UNDERCURRENTS INFLUENCING PUBLIC FUNDING FOR CANADIAN HIGHER EDUCATION INSTITUTIONS, 1963-1997: ECONOMIC DISCOMFORT AND POLICY MOOD

by

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Abstract

There is a tenuous link between government intentions and funding for higher education institutions during recessions. Sorting out this puzzle involves developing a better understanding of the influences on government policy choices for funding.

This study uses theoretical frameworks from political science to guide the design and selection of measures to interpret economic and political variables associated with government expenditures on higher education institutions in Canada between 1963 and 1997. The general model builds on current variables used in the literature by adding measures of voters’ economic discomfort, policy feedback through prior period expenditures, and constructing a measure of policy mood of federal voters as a proxy for public opinion.

In general, federal funding for universities tends to decrease with policy feedback, community college funding increases with economic discomfort, and vocational funding decrease as federal GDP increases. At the same time, provincial funding for universities tends to increase with provincial GDP and community college funding increases with provincial GDP and Employment Insurance applications.

In summary, there is a statistically significant trend of federal government expenditures shifting funds between institutional types during recessions. In the Maritimes, federal funding creates a net shift from community colleges to vocational institutes. Outside of the Maritimes, federal funding tends to shift from community colleges to universities and vocational institutes.
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expenditures per person, and debt divided by GDP), use (e.g., pace), and interpretation (e.g., economic discomfort) as described in Chapter 2.

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Dedication

To my parents
1 Introduction

1.1 Introduction

What is the magnitude and relationship between political influences on the public funding of higher education? Educational researchers, political scientists, and economists continue to wrestle with this question due to the growing importance of the role of higher education in society. One puzzle involves the tenuous link between government intentions and actual funding for higher education institutions during recessions when demand for student spaces tends to increase (Betts & McFarland, 1995; Humphreys, 2000). Sorting out this puzzle involves developing a better understanding of the influences on government policy choices for funding.

It is particularly challenging to connect politicians’ ideas and governmental actions within the complexities of Canadian federalism. Similarly, it is difficult to untangle policy decisions related to funding higher education given the public benefits to citizenship and the private gains (i.e., individual and organizational) from careers built upon graduates’ skills. At a macro level, the Canadian higher education sector exhibits contested overlapping federal and provincial jurisdictions, fragmented implementation between the provinces, and dramatic shifts in funding levels over time (Fisher et al., 2006). At a micro level, each Canadian higher education institution includes a blending of its focus on citizenship and career outcomes. However, this blending varies by institutional category (i.e., universities, community colleges, and vocational training institutes) and, at varying levels, by province.
1.1.1 Policy Choice Meta-Framework

As a starting point, it is useful to categorize the different theoretical approaches to understanding policy processes. As outlined by Jacobs (2010a, 2010b, 2010c, 2010d, 2010e), investigating a policy process generally involves the use of analytical tools that fall within one or more of the following categories in conjunction with an evaluation of the surrounding environmental factors (i.e., economics and demographics):

(1) policy feedback from prior periods (e.g., Pierson, 1993),
(2) public opinion and elections (e.g., Weaver, 1986; Ferejohn, 1990),
(3) organization of interests (e.g., Olson, 1982; Lindblom, 1982; Wilson, 2003),
(4) policymaker’s ideas (e.g., Hall, 1993; Bleich, 2002), and
(5) political institutions (e.g., Immergut, 1992; Pierson, 1995).

That is, Dr. Jacobs provided a compendium of theorists corresponding to each category during lectures on comparative politics of public policy (i.e., POLI 352) from January to April 2006, at the University of British Columbia and outlined methodologies to consider the interaction and relationship between these categories when interpreting policy choices in a comparative manner. For example, prior policy decisions may provide feedback that limits the legislative options available for political institutions or alter the nature of interest group activities in a jurisdiction. Therefore, one way to understand policy choice(s) is to compare variation in these analytical categories across jurisdictional cases (Jacobs, 2010f).

In general, this framework of frameworks, or “meta-framework”, considers the environment before and after a policy choice with a focus on the interaction and influence
of policy feedback, public opinion, interest groups, and policymakers’ ideas expressed through political institutions as a policy choice or set of policy choices (Figure 1).

This paper uses policy feedback, public opinion and elections, organization of interests, policymakers’ ideas, and political institutions as theoretical categories for contextualizing the relevant higher education literature, underpinning the research goals, and guiding the application of the research findings.

**Figure 1: Policy Choice Meta-Framework**

Meta-framework of categories for political science tools (i.e., theories, frameworks, and findings) for comparative analysis.

In short, research to date argues that politics influence higher education funding through the role of political institutions and/or the organization of interests. In addition, there is a consistent view in the literature that the economy is one of the largest environmental influences on funding levels (e.g., Gold, 1990; Layzell & Lyddon, 1990).
However, researchers have produced mixed results from using inferential statistics to isolate political variables from economic factors (Elliott, 1995; Hossler, Lund, Ramin, Westfall, & Irish, 1997; Rizzo, 2003; Weerts & Ronca, 2006; Archibal & Feldman, 2006; Tandberg, 2007; McLendon, Hearn, & Mokher, 2009).

