International Journal of Public Opinion Research Vol. 14 No. 3 0954–2892/99 $3.00

ISSUE ATTRIBUTES AND AGENDA-SETTING BY MEDIA, THE PUBLIC, AND POLICYMAKERS IN CANADA

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ABSTRACT

Agenda-setting hypotheses inform research on both media influence and policy making. The study draws from these two literatures, building a more accurate and comprehensive model of the *expanded* agenda-setting process. Evidence is derived from a longitudinal dataset, including a content analysis of Canadian newspapers, results from public opinion polls, and measures of attention to issues in Question Period, committees, Throne Speeches, and legislative initiatives from 1985 to 1995. A model is estimated that accommodates dynamic, multi-directional effects. Findings are presented for three issues—inflation, environment, and debt/deficit—with an eye on examining different agenda-setting dynamics, and the degree to which these dynamics are linked to issue attributes. The results (1) demonstrate the value of an agenda-setting framework and a means of modelling media effects and the policy making process, and (2) indicate the importance of taking issue attributes into account in predicting or accounting for agenda-setting effects.

Relationships between mass media, the public, and policymakers are at the centre of both political communications and everyday politics. These interactions reach into a wide range of research interests, including the media's role in the formation of public opinion and public policy, and the degree to which public policy follows or leads public opinion. Abstractly, we might reflect on the wider implications these relationships have for democratic theory or institutional development. Concretely, we might consider what they tell us about day-to-day

This article was first submitted to *IJPOR* April 3, 2001. The final version was received July 20, 2001. The author wishes to thank Richard Johnston, Byron Shafer, and the Journal's anonymous referees for their comments on previous versions of this paper, Donald Blake, Bryan Jones, Richard Jenkins, and Patrick Fournier for their helpful comments on related work, and William Veloce and Lewis Soroka for their help with economic and statistical matters. The Social Sciences and Humanities Research Council of Canada provided support for this research in the form of a doctoral fellowship. Public opinion data analysed within were made available by the University of British Columbia Numeric Data Services, the Centre for the Study of Democracy at Queen's University, and the Carleton University Data Centre. None of these institutions or individuals bears any responsibility for errors or omissions in the final product.

interactions between newspapers, television, citizens, politicians, and bureaucrats.

That these topics are typically examined only in part is no surprise, considering the scope of the territory covered. An *agenda-setting* framework offers the possibility of looking concurrently at a wide range of political relationships, however, and of empirically mapping political communications at the societal level. Admittedly, agenda-setting research has rarely capitalized on this potential. Work on public agenda-setting has seldom drawn from policy agenda-setting research, and vice versa. Nevertheless, past work suggests that agenda-setting models are capable of accommodating both media-public dynamics and the relationships between these actors and the policy process.

The paper that follows represents one attempt at doing exactly this. It is based on data for three issues from Canada, but the model is easily adapted to any issue in any democracy. Policy measures will likely change with different governing institutions, of course, as will media-public-policy relationships. But the general tenets upon which this research is based—the value of an agenda-setting framework, a statistical model of the *expanded* agenda-setting process, and an acknowledged relationship between agenda-setting dynamics and issue attributes—are described here with the expectation that they are valuable beyond the Canadian examples used below.

We begin with a brief review of public and policy agenda-setting research. This body of research is considerable, as are its contributions to political science and communications. Nevertheless, the literature has remained splintered and is often beleaguered by methodological difficulties. Some of these difficulties are described below, and a new model and measures are presented with the aim both of uniting the vast bodies of past public and policy agenda-setting work, and of better accommodating dynamic, multi-directional relationships. This model is then estimated for three issues in Canada—inflation, environment, and debt/deficit. Results are discussed as they pertain to the Canadian experience in particular and, more generally, to the agenda-setting framework and the connection between issue attributes and issue dynamics.

AGENDA-SETTING: PROBLEMS AND POTENTIAL

Agenda-setting research focuses not on issue opinions, *per se*, but on issue salience. Cohen was the first to state what has become the central public agenda-setting hypothesis: the press 'may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about' (Cohen 1963, p. 13). Following from Cohen's discussion, *public agenda-setting* work demonstrates that increased issue salience for the media leads to increased issue salience for the public—in agenda-setting terms, that the media agenda has an impact on the public agenda, where an

agenda is a 'ranking of the relative importance of various public issues' (Dearing 1989, p. 310). McCombs and Shaw's (1972) study stands as the first empirical public agenda-setting study; well over 150 have followed in their footsteps.[1]

Cobb and Elder (1972), meanwhile, have used a similar framework to examine public policy formation. Subsequent *policy agenda-setting* studies examine relationships between media and policy, as well as public and policy agendas.[2] Studies by Kingdon (1995) and Baumgartner and Jones (1993) represent the current state of this line of research; in their consideration of public opinion, in fact, Baumgartner and Jones' work stands as one of the few recent policy-oriented studies to draw from both the public *and* policy agenda-setting traditions.

The combination of empirical work on public opinion and on public policy is long overdue; recent efforts include only half-hearted attempts to build models using both public opinion and policy measures. Nevertheless, it is clear that effects of/on the public and of/on policymakers are intimately connected, and the most significant advantage of an agenda-setting framework is its ability—through the use of a common vernacular and directly comparable measures—to combine mass media analysis, public opinion research, and studies of the policymaking process. In this way, agenda-setting work is uniquely qualified to offer empirical accounts of political communications at the societal level. A central goal of the current work is to demonstrate this fact, by making an explicit effort to combine public opinion- and policy-oriented agenda-setting analysis, and by building a model that empirically links media, public, and policy agendas.

