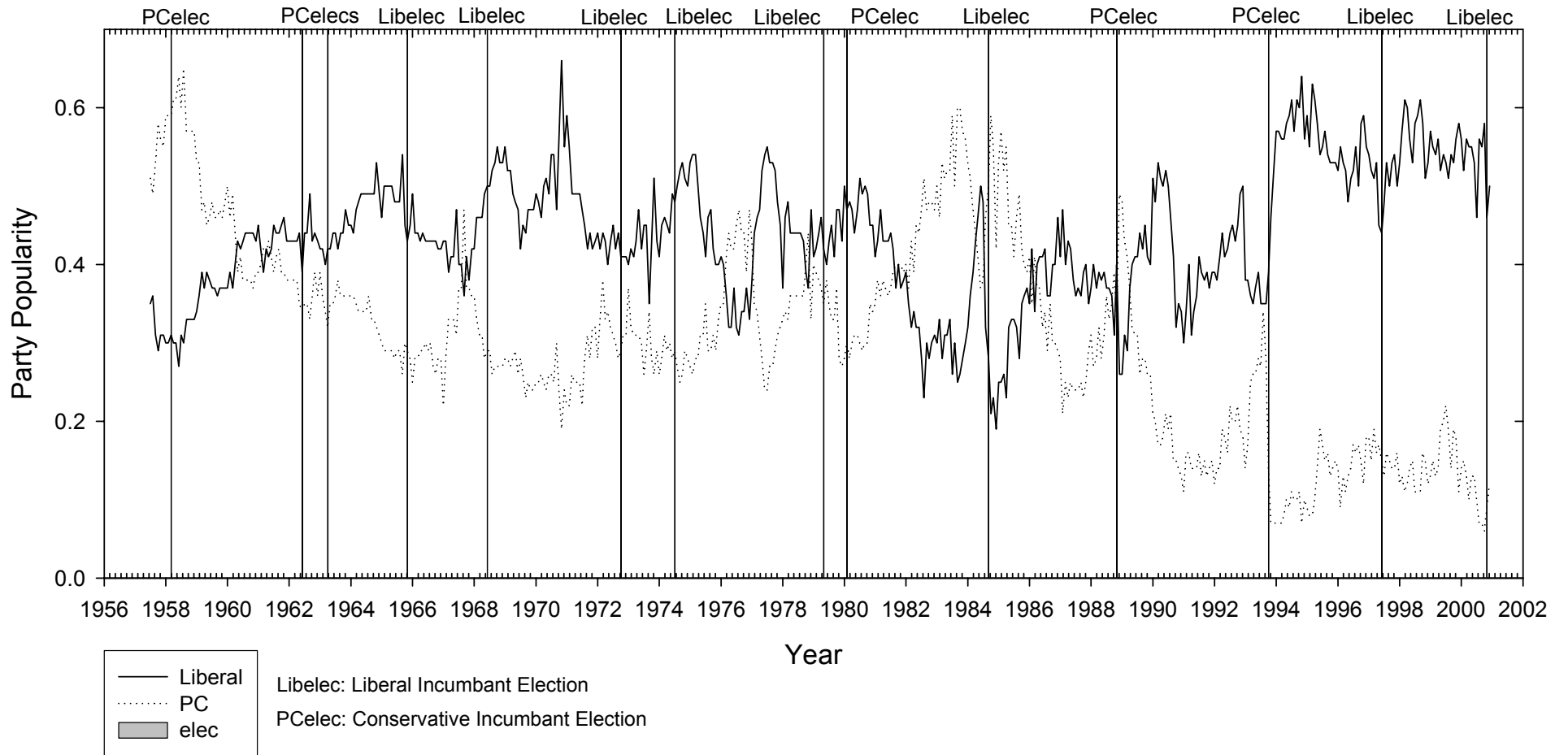




Figure 2: Government Popularity, 1957-2000

Government Popularity 1957-2000 with Elections Demarcated

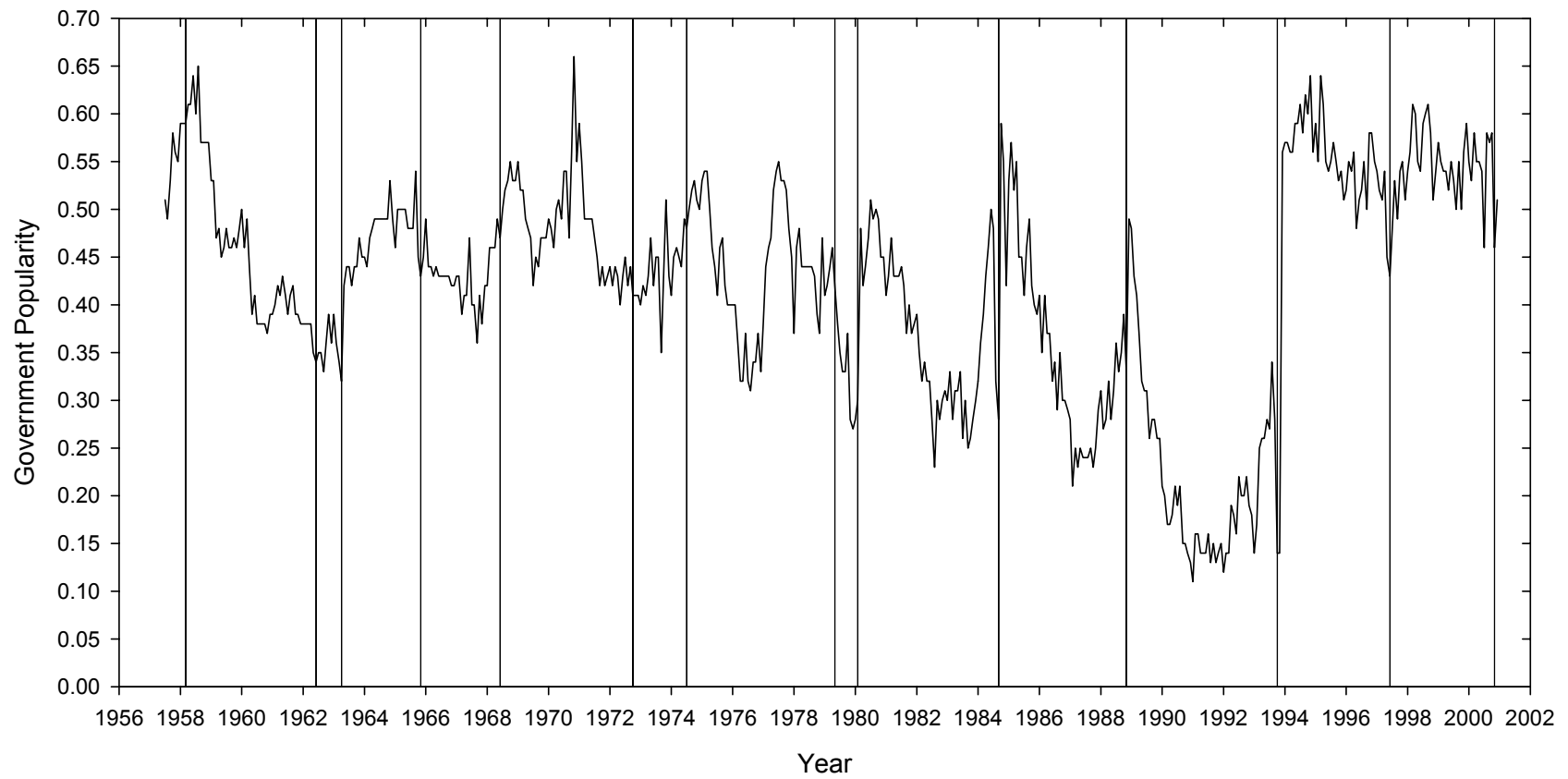


Figure 3: Predicted Liberal Popularity from Deterministic Parts of State-Space Popularity Model