This paper proposes the use of analytical tools from the relatively unused categories of policy feedback, public opinion and elections, and policymakers’ ideas to complement existing higher education research. To do so, this study builds on political science literature related to a general underlying trend or “policy mood” (Stimson, 1991, 1999) as a proxy for public opinion that can influence elections and policymakers’ ideas. Specifically, this paper extends literature on the economy and policy mood (Durr, 1993; Stevenson, 2001) and literature on the economy and voting preferences (Kayser, 2009; De Neve, 2010) to build a case for the role of policy mood in higher education funding research.

At the same time, this study provides a lens to interpret previous research. This lens acts as a bridge from previous research that used public opinion and elections and/or policymakers’ ideas as peripheral factors in higher education funding (Archibal & Feldman, 2006; Tandberg, 2007; McLendon et al., 2009). That is, this study connects past literature arguing that politics matter to relevant literature using policy mood as a core measure to understand political questions (Stimson, 1991, 1999; Durr, 1993; Best, 1999; Stevenson, 2001; Enns & Kellstedt, 2008). In addition, current literature on higher education funding describes symptoms of policy feedback without directly identifying the concept and considers government debt indirectly. This paper suggests policy feedback
and government debt are useful concepts to add explicitly to inferential analysis of higher education funding.

**1.1.2 Political Ideology**

For convenience, it is useful to convert the variety of technical labels describing political ideology into the commonly used terms of left and right. As outlined by Kershaw (2005), investigating questions involving political ideas may locate ideology in relation to six labeled areas: social liberalisms, feminisms, communitarianism, third way, neo liberalisms, and social conservative. In comparative political analysis, it is often useful to locate these areas in four quadrants (Figure 2). For simplicity, this study converts and compresses the various labels in the higher education finance literature to a location on the axis representing a continuum between left and right.

**Figure 2: Labeling Political Ideologies**
Map of technical labels and common terms (Source: Author illustration based on concepts described by Kershaw (2005))
The following literature review sets up this study’s proposal to add tools related to policy feedback, public opinion and elections, and policymakers’ ideas to previous research frameworks by covering relevant themes in the Canadian context, political economy of state appropriations in the United States, and the potential role for policy mood in higher education funding analysis. Each section uses the relevant categorical types of tools for the analysis of policy choice(s) as a lens to organize the current literature.

The remaining chapters cover methodology, methods, and results following this proposal to use political science frameworks for analysing higher education funding in Canada. The purpose of this study is to explore an empirical model capable of solving the puzzle of the tenuous link between government intentions and actual funding for higher education during recessions when demand at higher education institutions tends to increase.

1.2 Literature Review

In general, the politics of higher education funding is an under researched area. For example, the first formal inferential statistical analysis published in the United States was in 2003. This review includes PhD dissertations where applicable given the small sample size of directly relevant literature on funding within federal countries in journals from English speaking countries.

In the next two subsections, I review the literature on inferential statistical research related to higher education funding. That is, I review research specific to Canadian federalism and then research on the general role of political economy in higher education funding in the federal context within the United States. The American
examples provide a useful analytical parallel to the Canadian federal environment given similar economic and demographic trends. However, there are clear limits to the comparison due to fundamental differences in political institutions between the two countries. The third subsection reviews literature that supports a role for the use of policy mood analysis.

1.2.1 Role of Canadian Federalism in Higher Education Funding

By definition, research investigating the role of Canadian federalism in policy choices will use tools primarily related to political institutions. In addition, tools emphasizing the central role of political institutions in policy choice have served a foundational element within political science since the 1960s (e.g., Dawson & Robinson, 1963) and branched out into multiple forms of institutional theory primarily based on rational choice frameworks (e.g., Besley & Case, 2003).

It is understandable that the most relevant statistical analysis involving higher education funding in Canada would use the economy and the lens of political institutions as the core tools to investigate relationships. Elliott (1995) used approaches grounded in economic research focusing on federal government transfers – a key theme in the literature at the time (Wu 1985a, 1985b, 1986; Coyte & Landon, 1990). That is, Elliott (1995) used thirteen economic variables to investigate an attribute of the political institutions in Canada (i.e., federal transfer payments from the national government to the regional governments) to determine its influence on higher education funding levels by province. In addition, Elliott’s (1995) study included four non-economic variables within the categories of demographics and politics to a functional model based on local government utility maximization.
As American researchers were learning during the same period, simple models of supply and demand were not proving as effective as envisioned (Doyle, 2007). In Elliott’s (1995) research, the new peripheral variables (i.e., three demographic variables and one political variable) did not appear to have a significant influence on expenditures. For example, the only political variable was a measure of the right-left location of the provincial legislatures, using a percentage of seats per party and an arbitrary party ideological score, that did not show a significant relationship between movement to the left and increased higher education funding (Elliott, 1995). However, the overall model, using seventeen variables, did reinforce the prominent role of the economy (*ibid*).