Combining disparate literatures on agenda-setting is the first goal of this project; recognizing and accommodating for the fact that different issues will have different agenda-setting dynamics is the second. Different issues have led to markedly different agenda-setting results, after all, and recent work suggests that the direction of media-public, media-policy, and public-policy relationships vary both across issues and over time (Brosius and Kepplinger 1990, Gonzenbach 1996, Soroka 1999*a*). Different hypotheses have been offered to account for this varied evidence. Some is due simply to methodological differences—measures of agendas and means of analysis have varied widely. Issue attributes also play a role, however. Zucker's (1978) 'obtrusiveness' hypothesis is perhaps the best-known issue attribute theory: he suggests that the more obtrusive an issue is—the more likely individuals experience it directly—the less potential there is for media effects on public opinion. Other authors have suggested additional hypotheses: (1) 'concrete' issues should be more open to media effects than

[1] For thorough reviews of the agenda-setting literature, see Dearing and Rogers (1996), McCombs and Shaw (1993), and Rogers *et al.* (1993).

[2] There is no equivalent review of the policy agenda-setting literature, although some of it is covered in the public agenda-setting reviews. For a representative sample of work on the USA—other than those mentioned above—see Mayer (1991), Page and Shapiro (1983, 1992), Pritchard (1986), and Wanta *et al.* (1989); for work on Canada, see Howlett (1997, 1998) and Soroka (1999*b*, 2002).

'abstract' issues (Yagade and Dozier 1990); (2) the public has a limited attention span, so issues that are salient for a long period will eventually offer less opportunity for media impact (Downs 1972, Zucker 1978); (3) issues that involve dramatic events or conflict should have an increased potential for media attention and effects on public opinion (MacKuen and Coombs 1981, Wanta and Hu 1993).

In spite of their potential for accounting for (and predicting) variation in agenda-setting effects, hypotheses about the role of issue attributes in agenda-setting have received only intermittent attention in the public agenda-setting literature. Moreover, they have tended to deal more with the media-public link than with links between these and policy agendas. In fact, no effort has been made to test hypotheses regarding the role of issue attributes in the larger agenda-setting process. Accordingly, three issues—inflation, environment, and debt/deficit—are examined below with an eye towards both highlighting differences in issue attributes, and testing the potential for issue attribute hypotheses in accounting for different media-public-policy agenda-setting dynamics.[3]

THE ISSUES

Inflation

Inflation in Canada from 1985 to 1995 falls into two periods. 'From 1982 to 1991', Theissen (1998) writes, monetary policy in Canada was carried out with price stability as the longer-term goal and inflation containment as the shorter-term goal, but without intermediate targets or a specified path to the longer-term objective' (Theissen 1998, p. 417). This method proved unsatisfactory, leading to a peak in inflation in 1989–91. New inflation targets were then introduced as part of the 1991 budget, and inflation began to decline dramatically. In fact, actual inflation declined much more quickly than expected inflation during this period (Johnson 1997), reaching a low point in 1994 and then balancing out for the rest of the period.

We expect inflation to be the quintessential 'obtrusive' issue. This is an issue that most individuals experience regularly—the public does not need the media to tell them when inflation is bad. Rather, public concern about inflation should simply follow the rate of inflation. Indeed, Figure 2, along with the bulk of past work on public agenda-setting for inflation shows that this is an accurate description of trends in public opinion (Behr and Iyengar 1985, Demers *et al.*

[3] The issues surveyed here represent a subset of the eight issues originally investigated by the author: AIDS, crime, debt/deficit, environment, inflation, national unity, taxes, and unemployment (see Soroka 1999*a*, 2002). These three issues have been selected since they illustrate variation in both issue attributes and agenda-setting results; it is worth noting, however, that the theory and methodology used here was successful at modeling agenda-setting dynamics for seven of the eight issues originally surveyed. (Due to little variation in public opinion on AIDS, this estimation was less successful.)

1989, MacKuen and Coombs 1981, Winter *et al.* 1982). The forthcoming estimation will provide an additional test of this hypothesis.

Environment

Environmental issues went through a period of increased salience in the late 1980s/early 1990s. This period is marked by the crash of the Exxon Valdez oil tanker in March 1989, the twentieth anniversary of Earth Day in April 1990, and the much-touted June 1992 United Nations Conference on Environment and Development in Rio de Janeiro. Environmental policy-making was also at a high during this period, with the Canadian Environmental Protection Act (1988) and the formulation and introduction of the Green Plan (1990). The Plan detailed federal environmental initiatives and objectives, and served as a guide for Federal behaviour until 1995.

Environment should be more open to media influence than inflation. Most individuals will not experience environmental problems everyday—the issue is 'unobtrustive', so there exists the possibility that the media will seize on an environmental issue and increase public concern. Additionally, the existence of dramatic events should increase the potential for media effects. Environmental issues have received considerable attention in agenda-setting literature, partly because they play the role of guinea pig in Downs' (1972) seminal 'issue attention cycle' article. Again, both the time series illustrated in Figure 2 and past research suggest a similar result: the media agenda should lead the public and policy agendas, and there should be virtually no relationship between any of these agendas and real-world environmental indicators (Ader 1995, Atwater *et al.* 1985, Brosius and Kepplinger 1990, Hansen 1991, Hester and Gonzenbach 1995, Iyengar and Kinder 1987, MacKuen and Coombs 1981, Parlour and Schatzow 1978, Smith 1987).

Debt and Deficit

After declining gradually since World War II, Canadian federal government debt (as a percentage of GDP) began to climb again in the mid-1970s. This was largely a product of the expansionary fiscal policy used to fight effects of the first oil shock in the early 1970s and the recession in the early 1980s. The federal government was extremely lax in controlling its debt throughout the 1980s (Kneebone 1994). Dodge suggests that political and public attention to the debt was restricted during this time by the focus on free trade and tax reform: 'Governments and the public can really only focus on one or two economic issues at a time' (Dodge 1998, p. 282). As a result, public attention and political will did not grow until the debt problem had worsened considerably. Politicians and the public recognized it as a major problem only passingly in

April of 1989, the month of the first budget discussion in which deficit and deficit slashing were identified as pressing concerns, and then not for an extended period until 1993 (with the budget of that year, the following election, and actions by the new Liberal government to eliminate deficits). The height of concern over federal debt and deficits occurred after the period surveyed here, likely around the time of the 1998 election.