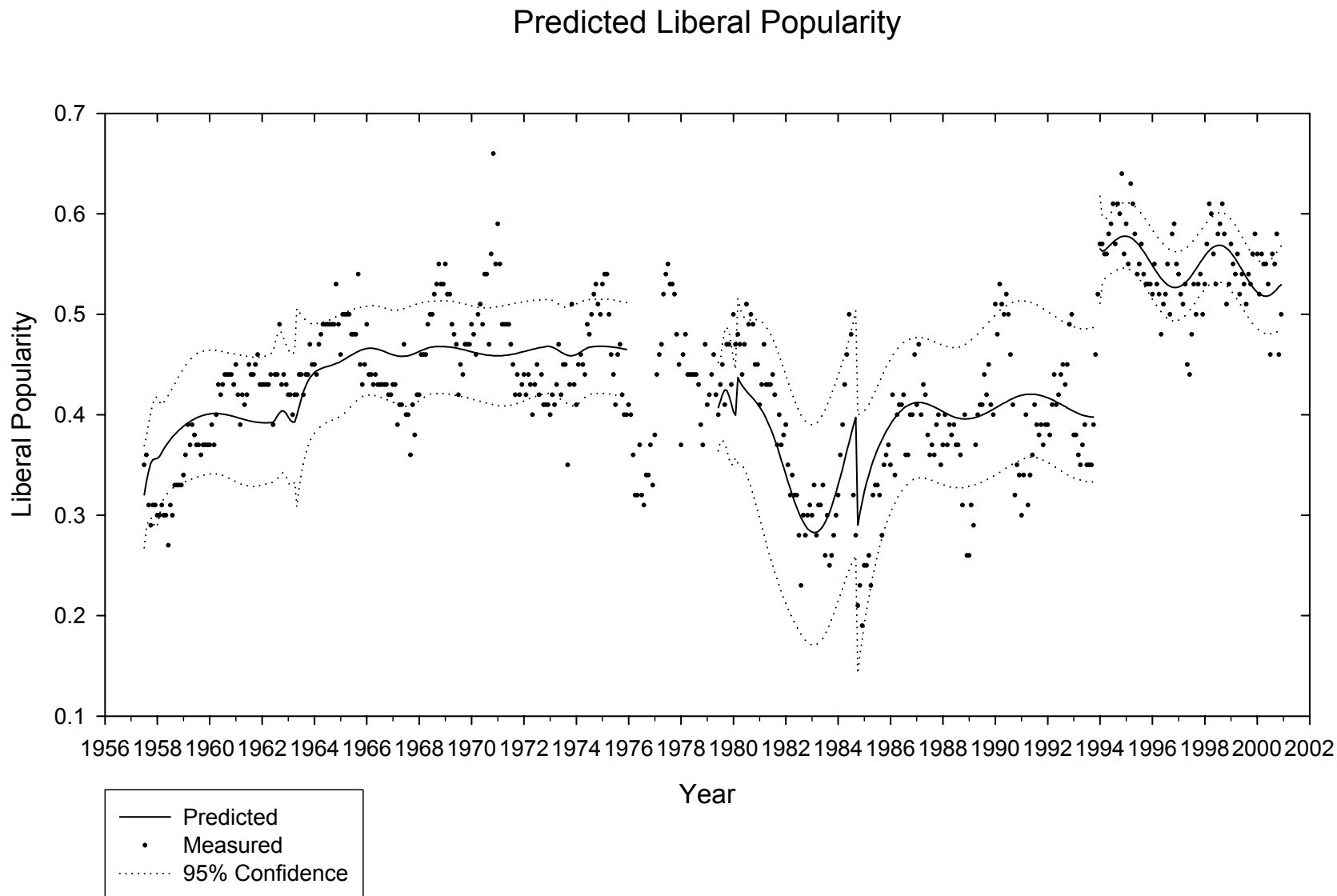
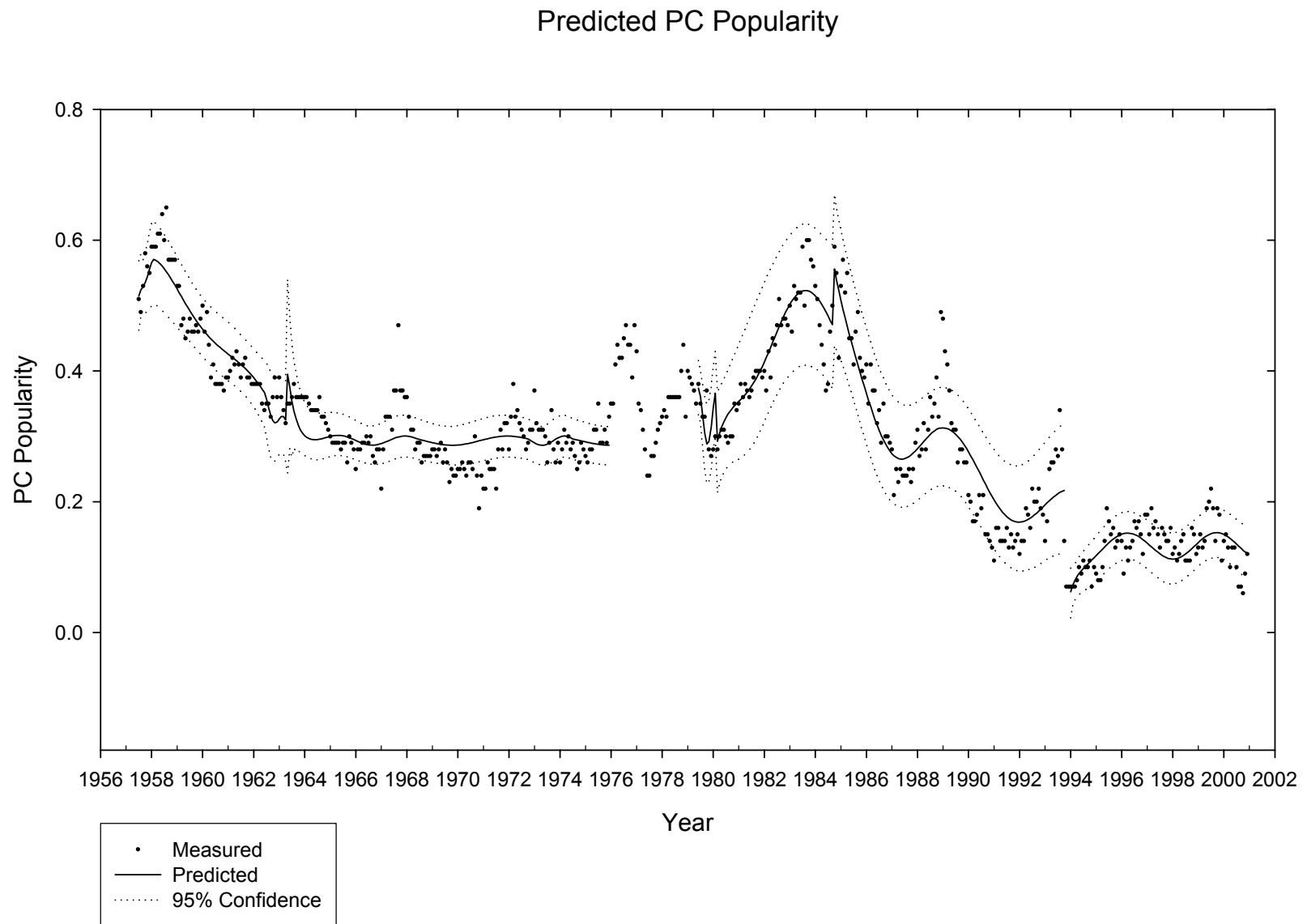
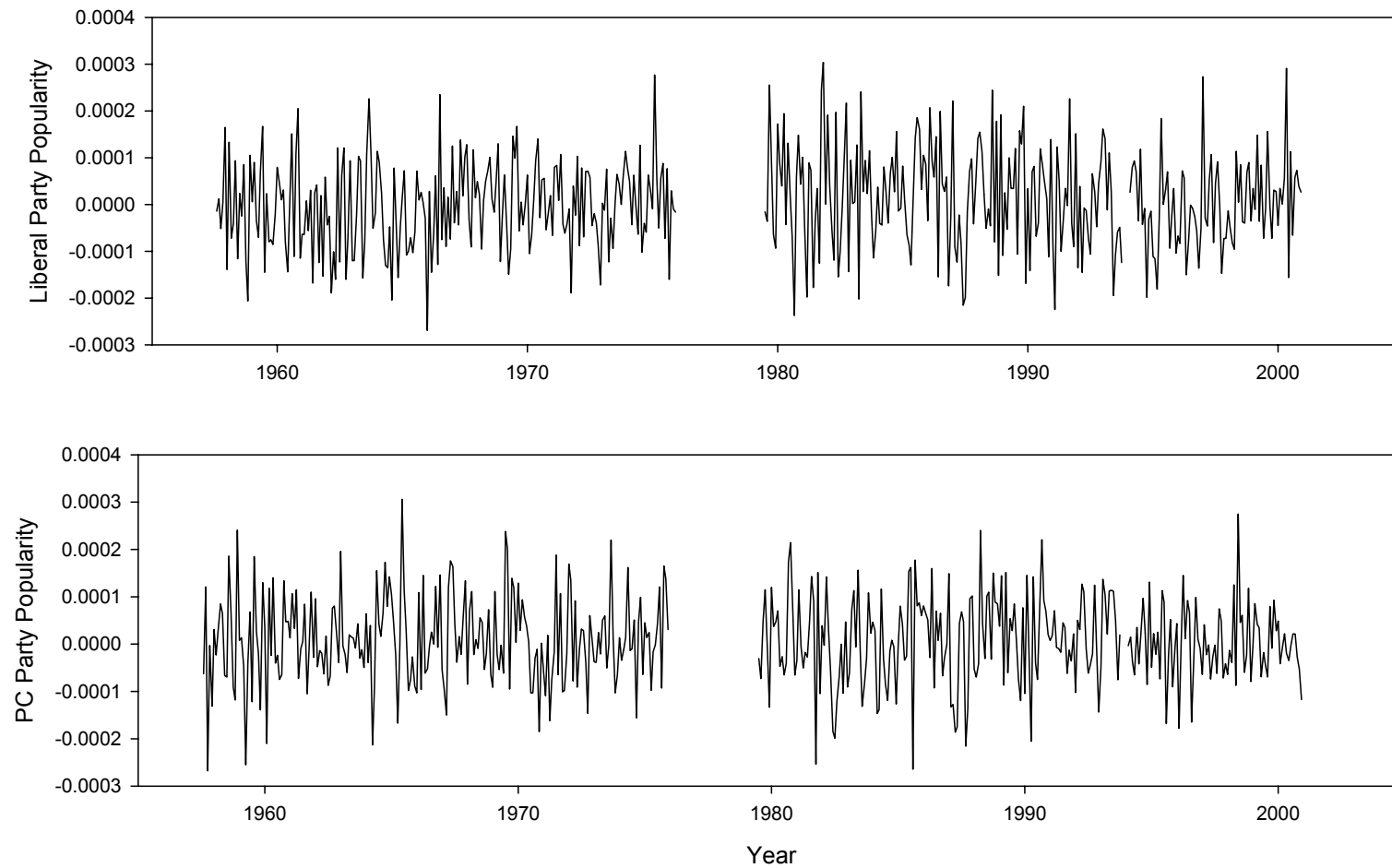