Understandably, descriptive statistical researchers have also used the provinces as the primary unit of analysis to investigate Canadian higher education expenditures (e.g., Wu, 1985a, 1985b, 1986; Fisher et al., 2006; Fisher, Rubenson, Jones, & Shanahan, 2009). Interestingly, the role of policymakers’ ideas moves from the periphery to the core when research moves from a utility maximization perspective to a lens based on sociological approaches to public policy. Specifically, Canadian empirical results have not yet shown a statistically significant role for political ideology in higher education funding. At the same time, Canadian descriptive researchers highlight the role of political-economy trends (e.g., marketization) in a way that strongly suggests a role for policymakers’ ideas, particularly towards fiscal management, influencing government funding for Canadian higher education (Fisher et al., 2006; Fisher et al., 2009; Metcalfe, 2010).

The lack of inferential evidence to support descriptive findings is most likely due to the complexity of political institutions in a federal state and the inherent challenges to
gathering appropriate data for inferential analysis in this context (Rizzo, 2003). As the next subsection will detail, American researchers struggle with the same dilemma and have made slightly more progress with greater resources applied to this topic. However, Doyle (2007) points out that “incorporating state-level responses to federal changes in policy would constitute a major theoretical innovation in our understanding of this area [i.e., the political economy of redistribution through higher education subsidies]” (p. 399). The next subsection highlights relevant research on the general role of political economy in higher education funding in the federal context of the United States.

1.2.2 Role of Political Economy in Higher Education Funding

American higher education research followed a pattern, similar to Canada, of initially basing core descriptive analysis of funding questions on economic and demographic variables by state (Hearn & Griswold, 1994; Hearn, Griswold, & Marine, 1996; Heller, 1999) and, in parallel, fostering preliminary efforts to add inferential analysis (Hossler et al., 1997; Toutkoushian & Hollis, 1998).

The first undertaking to bridge descriptive and inferential statistical analysis did so through a broad factor analysis of survey results combined with a cross sectional view of twelve economic and demographic variables organized by state (Hossler et al., 1997). Hossler et al. (1997) also included three variables to measure the role of policymakers’ ideas. That is, the Americans for Democratic Action (ADA) rating of senator voting on a right-left scale, a ranking of senate voting patterns on a right-left scale, and state consideration of adopting a market model for higher education funding. The authors did not find the political variables in this model to be significant (ibid.).
Part of the challenge in analysing state appropriations for higher education is the use of cross sectional models (Toutkoushian & Hollis, 1998; Rizzo, 2003). Toutkoushian and Hollis (1998) demonstrate a methodology to use panel data and control for state effects in order to reestablish significant relationships between state appropriations and variables for economics, demographics, and the organization of interests. However, the political variables in this model, in this case the organization of interests, showed mixed results (Toutkoushian & Hollis, 1998).

In combination with availability of panel data/methodology and perhaps McLendon’s (2003) concerns on the lack of systemic political analysis of higher education topics, the number of papers using inferential statistics and panel data specifically investigating the political influences on state financing of higher education rose from zero to five by 2009 (McLendon et al., 2009).

These five papers establish a thread for using inferential methodology to evaluate political factors in higher education funding in the United States. In particular, the last three use similar data sources and approaches. For example, each investigates annual data on state appropriations per $1,000 of personal income, from Illinois State’s Grapevine Project, with various independent variables as part of a model guided by theory from scholars of political institutions. Of particular interest is the shared use of an independent variable for a proxy of policymakers’ ideas based on the annual State Ideology index (Berry, Ringquist, Fording, & Hanson, 1998) maintained by the Interuniversity Consortium for Political and Social Research. The rest of this subsection considers each paper chronologically given that the five papers sequentially build on each other.
The first paper applies a simplified consumer choice model on panel data to empirically explore relationships between seventy-three variables to explain a decrease in the share of state budgets allocated to public higher education institutions (Rizzo, 2003). Rizzo (2003) uses six political variables, in total, with three measuring political institutions (i.e., one party control, governor election year, and Holbrook and Van Dunk’s (1993), political competition index), one measuring the organization of interests (i.e., mixture of assembly and senate seats), one measuring public opinion and elections (i.e., voter turnout), and one measuring policymakers’ ideas (i.e., democratic governor).

The main results of the paper confirm a significant and sizable role for a few key economic and demographic variables (ibid.). Rizzo (2003) provides mixed results for the political variables with only one proxy for political institutions having a meaningful effect (i.e., situations with one party in control tend to produce budgets with increased K-12 education spending).

Interestingly, Rizzo (2003) identified a fundamental challenge with the time series data where prior period data correlates with the current period data. Rather than interpreting this as a problem, Pierson (1993) would argue that this might be an example of these variables exhibiting an influence through policy feedback. In addition, previous research highlights that prior funding levels are important predictors of future government support (Layzell & Lyddon, 1990). In sum, this study found a significant role for the state environment (i.e., economic and demographic factors) on higher education funding and implied a role for policy feedback.