The debt/deficit is both unobtrusive and abstract, and is unlikely to become salient unless policymakers emphasize it. The public does not feel the presence of the federal debt/deficit directly, after all, and the media are likely to remain either oblivious to or uninterested in the problem until policymakers highlight it. Past agenda-setting research has demonstrated moderate effects of the media on public attention to public debt and deficits (Brosius and Kepplinger 1990, Jasperson *et al.* 1998, Weaver 1991). These studies have not considered the role of policymakers, however, and in the Canadian case—where both periods of heightened debt/deficit salience seem to have been brought on by government actors identifying the problem and staking a political claim—the policy agenda is likely an important part of the story. Accordingly, the increased salience of debt/deficit in Canada should provide an example of policy agendas leading media and public agendas.

In short, past issue attribute hypotheses suggest that inflation should be real-world-driven, environment should be media-driven, and debt/deficit should be policy-driven. The modeling effort that follows represents one attempt to test these specific hypotheses. More generally, our work is guided by the following expectations: (1) different issues display different agenda-setting dynamics, and (2) this variance in dynamics is linked to issue attributes.

RESEARCH DESIGN

The Model

Past agenda-setting work has shown that relationships between the media, public, and policymakers can vary in direction, or be bi-directional. That the statistical procedures used have not been able to accommodate or estimate these dynamic, bi-directional links, then, stands as a major flaw with much past work. Bartels' (1996) recent examination of the press-policy relationship stands as an exception—he uses vector autoregression (VAR) to model the bi-directional relationship between these two agendas. The work below follows suit by estimating a system of equations using seemingly unrelated regressions (SUR).

We begin with an illustration of the *expanded* model upon which our equations are based. Figure 1 illustrates the hypothesized relationships between the media, public, and policymakers. The three primary agendas are illustrated, and causal arrows run in both directions between most of them. There is no direct link

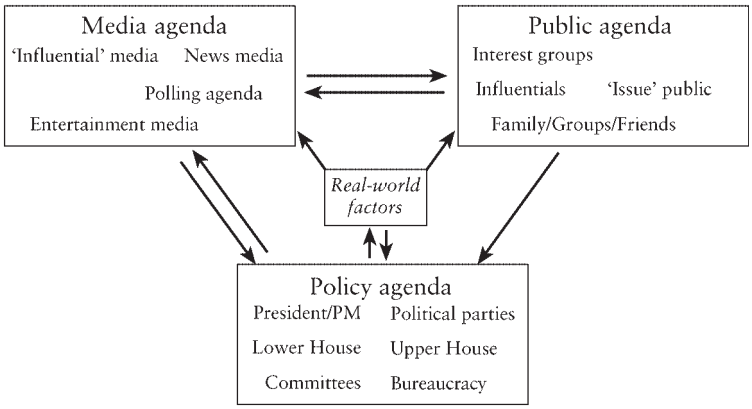

FIGURE 1 **An expanded model of the agenda-setting process**

from the policy to the public agenda, based on the assumption that policymakers can affect the public through the media or real-world indicators, but not directly. Real-world factors are located at the centre, affected by policymakers and affecting each of the three agendas. A number of sub-agendas are illustrated within each of the primary agendas. This points to the fact that the primary agendas might be represented in different ways, but also to the possibility of both intra- and inter-agenda analysis. We might explore whether the *New York Times* affects the media agenda, for example, or the relationship between the Cabinet and House agendas. The model, then, accomplishes two tasks: (1) it provides a framework with which to compare, contrast, and combine a wide variety of agenda-setting analyses, and (2) it makes few assumptions about directions of causality, emphasizing the possibility of multi-directional agenda-setting and suggesting a structure for empirical investigation.

Following from Figure 1, an *expanded* agenda-setting process is estimated below using a system of three equations—one for each of the primary agendas. The basic model is as follows:

$$MD_t = MD_{t-k} + PB_{t-k} + QP_{t-k} + Cm_{t,t+1} + PMb_{t,t+1} + Gb_{t,t+1} + THSp_{t,t+1} + Ec_{t-1,t,t+1} + Bd_{t-1,t,t+1} + RW_{t-m} \quad (1)$$

$$PB_t = MD_{t-k} + PB_{t-k} + Ec_{t-1,t,t+1} + RW_{t-m} \quad (2)$$

$$QP_t = MD_{t-k} + PB_{t-k} + QP_{t-k} + Cm_{t,t+1} + PMb_{t,t+1} + Gb_{t,t+1} + THSp_{t,t+1} + Bd_{t-1,t,t+1} + RW_{t-m} + sit, \quad (3)$$

where *MD* is the media agenda, *PB* is the public agenda, *QP* is Question Period content, *Cm* is Parliamentary committee reports, *PMb* is Private Members' Bills, *Gb* is Government Bills, *THSp* is Throne Speech content, *Ec*, *Bd*, and

sit are dummy variables representing elections, budgets, and whether the House was sitting in a given month, and *RW* is real-world indicators.