Figure 4: Predicted PC Popularity from Deterministic Parts of State-Space Popularity Model



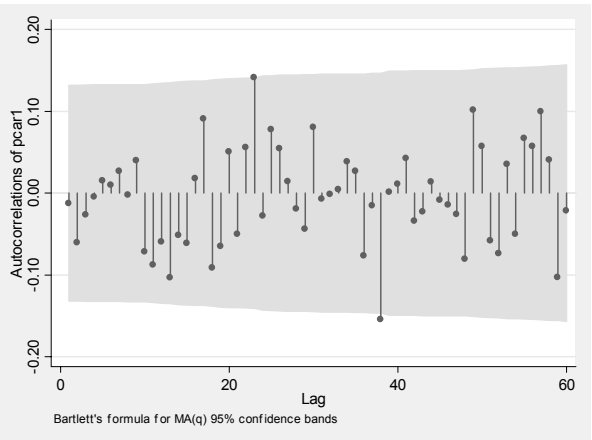
**Figure 5: Residual Movement within  $\alpha$  Component of Liberal and PC Popularity, 1957-2000**

Residual Movement within  $\alpha$  Component, 1957-2000



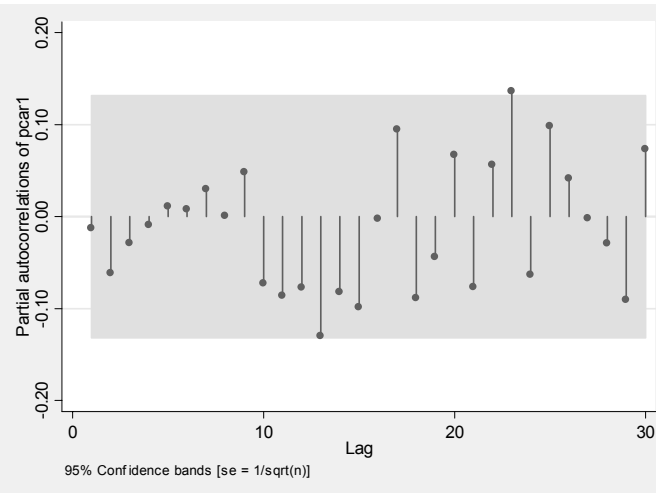
**Figure 6: Party Popularity Models, 1957-1975**

AC: PC AR1 Residuals

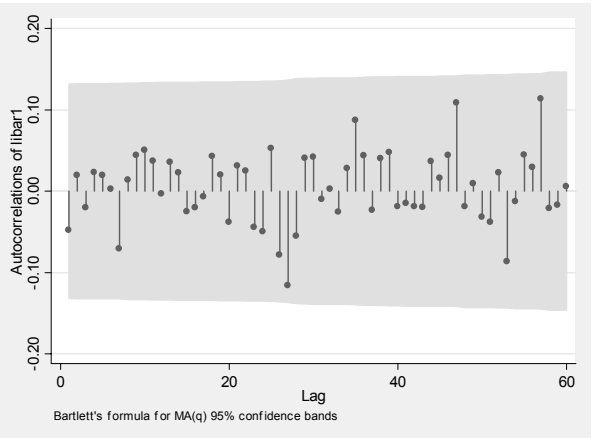


Portmanteau (Q) statistic = 35.1737  
 Prob > chi2(40) = 0.6871

PAC: PC AR1 Residuals

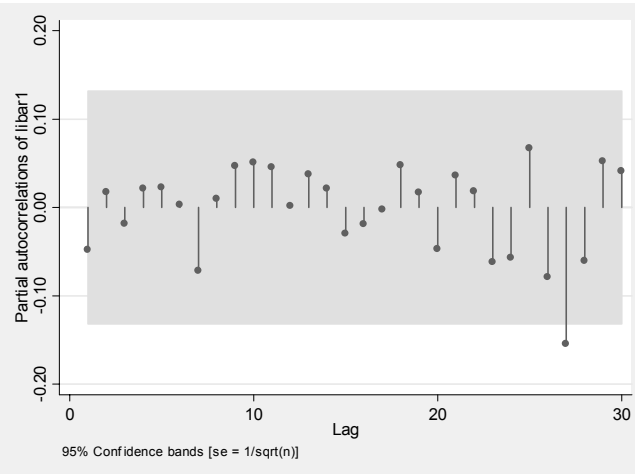


AC: Liberal AR1 Residuals



Portmanteau (Q) statistic = 18.0886  
 Prob > chi2(40) = 0.9989

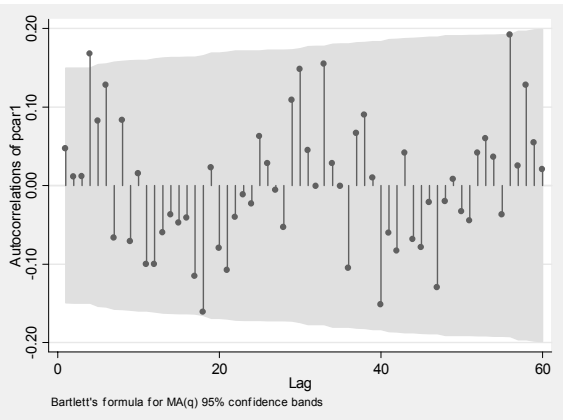
PAC: Liberal AR1 Residuals



(cont.)

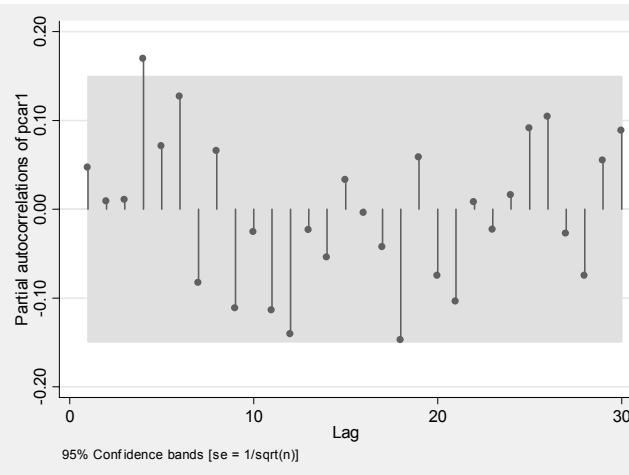
**Figure 6 (cont.): Party Popularity Models, 1979-1993**

AC: PC AR1 Residuals



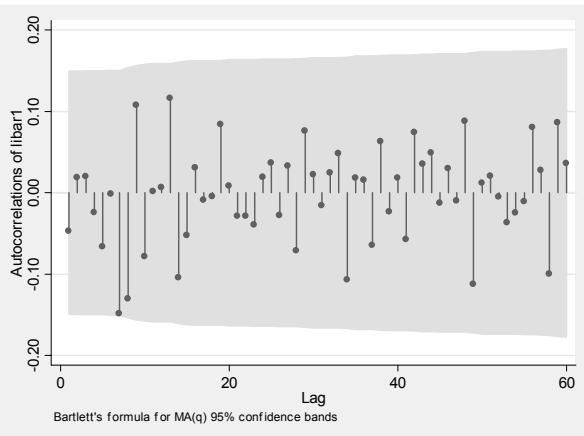
Portmanteau (Q) statistic = 54.7514  
 Prob > chi2(40) = 0.0601