The second paper completes a mixed methods approach, including a regression of nineteen variables, to guide case selection in a comparative study of state funding for
public research universities using institutional type as the unit of analysis instead of the state (Weerts & Ronca, 2006). The study included eight economic variables, four demographic variables, four variables related to governance, and three political variables (ibid.). All three political variables were proxies for policymakers’ ideas through dummy variables for the party of the governor, majority in the upper house, and majority in the lower house during state budget decisions (ibid.). Weerts and Ronca (2006) found a significant and sizable role for three economic variables, one demographic variable, and one political variable (i.e., funding for research universities are approximately $43 million less per year if the upper house has a Republican majority during budget votes). In other words, this study found a significant role for the state environment (i.e., economic and demographic factors) and policymakers’ ideas.

The third paper looks at state funding of higher education and “tax revolt” institutions using an econometric approach to build an empirical model based on previous literature to run a regression with fixed effects, using ordinary least squares (OLS), on pooled cross-section and time series data from twelve variables between 1961 and 2001 (Archibald & Feldman, 2006). The study follows a theoretical framework grounded in political institutions, after arguing against a role for public opinion and elections, with the intent of exploring the impact on state funding from Tax and Expenditure Limitation (TEL) laws and Supermajority Requirements (SMR) for tax increases (ibid.). The study’s political variables include the two main factors of investigation (i.e., TEL and SMR measures as proxies for the impact from those changes on state political institutional processes) and four proxies for policymakers’ ideas (ibid.).
Archibald and Feldman (2006) found a significant role for three of the political variables (i.e., TEL, SMR, and state ideology) and both economic variables (i.e., government expenditures on health and corrections). However, the authors reported conflicting results for the political variables used by Weerts and Ronca (2006). That is, party affiliation of the governor, upper house, and lower house as proxies for policymakers’ ideas. These mixed results may be a function of the authors’ selection of 1980 to break the time series into before and after the Reagan presidency. In addition, the authors found that the alternative measure of policymakers’ ideas, that is the continuous variable for state ideology (Berry et al., 1998), showed a significant and intuitive relationship in that the results indicate that the more the state is on the political left, the higher the level of funding for higher education institutions in the sample.

Interestingly, the paper implies a role for policy feedback by discussing challenges with reverting TEL laws and SMR rules, once in place, but does not include any measures of policy feedback in the empirical model. In sum, this study found a significant role for the proxies of political institutions, policymakers’ ideas, and economic aspects of the state environment while descriptively acknowledging a role for policy feedback.

The fourth paper investigates political factors influencing state funding for higher education through a framework based on political institution theory that guides the selection of thirty-two variables and stepwise regressions, with fixed effects, on pooled cross-section and time series data between 1976 and 2004 (Tandberg, 2007).

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1 Tandberg (2010) is the journal version of Tandberg’s (2007) doctoral dissertation. This study uses the dissertation for access to additional details (e.g., Stata regression output).
Tandberg (2007) proposes and uses a framework grounded in theories related to “new institutionalism” (as cited from Shepsle, 1979, 1989; March & Olsen, 1984; Hofferbert & Urice, 1985; Grafstein, 1992; Dowding & King, 1995; Ostrom, 1991, 1999) by expanding and adapting the Institutional Rational Choice model. Tandberg (2007) explains that new institutionalism is a guiding perspective that “encompasses numerous theories, such as institutional rational choice, normative institutionalism, and historical institutionalism” (p. 36). The proposed framework (i.e., the Fiscal Policy Framework) includes eleven categories and, therefore, Tandberg (2007) includes a wide array of economic, demographic, and political variables to test those categories through the lens of political institutions. The study includes two primary regression models with eighteen environmental variables (i.e., economic and demographic), one proxy to measure policy incrementalism (i.e., a subset of policy feedback), two proxies to measure public opinion and elections, three proxies to measure the organization of interests, three proxies to measure policymakers’ ideas, and five proxies to measure the role of political institutions.

Regarding state appropriations per $1,000 of personal income, Tandberg (2007) found significant results for the lagged dependent variable, voter turnout, the proportion of higher education interests by state, state ideology, governor’s party, party of legislature, the presence of a funding formula, legislative professionalism, and one party control of the upper and lower state house.

Regarding the share of state funding allocated to higher education, Tandberg (2007) found significant results for the lagged dependent variable, the number of non-higher education interests by state, the governor’s party, the budgetary power of the governor, legislative professionalism, and term limits for elected officials.
The fifth paper examines political factors influencing state funding for higher education based on literature from higher education finance, higher education organization and governance, and comparative state politics. As such, it shares a number of variables from the studies noted above and a similar approach.

McLendon et al. (2009) rely on previous literature to select seventeen variables using time series data between 1984 and 2004. The proxies for the organization of interests include the number of higher education interest groups, governance board type, and merit aid. The proxies for policymakers’ ideas include the legislature party, governor party, and state ideology. The proxies for the role of political institutions include legislative professionalism, term limits, governor power, and TEL laws.

Regarding state appropriations per $1,000 of personal income, McLendon et al. (2009) found a significant role for the number of higher education interests by state, governor’s party, legislature party, legislative professionalism, term limits, and governor power using regression with fixed effects. In general, McLendon et al. (2009) found significant proxies for the state environment, organization of interests, policymakers’ ideas, and political institutions similar to previous studies.