The Measures

MD, *PB*, and *QP* are the three endogenous variables. The Canadian media agenda is measured using title searches for seven English newspapers (the *Halifax Chronicle Herald*, *Montreal Gazette*, *Globe and Mail*, *Toronto Star*, *Winnipeg Free Press*, *Calgary Herald*, and *Vancouver Sun*) in *Canadian Business and Current Affairs*, and one French newspaper (*La Presse*) in *Eureka*. The end result is a monthly time-series of the number of articles in Canadian newspapers with a particular keyword (e.g., 'inflation') in the title.[4]

The public opinion time series is based on responses to an open-ended survey question similar to, 'What do you think is the most important problem facing Canada today?', every time it was asked by six Canadian polling firms (Angus Reid, CBC/Globe and Mail, Decima, Environics, Gallup, and Pollara). While question wording varies somewhat, Smith (1980, 1985) suggests that most responses to 'the most important problem' (MIP) question are generally not affected by wording changes; preliminary tests led Soroka (2002) to the same conclusion. Results from the six firms are roughly comparable, then, and the responses are combined to create a monthly measure of the proportion of respondents giving a particular response (e.g. 'inflation').[5]

While the specification of media and public agendas is relatively straightforward, selecting a single measure of the policy agenda is more difficult. There is a considerable body of literature dealing with the policy agenda, certainly, but its measures vary widely. Moreover, the vast majority of work on policy agendas has been performed in the USA, where committee meetings, bill introductions, and presidential papers are easily measured and stand as reasonably accurate indicators of the policy agenda. The situation is very different in Canada, where a cabinet-centred parliamentary system with extraordinarily

[4] The newspapers used provide a good sample of newspapers in different provinces. *La Presse* is the only French-language newspaper for which data are available from 1985. All time series are the product of title searches using the following keywords: *Inflation*: inflation. *Environment*: environment; environmental; environmentalist; environmentalism; conservation; conservationalist; ozone; endangered and species; endangered and animal; endangered and plant; endangered and tree; endangered and fish; global warming; clearcut; clearcutting; acid rain; pollution; pollute; pollutant; polluter. *Debt/Deficit*: debt and national; debt and federal; debt and government; debt and public; deficit and national; deficit and federal. (Plurals are not listed, but were included in searches where appropriate. French equivalents, and feminine forms of words, were used for *La Presse* in *Eureka*.)

[5] In cases when more than one poll exists for a given month, results are combined and the proportion of all responses is used. A limited number of cases allowed for two responses. In these cases, again, the proportion of all responses is used (as in Behr and Iyengar 1985). Data are interpolated, using linear interpolation, for months in which no poll exists; this did not have to be done for very many months, and never more than two consecutively. Variations in question wording and the specific dates of polls are not listed here, but are available in Soroka (1999*a*, 2002), or upon request from the author.

strong party discipline ensures that committees play a small role, the potential for bill introductions is severely restricted, and the majority of important policy discussion takes place unrecorded behind closed doors.

Taking these factors into account, it is likely that debate in the legislature is the best single measure of the policy agenda in Canada. Question Period (QP)—a forty-minute period during which opposition parties pose questions to Cabinet members—seems especially likely to offer an indication of the issues that are important to policymakers on a daily basis. Moreover, QP appears to be one governmental forum where day-to-day changes may be evident. Pritchard and Berkowitz (1993, p. 86) suggest that *symbolic* agendas, relating primarily to attention by policymakers to issues, are more easily changed than *resource* agendas, which are more closely linked to the allocation of capital (human or financial). We should expect, then, that while spending priorities or legislative initiatives will be slow to show agenda change, QP will be more likely to show short-term changes in issue salience.

The susceptibility of QP to short-term change is especially useful for a study using ten years of monthly data. Accordingly, QP content is used here as our primary measure of the policy agenda: *QP* is the number of column centimetres in Hansard, monthly, during Question Period, dealing with one of our three issues. The number of column centimetres is divided by the number of days the House sat each month to control for differences in this regard, and a dummy variable for months in which the House did not sit at all (*sit*) is included in equation 3 to soak up the effects of months in which there was no potential for the QP measure to be anything other than zero.

We must be careful not to treat QP content as an indicator of the entire policy agenda, of course—QP content is an accurate indication of what MPs are discussing in Question Period, but it is far less accurate at indicating legislative initiatives, committee discussions, or changes in spending priorities. That said, in an effort to better account for the possibility that media content and/or public opinion are affected by these other indicators of policy agendas, several additional measures are included as exogenous variables: (1) the number of related committee reports presented in the House each month (*Cm*), (2) the number of bill discussions (Private Members' and Government Bills; 1st, 2nd, 3rd, and other readings) in the House each month, and (3) the proportion of the Throne Speech given to an issue in months when there was a Throne Speech (*THSp*).[6] The fact that these are more resource-oriented (and will therefore tend to be more incremental in change than Question Period), justifies—or at least necessitates—their exogeneity in our model of relatively short-term effects. Nevertheless, including these measures provides a better

[6] The Throne Speech is the Canadian equivalent of the State of the Union Address in the USA, or the Queen's Speech in the UK. It is a statement of the Government's priorities, read by the Governor General, at the beginning of a new session of Parliament.

representation of the policy agenda and should improve our ability to identify effects of policy agendas on media content and public opinion.

The model also includes dummy variables for elections and budgets (*Ec*, *Bd*). These events may have an effect on attention to issues, and so are included here both to test this possibility and to control for these effects in the larger estimation. Since the House does not usually sit for several months previous to or following an election, the election variable is included only in the media and public equations. Budgets, on the other hand, should not affect the public directly—most people do not have direct experience with budgets, so effects of the budget, and other policy indicators, on public opinion should occur via the media. Accordingly, this variable is included in only the media and policy equations.

Finally, the models include real-world indicators (*RW*). The inflation model includes monthly changes in the consumer price index (CPI); the debt/deficit model includes yearly changes in the debt as a proportion of GDP, and yearly changes in the deficit as a proportion of Federal Government spending; the environment model includes yearly changes in the number of hectares harvested (forests), ozone depleting substances, carbon dioxide emissions, and number of species at risk.[7] The multiple environmental measures reflect the difficulty in selecting a single measure of the state of the environment. Nevertheless, including real-world indicators in the model is essential to the overall estimation. On the one hand, including real-world indicators allows us to judge the degree to which various agendas are connected to the real world. Perhaps more fundamental, however, is the fact that evidence of relationships between media, public, or policy agendas is more convincing if we can show that these relationships function independently of real-world circumstances.[8] Differenced series are used based on a belief that reactions by the public, media, and policymakers will most often be to relative changes in the various real world indicators rather than their actual values.