PAC: PC AR1 Residuals

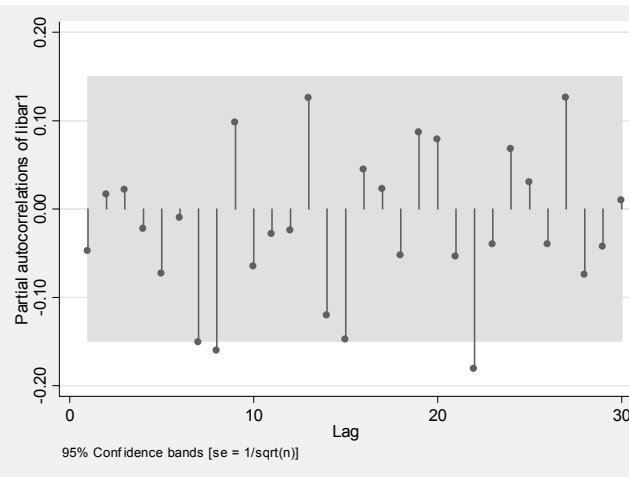


PAC: Liberal AR1 Residuals

AC: Liberal AR1 Residuals



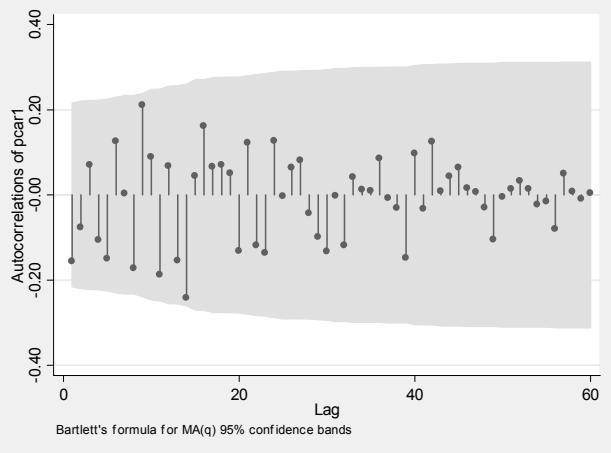
Portmanteau (Q) statistic = 27.6009  
 Prob > chi2(40) = 0.9314



(cont.)

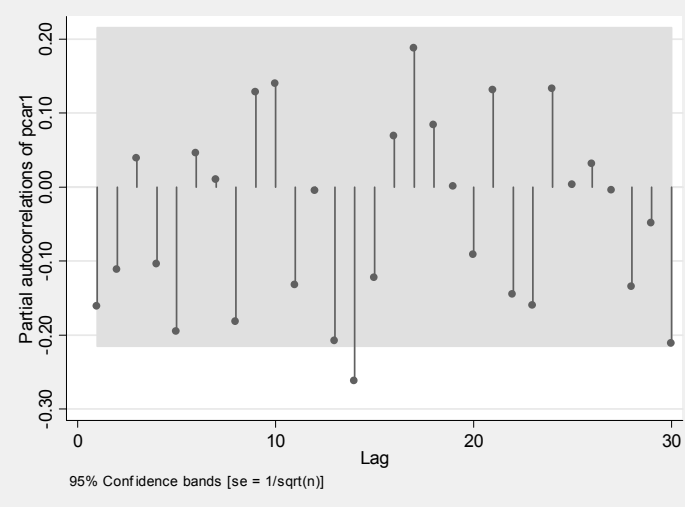
**Figure 6 (cont.): Party Popularity Models, 1993-2000**

AC: PC AR1 Residuals

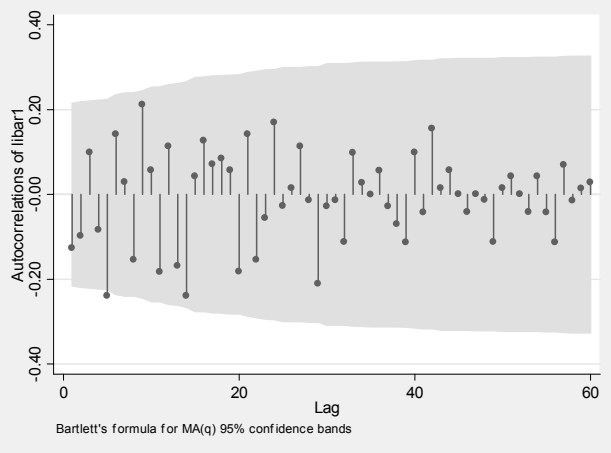


Portmanteau (Q) statistic = 53.4751  
 Prob > chi2(39) = 0.0612

PAC: PC AR1 Residuals

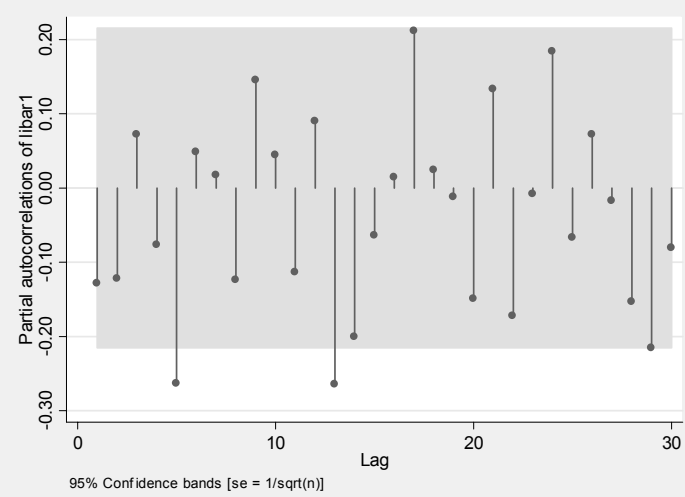


AC: Liberal AR1 Residuals

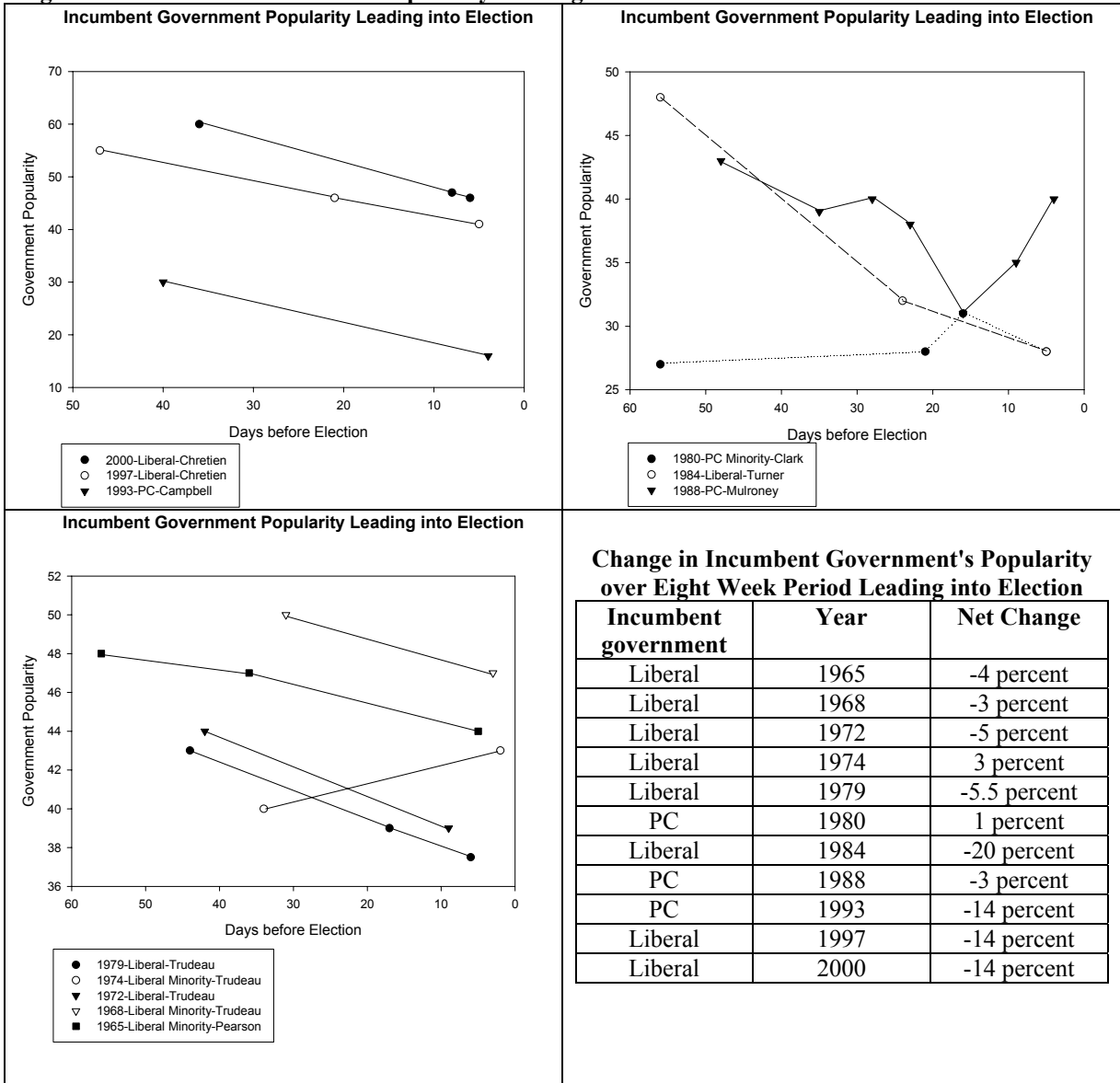


Portmanteau (Q) statistic = 33.6974  
 Prob > chi2(39) = 0.7101

PAC: Liberal AR1 Residuals



**Figure 7: Incumbent Government Popularity Leading into Election**





**Figure 8: State-Space Economic Popularity Models<sup>104</sup>****1957-1975 PC Party Popularity**

$$PCVOTE_t = \alpha_t + B_t + cyc_t + v_t$$

$$\alpha_t = 0.6676\alpha_{t-1} - 0.0228LIB_t + 0.0401PC_t + \varepsilon_t^\alpha$$