Specifically, the study reinforced a role for party affiliation that suggests the need for further research. “Given the recent growth in findings relating to partisanship factors, the time has come for a finer-grained conceptual and empirical assessment” (McLendon et al., 2009, p. 706). Interestingly, McLendon et al. (2009) reinforced a pattern of mixed results for the state ideology measure across the models used by Archibald and Feldman (2006) and Tandberg (2007). That is, half the models show a significant relationship for state ideology. In addition, the pattern does not seem to correlate with the presence of
party affiliation measures or the absence of a measure for policy feedback. This highlights the possibility of the type of model specification influencing the outcomes in these studies. Therefore, this is a key consideration needed in future research.

This review of American research on the role of political economy in higher education funding reinforces the challenges raised by Rizzo (2003) in this area:

(a) lack of consensus on a model for state expenditures,

(b) lack of data, and

(c) isolating internal, endogenous, relationships.

On top of these challenges, attempting to comparatively analyse this topic in Canada involves addressing the following two elements:

(d) fundamentally different political institutions and

(e) dissimilar organization of interests (due to Canadian political institutions).

Therefore, the peripheral measures used to date in the USA (i.e., public opinion and elections plus policymakers’ ideas) become core elements to apply the progress made in understanding the role of political economy in state appropriations for higher education to the Canadian context. Specifically, this means exploring a way to apply policy feedback and build Canadian alternatives for proxies of party affiliation and/or state ideology. In a sense, this means updating the work of past higher education researchers that used the influence of public opinion and cross sectional data (e.g. Borcherding & Deacon, 1972) to include panel data and address statistical challenges. For example, Toutkoushian and Hollis (1998) demonstrate that the significance of results can vary based on chosen statistical tools.
In short, recent higher education funding research generally avoids the influence of public opinion because it is very challenging to make it work empirically (Elliott, 1995; Rizzo, 2003; Archibald & Feldman, 2006). Two things have changed since the 1980s that allow a fresh look at public opinion in a model for government expenditures: theory and data.

First, political science researchers have made a broad shift towards including the role of ideas in theoretical tools (Blyth, 2003). This broad shift also includes theoretical work on the influence of public opinion as it pertains to elections (Ferejohn, 1990; Kim & Fording, 1998, 2003). In addition, the role of ideas fundamentally influences theoretical work supporting policy mood as a proxy for public opinion (Stimson, 1991, 1999).

Second, political science researchers at the Comparative Manifesto Project released several data sets (i.e., 2001, 2006, and 2010), from their efforts on this thirty-year project, to empirically map policy preferences of political parties in fifty-four countries. This data provides methodology to assess policymakers’ ideas (e.g., through a right-left scale) and a proxy to measure changes in party position at the national level (i.e., percentage vote per political party per national election). Given the availability of theory and data, the next subsection turns to the application of ideational tools in the Canadian context.

1.2.3 **Role for Policy Mood in Higher Education Funding**

Stimson’s (1991, 1999) research on policy mood established a theoretical framework for aggregating public opinion from survey data. This policy mood framework provides two key concepts. First, when aggregated responses on one issue move to the left, then responses on other issues tend to move to the left as well.
(Weakliem, 2005). Second, there appears to be a significant correlation between policy mood and indexes of public policy choices, in the USA, independently of party affiliation and the organization of interests (Stimson, MacKuen, & Erikson, 1995; Burstein, 1998; Erikson, MacKuen, & Stimson, 2002).

Policymakers tend to implement policies that are left oriented after the public’s policy mood moves to the left. However, researchers still debate and contest the role of public opinion in policy choice within political science. For example, it may be better to think of a potential link between public opinion and policy choice as strong, weak, or contingent (Manza & Cook, 2002). However, there is sufficient empirical evidence to suggest that policy mood is a useful tool for investigating the role of economy in influencing public opinion (Durr, 1993; Stevenson, 2001).

This study applies the theoretical concepts of policy mood, based on survey data, to voter preferences of party positions – that is, policy mood based on party manifesto and election data. Given this context, the use of policy mood serves three thematic purposes in relation to the analysis of policy choices for higher education funding in Canada: clarifying the role of the economy, generalizing voter preferences from party manifestos, and identifying federal voting trends by province.

First, policy mood research empirically demonstrates that public opinion tends to move to the left after periods of economic prosperity and move to the right with economic downturns (Stevenson, 2001). Variation in this tendency will likely confound results if researchers do not treat the state of the economy and public opinion separately as independent variables. In addition, Durr (1993) demonstrates that expectations of economic growth increase support for more left oriented domestic policies and
expectations of economic decline increase support for policies leaning to the political right. This implies that debt may influence public opinion in a unique way and that there may be an economic tipping point that pivots public opinion.

Elliott (1995) is the only higher education funding study to consider governments’ ability to pay as a combination of the economy, tax levels, and debt service. However, this view of current revenue does not separate the potential impact on public opinion from an expected future economic decline implied by high debt levels requiring a stream of debt service payments. Government debt is an economic variable that includes both current and future components capable of influencing public opinion.