The number of lags used for endogenous variables (k) and real world indicators (m) is determined using the usual strategy for VAR/SUR estimations: (1) the model is estimated using a maximum number of lags (based either on data constraints or theoretical premise), (2) lags are dropped one-by-one if they are not statistically significant, and (3) provided the model's residuals show no autocorrelation, the model is accepted. The number of lags for exogenous

[7] Details on real-world indicators are as follows: Consumer price indexes (monthly, 1996 classification), Debt (annually, as a proportion of GDP), and Deficit (annually, as a proportion of Federal Government Revenue) are from *Statistics Canada*; timber harvest levels (Annual area harvested, 1000s of hectares), new supplies of ozone-depleting substances, CFCs and other ODS, Carbon dioxide emissions from fossil fuel use (megatonnes), and cumulative change in risked species (of all species, subspecies, and populations evaluated by COSEWIC) are reported in *Canada's Environmental Indicators* Series, Environment Canada.

[8] For further discussion about the importance of real world indicators in agenda-setting estimations, see Behr and Iyengar (1985), Rogers and Dearing (1988), and Zucker (1978).

variables was based on a series of preliminary tests. Any correlation between the exogenous policy variables and the others exists either concurrently or within a one-month period. Accordingly, they are included at lags t and $t+1$ only. Any election and budget effects also happen within a one-month period, but the impact of these phenomena sometimes precedes the actual event.[9] Election and budget variables, then, are included at lags $t-1$, t, and $t+1$.

Media, policy, and real-world data were collected from 1985 to 1995. Not all issues were coded by all polling firms from 1985 onwards, however, so the estimations are restricted to the time-period for which public opinion data were available. The inflation estimation begins in May 1985; environment in June 1988; debt/deficit in May 1988.

The Estimation

Equations 1 to 3 are estimated as a system using Zellner's (1962) seemingly unrelated regressions (SUR) procedures.[10] The only problem with solving the equations in this way is that multiple lags and an estimation that allows for both direct and indirect effects combine to make interpreting the results considerably more difficult than in a standard regression. The multicollinearity that can result from the use of many lagged variables, for example, produces the possibility that, while the overall effects are accurate, the individual coefficients are not. We can no longer examine individual coefficients; we can, however, make more convincing claims about causal relationships between variables (Freeman *et al.* 1989).

Accordingly, our interpretation of the results is based on Granger exogeneity tests and impulse response functions. These are typical means of interpreting VAR/SUR models; the methodology involved, and their use in political science, has been well described elsewhere. Granger tests, on the one hand, are used to test the null hypothesis that the sum of all lags for a given variable in a single equation is equal to zero.[11] These tests provide a snapshot of causal effects; they do not indicate the sign of the effects, however, and give only a thin

[9] The effect of elections on the public, for instance, can happen during the campaign period in the month preceding the actual vote. Similarly, anticipation of the April budget can have an effect on Question Period discussion in March.

[10] Statistically speaking, SUR techniques use Aitken's generalized least squares (GLS) to solve a system of equations accounting for linked error terms, creating more efficient estimates in certain situations than either ordinary least squares (OLS) on individual equations or a vector autoregression (VAR) OLS estimation. SUR is used here rather than VAR because the right-hand side variables are not the same across equations 1 to 3. For a discussion of the advantages of SUR over VAR when this is the case, see Greene (1992) or Dwivedi and Srivastava (1978).

[11] This is an extension of the simple Granger causality test (Granger 1969, Freeman 1983): (1) a model such as equation 1 is estimated with and without variable PB_t, and (2) a likelihood ratio test is used to test the null hypothesis that the history of PB_t contributes nothing to the prediction of MD_t. A statistically significant test is taken as an indication of causality, while an insignificant test is taken as an indication that PB_t is exogenous to the process.

indication of the dynamic relationship between two variables. Impulse response functions, then, are used to provide more detailed information about the relationships between endogenous variables. The mechanics are complicated and will be left to statistics texts (e.g. Enders 1996); for our purposes, a brief explanation will suffice. All autoregressive (AR) processes have a moving average (MA) representation, where the current value of an endogenous variable is expressed in terms of present and past shocks to each endogenous variable. For a VAR/SUR estimation, the resulting sets of MA coefficients are called impulse response functions, and plotting them over time is a way to visually represent the behaviour of the endogenous series in response to shocks in one of these series. If results are standardized, the effects of or on each variable are directly comparable, and provide a useful tool with which to examine the magnitude, direction, and duration of causal effects.[12]

In sum, our model is aimed at measuring multi-directional causal relationships between media, public, and policy agendas. Efforts have been made to include all the relevant variables and causal links. Statistically speaking, this should increase the accuracy of our estimations, and lead to more reliable indications of causality. Practically speaking, it should lead to a more complete picture of political communications in Canada, and provide a model that is easily adapted to a wide variety of countries and issues.

RESULTS

Results for all issues are displayed in Table 1 and Figure 3. Table 1 (A to C) presents the results of the Granger exogeneity tests. Each dependent variable is listed (column 1) along with all its independents (column 2). The chi-square test (column 3) tests the null hypothesis that all the coefficients for that independent variable are not different than zero. A significant chi-square test (column 4), therefore, indicates that lags of the independent variable contribute significant information to the prediction of the dependent, above and beyond the effects of all the other variables in the system, and—since this is an SUR estimation—taking into account the possibility that the individual equations are related.