$$B_t = 0.3756LIB_t + 0.4954PC_t - 0.0008LIBELEC - 0.0213PCELEC - 0.0010FLQ + 0.15LEADERCONV + \varepsilon_t^B$$

$$cyc_t = 0.0005 \sin(\lambda\theta)LIB_t - 0.006 \cos(\lambda\theta)LIB_t + 0.0245 \sin(\lambda\theta)PC_t - 0.0041 \cos(\lambda\theta)PC_t + \varepsilon_t^{cyc}$$

**1957-1975 Liberal Party Popularity**

$$LIBVOTE_t = \alpha_t + B_t + cyc_t + v_t$$

$$\alpha_t = 0.8529\alpha_{t-1} + 0.01792LIB_t - 0.01186PC_t + 0.003634^* OPPUNEMP_{t-6} + \varepsilon_t^\alpha$$

$$B_t = 0.3346LIB_t + 0.3291PC_t - 0.0266LIBELEC - 0.0173PCELEC + 0.0017FLQ + \varepsilon_t^B$$

$$cyc_t = 0.0117 \sin(\lambda\theta)LIB_t + 0.0088 \cos(\lambda\theta)LIB_t - 0.0006 \sin(\lambda\theta)PC_t - 0.0011 \cos(\lambda\theta)PC_t + \varepsilon_t^{cyc}$$

**1979-1993 PC Party Popularity**

$$PCVOTE_t = \alpha_t + B_t + cyc_t + v_t$$

$$\alpha_t = 0.731\alpha_{t-1} + 0.0523LIB_t + 0.0397PC_t - 0.001322^* GOV_{t-1}INF_{t-1}GDP_{t-1} - 0.00265^* GOV_{t-1}INF_{t-1} + 0.006635^* GOV_{t-1}GDP_{t-1} - 0.002377^* GOV_{t-13}GDP_{t-13}INF_{t-13} - 0.004604^* GOV_{t-13}INF_{t-13} + 0.01123^* GOV_{t-13}GDP_{t-13} + \varepsilon_t^\alpha$$

$$B_t = 0.2364LIB_t + 0.3209PC_t - 0.1034PCELEC + 0.06652_4 LIBELEC + 0.03933NEWLEADER + \varepsilon_t^B$$

$$cyc_t = -0.0096 \sin(\lambda\theta)LIB_t - 0.0643 \cos(\lambda\theta)LIB_t + 0.05377 \sin(\lambda\theta)PC_t + 0.02977 \cos(\lambda\theta)PC_t + \varepsilon_t^{cyc}$$

*(cont.)*


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<sup>104</sup> \* indicates statistical significance for economic variables only.

### 1979-1993 Liberal Party Popularity

$$LIBVOTE_t = \alpha_t + B_t + cyc_t + v_t$$

$$\alpha_t = 0.8268\alpha_{t-1} - 0.03090LIB_t - 0.0005PC_t \\ + 0.0014 * OPP_t GDP_{t-1} INF_{t-1} - 0.0010 OPP_t INF_{t-1} - 0.0069 * OPP_t GDP_{t-1} + \varepsilon_t^\alpha$$

$$B_t = 0.4691LIB_t + 0.4327PC_t + 0.06369PCELEC - 0.1243LIBELEC + 0.05454LEADERCONV + \varepsilon_t^B$$

$$cyc_t = 0.03067 \sin(\lambda\theta)LIB_t + 0.08591 \cos(\lambda\theta)LIB_t - 0.01794 \sin(\lambda\theta)PC_t - 0.01629 \cos(\lambda\theta)PC_t + \varepsilon_t^{cyc}$$

### 1993-2000 PC Party Popularity

$$PCVOTE_t = \alpha_t + B_t + cyc_t + v_t$$

$$\alpha_t = 0.8504\alpha_{t-1} - 0.009885LIB_t + \varepsilon_t^\alpha$$

$$B_t = 0.3168LIB_t + \varepsilon_t^B$$

$$cyc_t = -0.0094 \sin(\lambda\theta)LIB_t - 0.01747 \cos(\lambda\theta)LIB_t + \varepsilon_t^{cyc}$$

### 1993-2000 Liberal Party Popularity

$$LIBVOTE_t = \alpha_t + B_t + cyc_t + v_t$$

$$\alpha_t = -0.03511\alpha_{t-1} + 0.04631LIB_t + 0.007703 * GOV_{t-5} GDP_{t-5} INF_{t-5} \\ - 0.0327 * GOV_{t-5} INF_{t-5} - 0.0086 GOV_{t-5} GDP_{t-5} + \varepsilon_t^\alpha$$

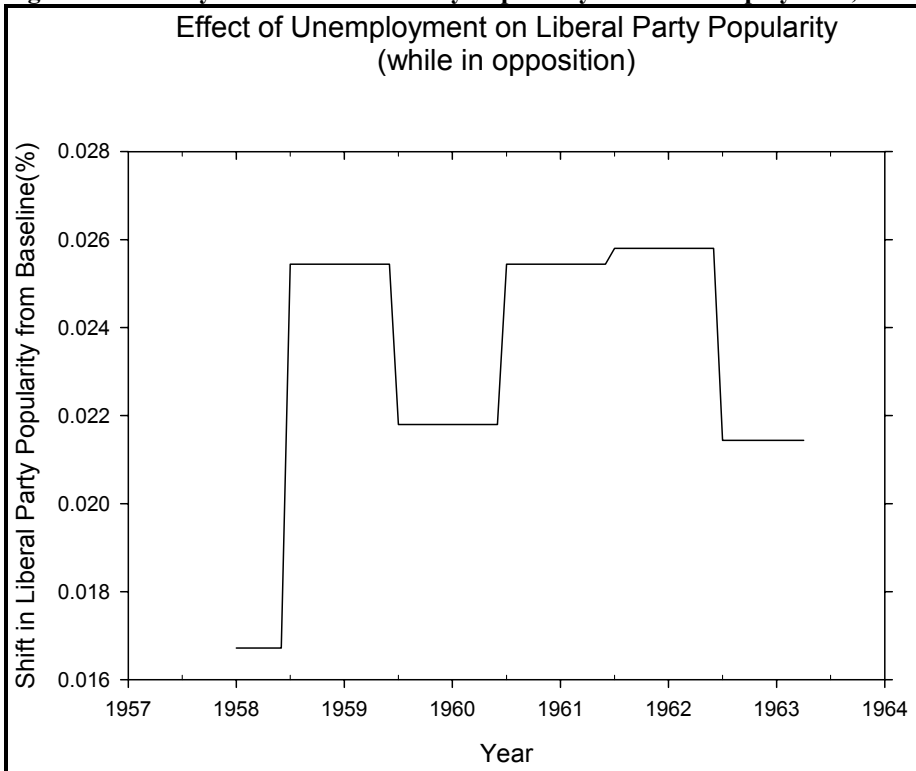
$$B_t = 0.5551LIB_t - 0.0832LIBELEC + \varepsilon_t^B$$

$$cyc_t = -0.0075 \sin(\lambda\theta)LIB_t + 0.0208 \cos(\lambda\theta)LIB_t + \varepsilon_t^{cyc}$$