Durr (1993) and Stevenson’s (2001) findings suggest public opinion could be volatile depending on voters’ interpretation of current and future economic trends. This implies that the pace and direction of change in economic variables could influence a sense of economic discomfort in voters. Therefore, policy mood theory suggests including separate independent variables for economic indicators, government revenue, government debt, and public opinion to better specify regression models.

Second, party position literature on developing a right-left policy scale supports the inverse of the findings from policy mood research. That is, when aggregated responses (from political parties) on a broad range of issues moves to the left, then responses on a single issue will tend to move to the left as well (Budge et al., 2001; Klingemann, Volkens, Bara, Budge, & McDonald, 2006; Volkens, Lacewell, Regel, Schultze, & Werner, 2010).

Kim and Fording’s (1998, 2003) research on vote weighting serves as a bridge between measuring party positions and tracking voter ideology. The “Kim-Fording”
(1998) method of vote weighting estimates the median ideological position of the electorate by interpreting the party position closest to its supporters, weighting the position of each party with the percentage of votes received, and calculating a weighted average of the parties per election. Kim and Fording (1998) find strategic voting does not significantly alter the effectiveness of this measure in Canada between 1946 and 1989.

Voting in elections is a form of public opinion that aggregates the importance of issues. Using the median ideological position of the electorate is one way to track policy mood that includes issue salience as recommended by Best (1999). Recent research by Kayser (2009) and De Neve (2010) directly compares the role of the economy and voter ideology using the Kim-Fording (1998) method and Comparative Manifesto Project data. Therefore, combining publicly available national party position data with publicly available national election returns by province from the Canadian Parliamentary Guide provides an opportunity to separate policy mood from economic factors in regression models at the provincial level.

Third, policy mood theory can be a practical tool to address a portion of the lack of data for analysis of higher education funding. This is particularly relevant in the Canadian context. There is no Canadian equivalent of the standard measure of state ideology used in American research. The Degrees of Democracy project at McGill does use a “thermostatic” model to track and apply public opinion in Canada. However, the most relevant paper using the thermostatic model in Canada does not include an analysis of higher education but Soroka and Wlezien (2004) demonstrate that policy mood principles do seem to apply in Canada for other policy areas (e.g., education).
The policy mood literature supports a general consistency in the right-left location of public opinion. That is, if aggregated voter responses on one issue move to the left (e.g., an issue in the domain of federal politics), then responses on other issues tend to move to the left as well (e.g., including those within the domain of provincial politics). Therefore, a proxy for provincial ideology is fundamentally required to explore public opinion and elections because higher education in Canada is a provincial responsibility.

1.3 Research Outline

This quantitative study extends previous analyses in two ways. First, recently available data from the Comparative Manifesto Project allows the option to build a measure for the median voter in Canada on relevant federal party positions aggregated by province as a proxy for provincial policy mood. Second, this study contrasts government funding by institutional type to measure changes related to public policy focus on academic and job related training. Therefore, this quantitative study examines federal and provincial government expenditures for universities, community colleges, and vocational institutes in the fiscal year following each of the 1963 to 1997 elections by using a model including economic and political factors.

This study confirms and clarifies prior findings on the role of the economy and presents new findings for the role of policy feedback and public opinion on government expenditures for Canadian higher education institutions. The specific hypotheses to complete this study depend on the related theories described in the following sub section.
1.3.1 Theory

Two theoretical themes bridge the previously described literature and guide the selection of hypotheses in this study: public opinion and ideology.

The first theme establishes a policy mood framework (Stimson, 1991, 1999; Durr, 1993, Stevenson, 2001) to include an appropriate role for public opinion and elections by isolating it from economic effects in empirical models investigating higher education in Canada. Previous higher education literature focused on the electoral aspect of the public opinion and elections category. That is, Rizzo (2003) used voter turnout as a variable and Tandberg (2007) used both voter turnout and an electoral competition index as variables to measure political influence on higher education expenditures. However, none of the models to date used a measure of public opinion. The policy mood framework allows this study to identify elements of public opinion expressed through elections.

The second theme includes the core role of earnings through work in right-leaning neoliberal ideology (Murray, 1984; 1987; Mead, 1986, 1997a, 1997b; Kershaw, 2005) to segment the study’s analysis of higher education funding. Previous higher education literature set a precedent for relying on external measures of ideology. Hossler et al. (1997) used the Americans for Democratic Action (ADA) rankings for senator right-left location. In addition, Archibald and Feldman (2006), Tandberg (2007), and McLendon et al. (2009) used Berry’s (1998) state ideology tool. Neither of these tools will work in Canada because they are purposively specific to the American political context. Therefore, this study uses the Laver and Budge (1992) scale included in the Comparative Manifesto Project data set. Budge et al. (2001) and Klingemann et al. (2006) implemented the right-left liberalism scale specifically for comparative analysis between
countries in this data set. As such, it is a useful comparative tool given the variety of provincial approaches to higher education in Canada.