Figure 3 (A to I) illustrates the impulse response functions. In each case, three graphs are displayed for each issue. Those in the first column illustrate the effects on each agenda of a one standard deviation impulse in the media agenda; graphs in the next two columns do the same for the public and policy

[12] Impulse response functions are estimated using *RATS* (*Regression Analysis for Time Series*), using a relatively simple Bernanke–Sims decomposition (Bernanke 1986, Sims 1986), where each series is affected contemporaneously by its own innovations, but effects of the other two endogenous series do not appear until the next month.

TABLE 1 **Granger exogeneity test results**

Dependent variable	*Independent variable*	*Chi²* [a]	*Sig.*	*Dependent variable*	*Independent variable*	*Chi²* [a]	*Sig.*
A Inflation							
Media	Media	**40.77**	**(0.000)**	Public	Media	2.29	(0.809)
	Public	6.69	(0.245)		Public	**1086.03**	**(0.000)**
	Policy	**9.92**	**(0.078)**		Election	1.36	(0.715)
	Throne Speech	0.19	(0.909)		Real World	**12.81**	**(0.012)**
	Elections	3.15	(0.369)				
	Budget	**30.94**	**(0.000)**	Policy	Media	5.54	(0.353)
	Real World	5.85	(0.211)		Public	**15.06**	**(0.010)**
					Policy	**10.52**	**(0.062)**
					Throne Speech	**29.11**	**(0.000)**
					Budget	5.99	(0.112)
					Real World	**65.07**	**(0.000)**
B Environment							
Media	Media	**10.86**	**(0.054)**	Public	Media	**10.80**	**(0.055)**
	Public	**14.34**	**(0.014)**		Public	**65.77**	**(0.000)**
	Policy	**18.79**	**(0.002)**		Election	**13.13**	**(0.004)**
	Committees	1.98	(0.371)		Real World	**33.93**	**(0.000)**
	Bills	**14.20**	**(0.007)**				
	Throne Speech	**13.72**	**(0.001)**	Policy	Media	**14.78**	**(0.011)**
	Election	0.23	(0.972)		Public	**18.51**	**(0.002)**
	Budget	**17.61**	**(0.001)**		Policy	**16.83**	**(0.005)**
	Real World	6.93	(0.140)		Committees	1.88	(0.391)
					Bills	6.95	(0.138)
					Throne Speech	1.46	(0.483)
					Budget	3.38	(0.336)
					Real World	**13.82**	**(0.008)**
C Debt and deficit							
Media	Media	3.10	(0.377)	Public	Media	**16.49**	**(0.001)**
	Public	5.59	(0.133)		Public	**64.54**	**(0.000)**
	Policy	0.57	(0.903)		Election	2.27	(0.517)
	Committees	1.03	(0.596)		Real World	0.22	(0.894)
	Bills	1.53	(0.466)		Economy	5.32	(0.150)
	Throne Speech	**8.02**	**(0.018)**				
	Elections	5.56	(0.135)	Policy	Media	**10.91**	**(0.012)**
	Budget	5.80	(0.122)		Public	0.69	(0.876)
	Real World	2.90	(0.235)		Policy	**6.30**	**(0.098)**
					Economy	3.71	(0.294)
					Committees	0.55	(0.760)
					Bills	**11.82**	**(0.003)**
					Throne Speech	1.74	(0.418)
					Budget	5.39	(0.146)
					Real World	2.32	(0.313)
					Economy	**10.08**	**(0.018)**

Chi square tests in bold are significant at $p < .10$
[a] df = 5. [b] df = 3.

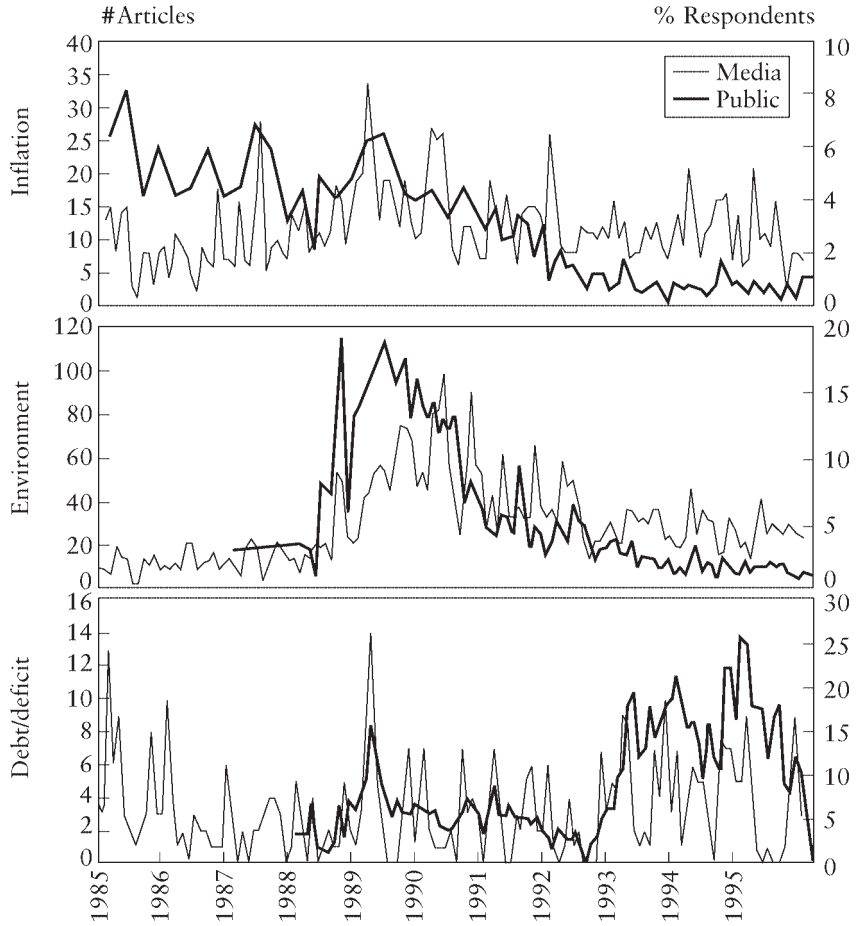

FIGURE 2 **Issue time series**

agendas, respectively. These graphs are discussed below, along with the Granger results, issue by issue.