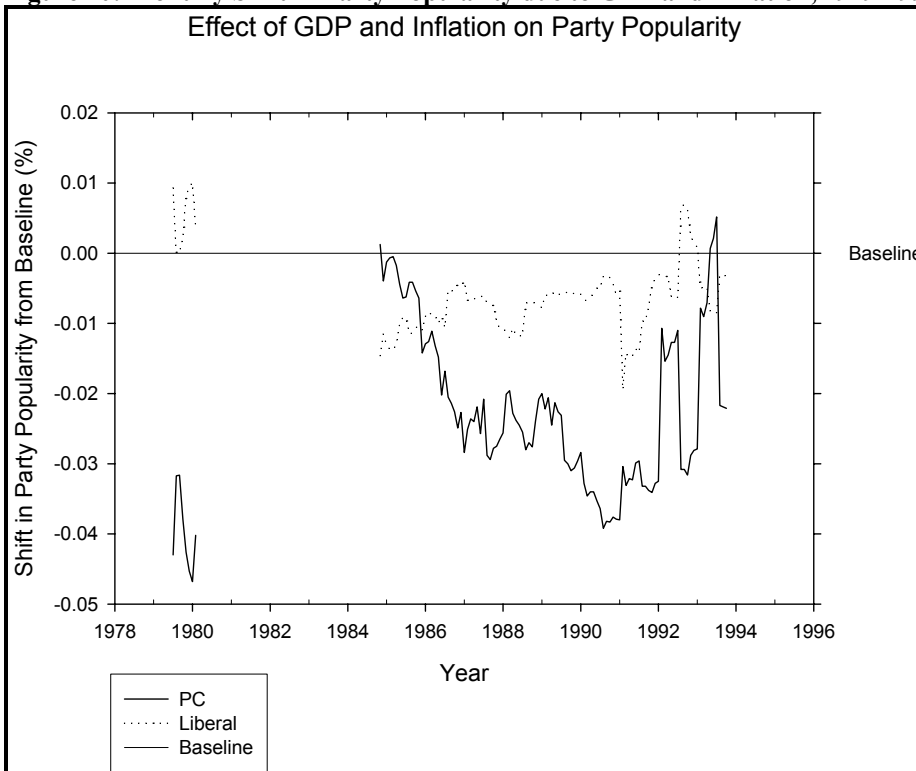
where

- LEADERCONV is the leadership convention dummy variable; and
- NEWLEADER is the dummy variable for the six months after a leadership change.

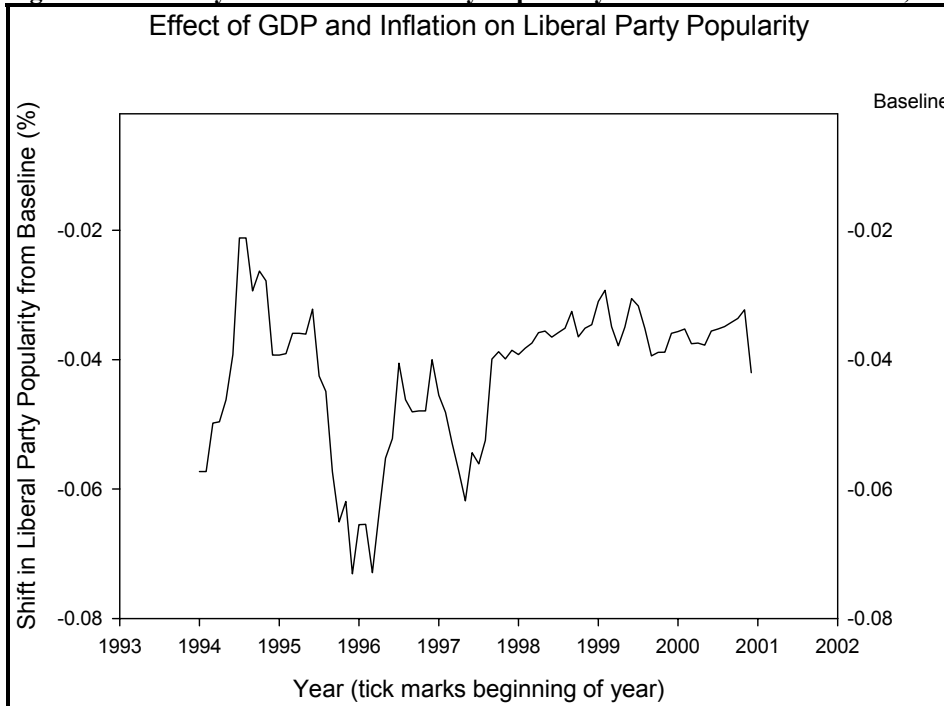
**Figure 9: Monthly Shift in Liberal Party Popularity due to Unemployment, 1957-1975**



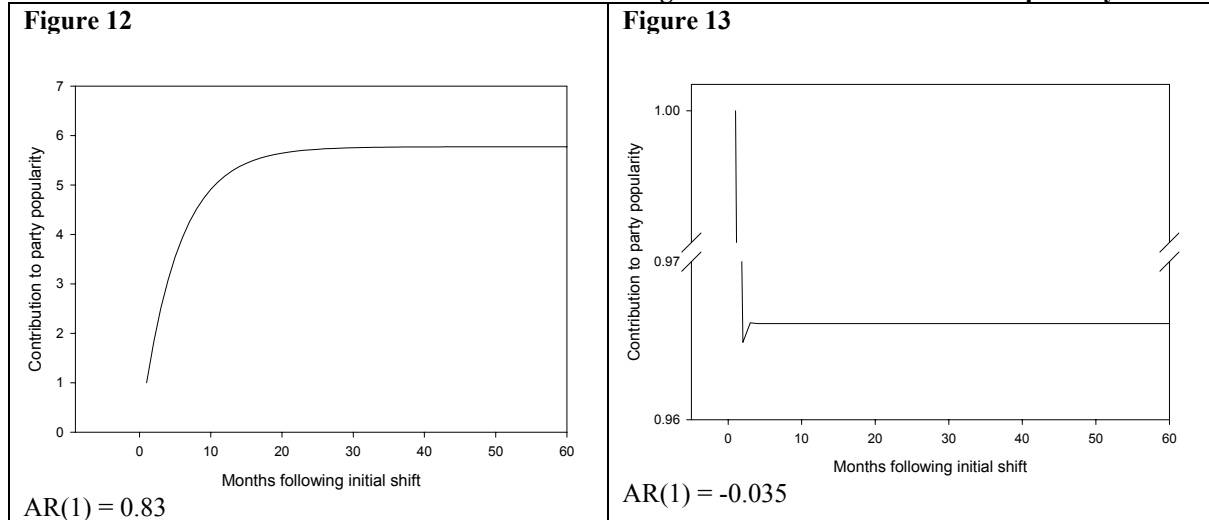
**Figure 10: Monthly Shift in Party Popularity due to GDP and Inflation, 1979-1993**



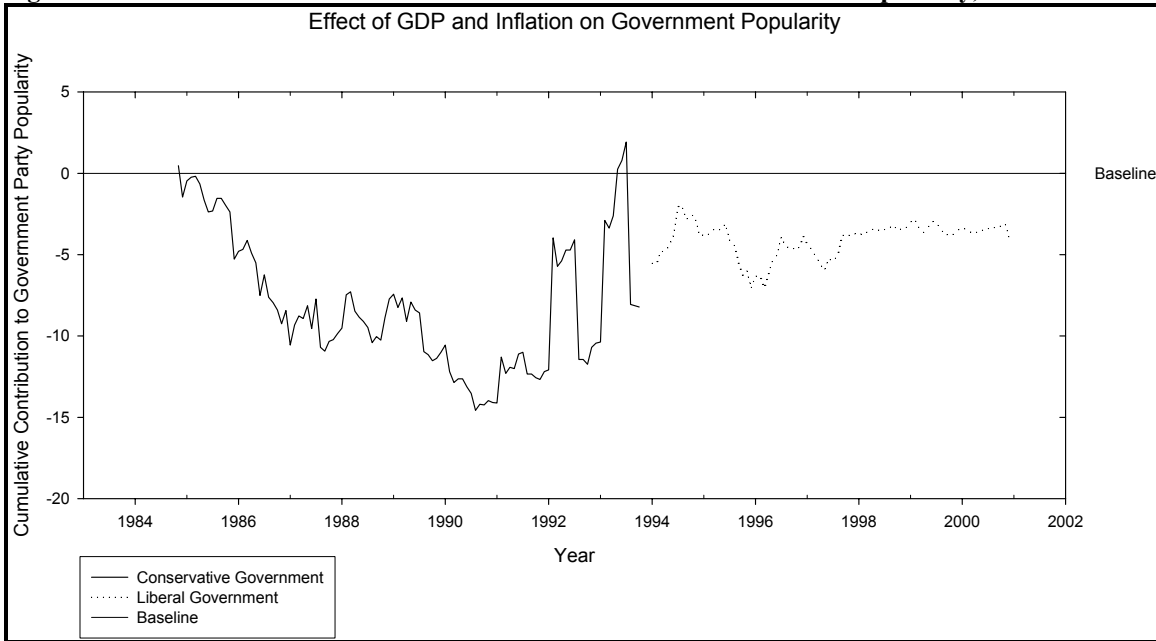
**Figure 11: Monthly Shift in Liberal Party Popularity due to GDP and Inflation, 1993-2000**