1.3.2 Hypotheses

This study tests the following four hypotheses guided by the theoretical themes of the economy and policy mood, voting preferences, and right leaning ideology:

(1) Government expenditures on universities will increase as the economy grows.

(2) University funding will decrease as voter’s policy mood moves to the right.

(3) Vocational institute funding will increase as the economy shrinks.

(4) Vocational funding will increase as voter’s policy mood moves to the right.

These hypotheses seek to separate the influence of governments’ ability to pay, determined indirectly by the economy, from the influence of voter’s policy mood. This study expects mixed results for government expenditures on community colleges due to the various combinations of academic and vocational foci at colleges between provincial jurisdictions.

1.4 Summary

The literature review highlights six conceptual areas to consider while researching policy choice(s). That is, an alternative structure for a policy choice meta-framework includes comparative analysis of environmental factors, policy feedback from prior periods, public opinion and elections, organization of interests, policymakers’ ideas, and political institutions. Previous rational frameworks for policy choice analysis tend to implicitly assume that political institutions or interest groups provide the broadest explanation for policy choices. The growing influence of ideational research in political
science provides the option to expand rational and non-rational frameworks to include viewing policy choice through the lens of ideas.

The purpose of this study is to explore an empirical model capable of solving the puzzle of the tenuous link between government intentions and actual funding for higher education during recessions when demand at higher education institutions tends to increase. This study provides a framework to investigate shifts within economic and political categories related to public funding. The value of the framework is the ability to quantify and predict trends in government expenditures. Canadian post-secondary education funding is a good test case for such a framework because of its overlapping jurisdictions, fragmented implementation, and dramatic shifts in funding focus over time. A better understanding of past funding patterns may allow educators, researchers, administrators, voters, and policymakers to make informed decisions about current funding challenges. Given the complexities of Canadian federalism and political behaviour, providing innovative tools that have broad use outside of political science will help to enable new perspectives on old challenges.
2 Methodology

2.1 Introduction

This study explicitly assumes there is a role for policy mood in policy choice analysis. Therefore, the purposive selection of data focuses on measuring five of the six conceptual areas within the policy choice meta-framework. This chapter covers the data sources and how the study measures the main concepts through proxy variables for higher education expenditures, economic environment, policy feedback, policy mood, and political institutions.

2.2 Data Sources

Canadian political institutions use the parliamentary model of “responsible” government that allows the government to fall at any point and a first-past-the-post electoral system. As such, federal elections often occur at irregular intervals and generate minority or majority governments. However, regardless of the timing of an election, it is customary for the new or re-established government to put forward a budget after the election. This policy choice occurs within a unique timeframe. In the months preceding an election, political parties author and promote their party platforms to actively seek the attention of voters. At the election, voters convey their public opinion through the ballot box in response to the policymakers’ ideas advocated through the campaign period.

The selection of data for this study seeks to collect information before and after Canadian elections as per the policy meta-framework. Ideally, this would include environmental factors such as the state of the economy, the nature of policy feedback constraining policy choices, and a clear view of policymakers’ ideas before the election.
Conveniently, an election provides a large sample of public opinion at a single point in time. In addition, budgetary decisions regarding government expenditures allow investigation of policy choices typically within six months of an election. In other words, an election is an opportunity to investigate policy choices.

There is a substantial lack of data to support the ideal investigation of policy choice in Canada. For example, there is no quantitative analysis of party platforms for provincial political parties in Canada. However, the Comparative Manifesto Project provides detailed analysis of Canadian federal party platforms between 1945 and 2006. The data includes information on key independent variables before a federal election and then data on the dependent variable after the federal election. In addition, this study collects provincial data where feasible. Therefore, this study selects and samples data from Statistics Canada, the Comparative Manifesto Project, and the Canadian Parliamentary Guide to collect information before and after Canadian federal elections.

The following subsections outline the data sets from the three sources and sampling procedures for data selection. In general, this study uses a purposive methodology to select longitudinal data timed to Canadian federal elections. Due to limited data availability, the maximum range for the data is 1962 to 1997.

### 2.2.1 Statistics Canada

This study uses eight publicly available data sets from the Statistics Canada CANSIM socioeconomic database. Where possible, this study uses unadjusted data (i.e., without seasonal or inflation modifications) to allow flexibility to build its measures. That is, this study adjusts the raw data where applicable to customize measurement.
The first data set includes total annual expenditures on education by source for each category of education delivered in Canada (i.e., CANSIM table 478-0001). This data set includes direct federal (Figure 3) and provincial (Figure 4) government expenditures by province allocated to universities, community colleges, and vocational institutes.

**Figure 3: Direct Federal Expenditures**

Source: Adapted from the Statistics Canada (2003) CANSIM database, Table 478-0001

These expenditures reflect indirect federal support (e.g., EPF) as part of the provincial allocation of funds. The data set includes expenditures at market prices (i.e., not inflation adjusted) between 1960 and 2000 for all provinces. The data set includes Ontario and Quebec from 1954 onwards but there is limited access to other economic data going back to 1954.

This study uses expenditures on education for the fiscal year following a federal election (i.e., April 1 to March 31). Therefore, this source provides data related to elections in 1963 through to 1997.