Granger test results for inflation (Table 1A) offer an obvious and strong illustration of prominent issue dynamics. Each series is autocorrelated—past values of each series are significant predictors of current values (the media coefficients are significant in the media model, for example). More importantly, significance tests of real-world lags indicate that the public and policy agendas are led by changes in the CPI. Some other effects are also evident—budgets spark attention to inflation in the media, for example, while Throne Speech content creates a similar rise in attention during Question Period. There is also a significant effect of the public on QP content, and the policy on the media agenda. Impulse response functions (Figure 3) indicate that the public impact

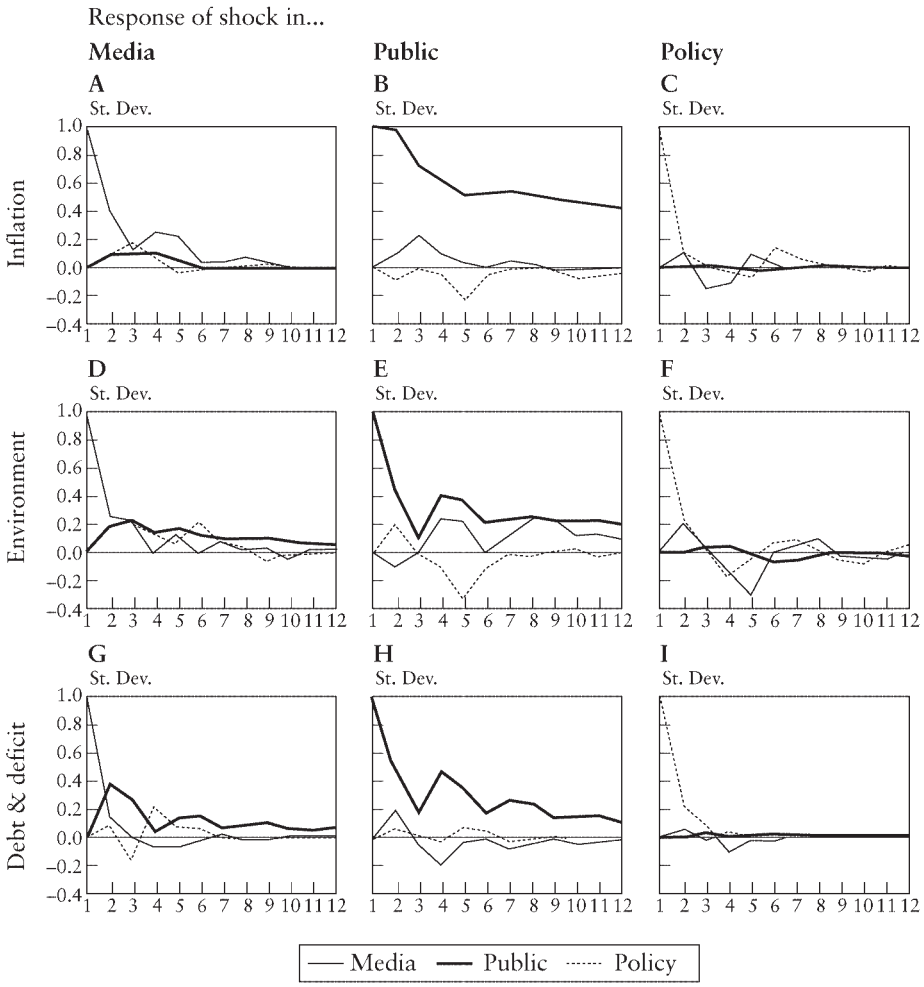

FIGURE 3 **Impulse response functions**

on QP content is negative, however, and so has no substantive explanation.

The dominance of the real-world indicator over other inter-agenda effects is also illustrated in the impulse response functions (Figure 3A–C). Public opinion appears to be virtually independent of the media agenda—an impact on the media series leads to only a very small rise in the public series in periods 2–4 (Figure 3A). There is a media-policy interaction, with a Question Period impact on media at period 2, and a slightly more sizeable media impact on the public agenda at periods 2–4 (Figure 3C, A). Finally, it is worth noting that public opinion has a moderate positive effect on media content at periods 2–5 (Figure 3B). This may suggest that the public reacts early to increases in inflation, and

that media response is dually to inflation and to public reaction to it. The magnitude of all these effects is relatively small, however; the absence of significant effects in the impulse response functions illustrates the fact that concern about inflation is driven for the most part by inflation itself.

In contrast, the Granger tests for environment (Table 1B) present evidence of sensational issue, media-driven effects. Again, each endogenous series is autocorrelated. Unlike results for inflation, however, environment results show a significant impact of the media on both the public and policy agendas. This is also reflected in the impulse response functions—a rise in media attention leads to increases in both the public and policy series (Figure 3D). By way of comparison, the effects of the media on the public agenda are roughly twice as large as those for inflation, and considerably more durable.

That said, media effects are only part of the story. The public agenda affects the policy agenda at period 2, and has a delayed but considerable impact on the media agenda as well. The policy agenda also has an effect on media attention at period 2 (Figure 3E, F). These effects are also evident in Granger tests, where all three endogenous agendas are significant predictors of all other agendas. The media plays a significant role in increased attention to environmental issues, therefore, but results indicate that the media, public, and policymakers play mutually reinforcing roles.