**Figures 12-13:**  
**Contribution of Constant Economic Conditions Producing an Initial 1 Percent Shift in Popularity**



**Figure 14: Cumulative Contribution of GDP and Inflation to Government Popularity, 1984-1993**



# Tables

**Table 1: Liberal and PC Party Popularity Variance, Explained and Unexplained**

		<b>1957-1975</b>	<b>1979-1993</b>	<b>1993-2000</b>
<b>Liberals</b>	<b>Total Variance</b>	36.4	50.7	15.6
	<b>Variance Explained by Deterministic Components</b>	12.4	17.1	3.8
	<b>Variance Attributable to Measurement Error</b>	5.0	2.2	4.5
	<i>Unexplained Variance</i>	<i>18.9</i>	<i>31.4</i>	<i>7.3</i>
<b>Progressive Conservatives</b>	<b>Total Variance</b>	87.9	156.7	12.4
	<b>Variance Explained by Deterministic Components</b>	71.1	121.1	3.5
	<b>Variance Attributable to Measurement Error</b>	3.3	3.8	2.1
	<i>Unexplained Variance</i>	<i>13.5</i>	<i>31.8</i>	<i>6.8</i>

Popularity is expressed as percentage for the purposes of this table



**Table 2: Estimated Political Context Effects for PC Party Popularity Model, 1957-1975**

		New leader		Leadership Convention	
		SE	Median	SE	Median
	<b>Memory AR(1)</b>	0.2346	<b>0.7797</b>	0.1605	<b>0.7870</b>
	<b>Liberal election</b>	0.0199	0.0039	0.0197	0.0005
	<b>PC election</b>	0.0260	-0.0192	0.0256	-0.0186
	<b>Leader</b>	0.0322	<b>0.1024</b>	0.0453	<b>0.1507</b>
<b>Government</b>	<b>Constant</b>	0.0358	<b>0.4929</b>	0.0349	<b>0.4942</b>
	<b>Trend – Long</b>	0.0008	<b>-0.0047</b>	0.0008	<b>-0.0047</b>
	<b>Trend – Short</b>	0.0368	<b>0.0307</b>	0.0247	<b>0.0296</b>
	<b>Phase</b>		<b>0.1116</b>		<b>0.1152</b>
	<b>Amplitude</b>	0.0129	<b>0.0263</b>	0.0128	<b>0.0259</b>
<b>Opposition</b>	<b>Constant</b>	0.0842	<b>0.2288</b>	0.0825	<b>0.2281</b>
	<b>Trend – Short</b>	0.0365	0.0100	0.0291	0.0105
	<b>Phase</b>		<b>0.2256</b>		<b>0.1850</b>
	<b>Amplitude</b>	0.0074	<b>0.0128</b>	0.0075	<b>0.0130</b>

Notes:

- 1) Phase is calculated post-Bayesian estimation and so no SE for its distribution is provided.
- 2) The popularity dependent variable is entered into the model as a proportion rather than a percentage.
- 3) Bolded values are determined to be statistically significant based on Bayesian estimated distribution of parameters.<sup>105</sup>

<sup>105</sup> Details on the guidelines used to determine significance of Bayesian estimated parameters can be obtained from the author at mapickup@interchange.ubc.ca.

**Table 3: Estimated Political Context Effects for Liberal Party Popularity Model, 1957-1975**

		Leader from Quebec		New leader		Leadership Convention	
		SE	Median	SE	Median	SE	Median
	<b>Memory AR(1)</b>	0.0490	<b>0.8954</b>	0.0549	<b>0.8747</b>	0.0526	<b>0.8784</b>
	<b>Liberal election</b>	0.0240	-0.0247	0.0244	-0.0258	0.0243	-0.0252
	<b>PC election</b>	0.0274	-0.0167	0.0281	-0.0158	0.0285	-0.0173
	<b>Leader</b>	0.0332	0.0230	0.0289	-0.0117	0.0406	0.0138
<b>Government</b>	<b>Constant</b>	0.0702	<b>0.3185</b>	0.0711	<b>0.3433</b>	0.0686	<b>0.3474</b>
	<b>Trend – Short</b>	0.0108	<b>0.0121</b>	0.0127	<b>0.0141</b>	0.0118	<b>0.0133</b>
	<b>Phase</b>		<b>0.2143</b>		<b>0.1937</b>		<b>0.2095</b>
	<b>Amplitude</b>	0.0095	<b>0.0170</b>	0.0096	<b>0.0174</b>	0.0096	<b>0.0172</b>
<b>Opposition</b>	<b>Constant</b>	0.0538	<b>0.3016</b>	0.0394	<b>0.3301</b>	0.0373	<b>0.3312</b>
	<b>Trend – Short</b>	0.0071	0.0099	0.0072	0.0080	0.0066	0.0075
	<b>Phase</b>		<b>0.2319</b>		<b>0.2437</b>		<b>0.2528</b>
	<b>Amplitude</b>	0.0124	<b>0.0212</b>	0.0121	<b>0.0209</b>	0.0118	<b>0.0208</b>

**Table 4: Estimated Political Context Effects for PC Party Popularity Model, 1979-1993**

		Leader from Quebec		New leader		Leadership Convention	
		SE	Median	SE	Median	SE	Median
	<b>AR(1)</b>	0.0428	<b>0.8986</b>	0.0455	<b>0.8843</b>	0.0432	<b>0.8950</b>
	<b>Liberal election</b>	0.0375	<b>0.0630</b>	0.0373	<b>0.0665</b>	0.0376	<b>0.0638</b>
	<b>PC election</b>	0.0211	<b>-0.1010</b>	0.0210	<b>-0.1034</b>	0.0211	<b>-0.1018</b>
	<b>Leader</b>	0.0250	0.0120	0.0213	<b>0.0393</b>	0.0189	0.0048
<b>Government</b>	<b>Constant</b>	0.0353	<b>0.3210</b>	0.0370	<b>0.3209</b>	0.0359	<b>0.3197</b>
	<b>Trend – Long</b>	0.0008	-0.0016	0.0007	<b>-0.0019</b>	0.0008	-0.0016
	<b>Trend – Short</b>	0.0079	0.0032	0.0082	0.0068	0.0078	0.0048
	<b>Phase</b>		<b>0.0951</b>		<b>0.0897</b>		<b>0.0956</b>
	<b>Amplitude</b>	0.0149	<b>0.0641</b>	0.0146	<b>0.0636</b>	0.0150	<b>0.0638</b>
<b>Opposition</b>	<b>Constant</b>	0.0609	<b>0.2393</b>	0.0609	<b>0.2364</b>	0.0595	<b>0.2315</b>
	<b>Trend – Short</b>	0.0124	<b>0.0210</b>	0.0135	<b>0.0241</b>	0.0127	<b>0.0231</b>
	<b>Phase</b>		<b>0.2735</b>		<b>0.2716</b>		<b>0.2614</b>
	<b>Amplitude</b>	0.0291	<b>0.0748</b>	0.0268	<b>0.0711</b>	0.0291	<b>0.0745</b>

**Table 5: Estimated Political Context Effects for Liberal Party Popularity Model, 1979-1993**

		Leader from Quebec		New leader		Leadership Convention	
		SE	Median	SE	Median	SE	Median
	<b>Memory AR(1)</b>	0.0419	<b>0.8815</b>	0.0414	<b>0.8886</b>	0.0436	<b>0.8786</b>
	<b>Liberal election</b>	0.0457	<b>-0.1215</b>	0.0452	<b>-0.1199</b>	0.0443	<b>-0.1243</b>
	<b>PC election</b>	0.0238	<b>0.0621</b>	0.0235	<b>0.0631</b>	0.0233	<b>0.0637</b>
	<b>Leader</b>	0.0238	0.0160	0.0207	-0.0243	0.0213	<b>0.0545</b>
<b>Government</b>	<b>Constant</b>	0.0847	<b>0.4347</b>	0.0734	<b>0.4420</b>	0.0705	<b>0.4691</b>
	<b>Trend – Long</b>	0.0012	<b>0.0023</b>	0.0012	<b>0.0023</b>	0.0012	<b>0.0022</b>
	<b>Trend – Short</b>	0.0133	<b>-0.0198</b>	0.0125	<b>-0.0172</b>	0.0140	<b>-0.0224</b>
	<b>Phase</b>		<b>0.1896</b>		<b>0.1824</b>		<b>0.1983</b>
	<b>Amplitude</b>	0.0331	<b>0.0984</b>	0.0323	<b>0.1003</b>	0.0312	<b>0.0960</b>
<b>Opposition</b>	<b>Constant</b>	0.0493	<b>0.4137</b>	0.0390	<b>0.4293</b>	0.0379	<b>0.4327</b>
	<b>Trend – Short</b>	0.0066	-0.0022	0.0060	-0.0031	0.0065	-0.0043
	<b>Phase</b>		<b>0.3629</b>		<b>0.3704</b>		<b>0.3549</b>
	<b>Amplitude</b>	0.0133	<b>0.0278</b>	0.0135	<b>0.0296</b>	0.0130	<b>0.0293</b>