While uni-directional effects of the media on other agendas are not identified in this model, however, additional considerations do suggest the comparative significance of the media as a leader over the public and policy agendas. Impulse response functions suggest that media effects on the public begin at period 2 and are lasting, for instance. Public effects on the media are initially small and negative, on the other hand, and do not become positive until period four (Figure 3D, E). These dynamics suggest the possibility that while the relationship between the media and public becomes a reciprocal one, the initial relationship is one in which the media leads.

Impulse response functions also indicate that media effects on policymakers are slightly greater and more prolonged than are effects in the other direction. The predominant direction of the media-policy relationship can be determined in a more convincing manner using weekly series, however. While these estimations use monthly data, both the media and policy time series are available on a weekly basis, and similar analyses of these data may provide a more accurate look at inter-agenda dynamics. Granger causality tests with this weekly data indicate that media Granger-causes policy, and that policy does not Granger-cause media (using 4 lags; $F = 2.274$; *significance* $= .05$; $df = 4,558$). As with the public, then, and demonstrated in a more compelling fashion, the media plays the dominant role in the media-policy relationship, in line with our expectations for environmental issues.

Turning finally to results for debt/deficit, Granger tests serve to emphasize

the importance of the media agenda (Table 1C). In spite of very little autocorrelation in the media series, tests show the media has a positive effect on both the public and policy agendas. This effect is further indicated in the impulse response functions, which indicate that an increase in salience for the media leads to a marked and sustained increase in the public agenda, and—while the effects are more irregular—the policy agenda is also positively affected (Figure 3G).

The expected policy effects on the media agenda are less clear—certainly, results show this relationship is likely to be bi- rather than uni-directional. Preliminary tests showed the two series are strongly correlated at lag 0; Granger tests offer evidence of causality running from media to Question Period and not in the other direction. This relationship is also reflected in the impulse response functions—there is an irregular but evident effect of media on policy, and virtually no effect of policy on media (Figure 3G, I).

A more conspicuous effect of policy on the media agenda takes the form of a strong and significant Throne Speech coefficient at lag 0,[13] and, consequently, a significant Granger test for Throne Speech coefficients in Table 1C. The significant effects here are likely attributable to the 1989 Throne Speech. Interestingly, this Throne Speech variable is not a significant predictor for the Question Period series. Nevertheless, the speech seems to have sparked media attention to the issue, and we can hypothesize that subsequent attention is in large part a product of this increased media attention.

The significant Throne Speech coefficient is evidence of two facts. First, it is clear that the debt/deficit issue was driven by both media and policymakers in Canada. Media plays an important role in increasing attention to debt/deficit issues, but this attention was sparked by the 1989 Throne Speech. Secondly, and more generally speaking, these results emphasize the potential problems with using only one measure as an indication of the policy agenda. Granger tests, after all, show a uni-directional effect of the media agenda on Question Period content. Without the additional policy measures, we would miss an important part of the picture of the dynamics surrounding the debt/deficit issue in Canada.

ANALYSIS AND CONCLUSIONS

The preceding work is very much an argument for a particular way of looking at politics. It is rooted in the belief that issues are an extraordinarily valuable unit of analysis. Moreover, it suggests that an agenda-setting framework offers the tools necessary to combine mass media studies, public opinion analysis, and public policy research. These fields are intimately connected, and examining

[13] The actual coefficients are not reported here, but are available upon request from the author.

them concurrently provides a more complete, and probably more accurate picture of the political interactions in a society.

In spite of its methodological perspective, however, this work does present specific findings, and these support specific conclusions. To summarize, we review our two major hypotheses:

1 *Different issues display different agenda-setting dynamics*: Our evidence suggests that agenda-setting dynamics will vary in both magnitude and direction. Variance in the direction of effects is most visibly demonstrated by the Granger tests. The media, public, and policy agendas sometimes lead, and sometimes follow. The magnitude of effects, on the other hand, is evident in the impulse response functions. Graphs in the first and third columns of Figure 3 illustrate the varied magnitude and longevity of media and policy effects, for instance, while the second column shows a public agenda that does far more than simply follow media content.

2 *This variance in dynamics is linked to issue attributes*: Results confirm what our descriptions of each issue suggest—differences in agenda-setting dynamics are systematically linked to issue attributes. The first column of impulse response functions, for instance, shows that media impact on the public is smaller for inflation than for the environment and debt/deficit; Granger tests corroborate the fact that the media leads for the latter two issues, but not the former. In line with Zucker's (1978) obtrusiveness hypothesis, then, the potential for media influence appears restricted for issues that the public experiences directly. Inflation is one such issue, and the evidence above demonstrates that the Canadian public (and policymakers) react to real-world economic conditions rather than media content.

The media's role is stronger for environmental and debt/deficit issues. For the environment, effects between media, public, and policy agendas appear to be multi-directional, suggesting that the increased salience in the late 1980s was not simply a product of media emphasis. Nevertheless, further analysis suggest that the media played an especially important role. The debt/deficit issue, on the other hand, displays very strong media effects on the public, while additional exogenous variables suggest that the Throne Speech sparked media interest. In this case, policymakers initiated the rise in issue salience—an important finding, since very little work on public agenda-setting has sought to empirically connect the policy, media, *and* public agendas.

In sum, the issues surveyed here suggest three different agenda-setting dynamics—in Canada, from 1985 to 1995, inflation was real-world-driven, environmental issues were media-driven, and debt/deficit issues were policy-driven. This outcome confirms our hypotheses, and lends support to the more general notion that there are important and traceable interactions between

media, public opinion, and policymakers. Narrowly conceived, our results demonstrate the value of an agenda-setting framework, a means of modeling media effects and the policy process, and the importance of issue attributes in agenda-setting processes. Broadly conceived, they provide an empirical snapshot of relationships between major actors in Canadian politics.

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