**Table 6: Estimated Political Context Effects for  
PC Party (in opposition) Popularity Model, 1993-2000**

	Leader from Quebec		New leader		Leadership Convention	
	SE	Median	SE	Median	SE	Median
<b>Memory AR(1)</b>	0.0924	<b>0.8301</b>	0.0905	<b>0.8287</b>	0.0957	<b>0.8072</b>
<b>Liberal election</b>	0.0219	0.0006	0.0218	0.0007	0.0220	0.0004
<b>Leader</b>	0.0203	0.0040	0.0220	-0.0203	0.0206	0.0132
<b>Constant</b>	0.0344	<b>0.0792</b>	0.0270	<b>0.0866</b>	0.0271	<b>0.0839</b>
<b>Trend – Short</b>	0.0078	0.0078	0.0071	0.0073	0.0078	0.0082
<b>Phase</b>		<b>0.3239</b>		<b>0.3386</b>		<b>0.3110</b>
<b>Amplitude</b>	0.0119	<b>0.0245</b>	0.0119	<b>0.0255</b>	0.0115	<b>0.0252</b>

**Table 7: Estimated Political Context Effects for Liberal Party (in government) Popularity Model, 1993-2000**

	SE	Median
<b>Memory AR(1)</b>	0.3024	0.5399
<b>Liberal election</b>	0.0289	<b>-0.0832</b>
<b>Constant</b>	0.0394	<b>0.5551</b>
<b>Trend – Long</b>	0.0004	-0.0002
<b>Trend – Short</b>	0.0258	0.0013
<b>Phase</b>		<b>0.3004</b>
<b>Amplitude</b>	0.0095	<b>0.0242</b>

**Table 8: Estimated Political Context Effects (incl. FLQ) for PC Party Popularity, 1957-1975**

		FLQ	
		SE	Median
	<b>Memory AR(1)</b>	0.4402	0.6676
	<b>Liberal election</b>	0.0208	-0.0008
	<b>PC election</b>	0.0269	-0.0213
	<b>Leader Convention</b>	0.0458	<b>0.1522</b>
	<b>FLQ</b>	0.0004	<b>-0.0010</b>
<b>Government</b>	<b>Constant</b>	0.0382	<b>0.4954</b>
	<b>Trend – Long</b>	0.0007	<b>-0.0043</b>
	<b>Trend – Short</b>	0.0650	<b>0.0401</b>
	<b>Phase</b>		<b>0.0903</b>
	<b>Amplitude</b>	0.0131	<b>0.0291</b>
<b>Opposition</b>	<b>Constant</b>	0.1476	<b>0.3756</b>
	<b>Trend – Short</b>	0.1396	-0.0228
	<b>Phase</b>		<b>0.2434</b>
	<b>Amplitude</b>	0.0069	<b>0.0119</b>

**Table 9: Estimated Political Context Effects (incl. FLQ) for Liberal Party Popularity, 1957-1975**

		FLQ	
		SE	Median
	<b>Memory AR(1)</b>	0.0548	<b>0.8811</b>
	<b>Liberal election</b>	0.0227	-0.0266
	<b>PC election</b>	0.0265	-0.0173
	<b>FLQ</b>	0.0004	<b>0.0017</b>
<b>Government</b>	<b>Constant</b>	0.0628	<b>0.3346</b>
	<b>Trend – Short</b>	0.0114	<b>0.0138</b>
	<b>Phase</b>		<b>0.1498</b>
	<b>Amplitude</b>	0.0101	<b>0.0199</b>
<b>Opposition</b>	<b>Constant</b>	0.0344	<b>0.3291</b>
	<b>Trend – Short</b>	0.0061	0.0076
	<b>Phase</b>		<b>0.2552</b>
	<b>Amplitude</b>	0.0109	<b>0.0193</b>



**Table 10: PC Economic Popularity Estimates Controlling for Political Context Effects, 1957-1975**

		1 Month Lag	
		SD	Median
	<b>Memory AR(1)</b>	0.2191	-0.4755
<b>Government</b>	<b>GDP x Inflation</b>	0.0070	0.0052
	<b>Inflation</b>	0.0141	0.0141
	<b>GDP</b>	0.0136	0.0047
	<b>Unemployment</b>	0.0148	0.0147
	<b>Trend - short</b>	0.1093	0.0520
	<b>Opposition</b>	<b>GDP x Inflation</b>	0.0012
<b>Inflation</b>		0.0041	-0.0030
<b>GDP</b>		0.0095	-0.0004
<b>Unemployment</b>		0.0072	0.0090
<b>Trend - short</b>		0.0512	<b>-0.1382</b>
		<b>Q-Test</b>	<b>P-value</b>
	<b>Residuals</b>	25.8862	0.9589

		Box-Jenkins	
		SD	Median
	<b>Memory AR(1)</b>	0.2353	-0.4848
<b>Government</b>	<b>InflationxGDP(t-2)</b>	0.0080	-0.0008
	<b>Inflation (t-2)</b>	0.0146	0.0151
	<b>GDP (t-2)</b>	0.0192	0.0042
	<b>InflationxGDP(t-3)</b>	0.0068	0.0058
	<b>Inflation (t-3)</b>	0.0127	0.0189
	<b>GDP (t-3)</b>	0.0195	0.0065
	<b>Trend – short</b>	0.0488	<b>0.1092</b>
	<b>Opposition</b>	<b>InflationxGDP(t-2)</b>	0.0014
<b>Inflation (t-2)</b>		0.0095	-0.0017
<b>GDP (t-2)</b>		0.0090	-0.0083
<b>InflationxGDP(t-3)</b>		0.0014	-0.0011
<b>Inflation (t-3)</b>		0.0093	0.0001
<b>GDP (t-3)</b>		0.0099	0.0072
<b>Trend – short</b>		0.0390	<b>-0.0879</b>
			<b>Q-Test</b>
	<b>Residuals</b>	28.6946	0.9084

**Table 11: Liberal Economic Popularity Estimates  
Controlling for Political Context Effects, 1957-1975**

		<b>Refined Box-Jenkins</b>	
		SE	Median
	<b>Memory AR(1)</b>	0.0575	<b>0.8529</b>
<b>Government</b>	<b>Trend – Short</b>	0.0072	<b>0.0179</b>
<b>Opposition</b>	<b>Unemployment (<i>t</i>-6)</b>	0.0017	<b>0.0036</b>
	<b>Trend – Short</b>	0.0096	-0.0119
		<b>Q-Test</b>	<b>P-value</b>
	<b>Residuals</b>	50.0617	0.1323

**Table 12: PC Economic Popularity Estimates  
Controlling for Political Context Effects, 1979-1993**

		<b>Refined Combined</b>	
		SE	Median
	<b>AR(1)</b>	0.0622	<b>0.7314</b>
<b>Government</b>	<b>GDP x Inflation (<i>t</i>-13)</b>	0.0013	<b>-0.0024</b>
	<b>inflation (<i>t</i>-13)</b>	0.0022	<b>-0.0046</b>
	<b>GDP (<i>t</i>-13)</b>	0.0063	<b>0.0112</b>
	<b>intercepts (<i>t</i>-1)</b>	0.0007	<b>-0.0013</b>
	<b>inflation (<i>t</i>-1)</b>	0.0019	-0.0027
	<b>GDP (<i>t</i>-1)</b>	0.0033	<b>0.0066</b>
	<b>Trend – Short</b>	0.0158	<b>0.0397</b>
<b>Opposition</b>	<b>Trend – Short</b>	0.0118	<b>0.0523</b>
		<b>Q-Test</b>	<b>P-value</b>
	<b>Residuals</b>	31.4470	0.8311

**Table 13: Liberal Economic Popularity Estimates  
Controlling for Political Context Effects, 1979-1993**

		Refined Base	
		SE	Median
	<b>Memory AR(1)</b>	0.0440	<b>0.8268</b>
<b>Government</b>	<b>Trend – Short</b>	0.0076	<b>-0.0309</b>
	<b>GDP x Inflation (<i>t-1</i>)</b>	0.0007	<b>0.0014</b>
	<b>Inflation (<i>t-1</i>)</b>	0.0016	-0.0010
	<b>GDP (<i>t-1</i>)</b>	0.0037	<b>-0.0069</b>
	<b>Unemployment (<i>t-1</i>)</b>	0.0017	0.0004
<b>Opposition</b>	<b>Trend – Short</b>	0.0204	-0.0050
		<b>Q-Test</b>	<b>P-value</b>
	<b>Residuals</b>	39.5046	0.4924

**Table 14: Liberal (in government) Economic Popularity Estimates  
Controlling for Political Context Effects, 1993-2000**

	<b>Box-Jenkins</b>	
	SE	Median
<b>Memory AR(1)</b>	0.2957	-0.0351
<b>InflationxGDP(t-5)</b>	0.0050	<b>0.0077</b>
<b>Inflation (t-5)</b>	0.0181	<b>-0.0327</b>
<b>GDP (t-5)</b>	0.0085	-0.0086
<b>Trend – Short</b>	0.0303	0.0463
	<b>Q-Test</b>	<b>P-value</b>
<b>Residuals</b>	33.7664	0.7071