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2 The data set includes Ontario and Quebec from 1954 onwards but there is limited access to other economic data going back to 1954.
The Statistics Canada data on government expenditures on higher education institutions relies on three surveys. The Financial Information of Universities and Colleges Survey is a census with cross checking between submitted surveys and audited financial statements from universities and colleges. The Survey of Federal Government Expenditures in Support of Education is a census with year over year checking and a response rate over 85%. The Financial Statistics of Community Colleges and Vocational Schools is a census of all non-degree granting community colleges and public vocational schools with year over year checking. There is a risk of variation in response rate and categories over time that may affect data quality. Therefore, this study uses the data with caution and under the assumption that errors are randomly distributed. The data appears to correspond with recent historical funding trends from a qualitative perspective.

**Figure 4: Direct Provincial Expenditures**
Source: Adapted from the Statistics Canada (2003) CANSIM database, Table 478-0001
The federal government decreased direct funding for universities after the 1997 federal election. At the same time, the federal government increased funds for vocational training in British Columbia, Nova Scotia, and Quebec. In general, the provincial governments allocate more funds to universities than community colleges and vocational institutes. Most provinces trimmed university funding in the late 1990s. However, this could be due to reduced federal EPF transfer funds and/or shifting allocations between universities, community colleges, and vocational institutes.

The second data set includes quarterly population estimates for all Canadian provinces (i.e., CANSIM table 051-0005). The data set includes estimates from 1951 to 2010 from census and intercensal estimates of births, deaths, and migration (Figure 5).

**Figure 5: Population**

Source: Adapted from the Statistics Canada (2010b) CANSIM database, Table 051-0005
There is a risk of Canada’s two largest provinces overweighing the panel data. Therefore, this study includes population data to create a common denominator of expenditures per person as described below in section 2.3. To match a consistent timeframe to expenditures, this paper uses data for provincial population from the quarter closest to the release of a federal budget.

The third data set includes the non-seasonally adjusted Consumer Price Index (CPI) relative to 2002 Canadian dollars (i.e., CANSIM 326-0020). This monthly data set covers CPI for Canada from 1914 to 2011 and by province from 1978 to 2011 (Figure 6).

**Figure 6: Consumer Price Index**

Source: Adapted from the Statistics Canada (2010d) CANSIM Table 326-0020 “Monthly CPI” using the average over 12 months before each applicable federal election (2002 CPI basket of goods = 100)

Similar to population data, this study uses the CPI to convert economic measures into standardized comparative analysis. That is, the calculation uses the specific month(s) of
the economic measure to select the appropriate month(s) from the CPI. However, this study also uses the CPI for price trends as an environmental factor for the economy. In that application, this study uses an average of the past twelve months before a federal election to avoid seasonal variation. Therefore, this source provides CPI data for elections from 1962 to 2006 federally and from 1979 to 2006 provincially.

The fourth data set includes unadjusted Canadian national gross domestic product (GDP) at market prices (i.e., CANSIM table 380-0002). This data set includes GDP quarterly from March 1961 to September 2010. As an environmental factor variable for the economy, this study uses data available from the last quarter before a federal election. Therefore, this source provides GDP data for elections from 1962 to 2006 (Figure 7).

**Figure 7: Federal GDP per Quarter**
Source: Adapted from the Statistics Canada (2010e) CANSIM Table 380-0002

![Federal GDP per Quarter ($ Billion)](source: CANSIM 380-0002)
The fifth data set includes provincial GDP at market prices. This data set includes annual GDP from 1961 to 1980 (i.e., CANSIM table 384-0014) and from 1981 to 2009 (i.e., CANSIM table 384-0001). This study uses data available for the preceding year closest to a federal election date as an environmental factor related to policy choices on higher education expenditures. Provinces with larger populations tend to have higher GDP (Figure 8).

**Figure 8: Provincial GDP per Year**

Source: Adapted from the Statistics Canada (2000) CANSIM Table 384-0014 and the Statistics Canada (2010f) CANSIM Table 384-0001

The sixth data set includes annual Canadian gross federal government debt for the fiscal year ending on March 31 (i.e., CANSIM table 385-0010). This data set includes federal debt from 1867 to 2008 at market prices. However, this study uses data preceding elections in 1962 to 1997 to match the other data sources.
The federal debt became an election issue in the 1990s and corresponded with the founding of the Reform Party and interest groups such as the Canadian Taxpayers Federation who advocate conservative fiscal values. The Liberal Party won the 1993 and 1997 elections and reduced federal government expenditures including transfers to the provinces. The resulting reduction of federal debt appears as a small dip in the unadjusted data (Figure 9).

**Figure 9: Federal Gross Debt by Year**

Source: Adapted from the Statistics Canada (2009) CANSIM Table 385-0010

The seventh data set includes annual provincial “net financial debt” (i.e., CANSIM 385-0014) because Statistics Canada does not track direct data on individual provincial debt levels. This data set includes an indicator of provincial deficits and surpluses from 1970 to 2008. Therefore, this study uses net financial debt as a proxy for provincial debt in the year preceding federal elections in 1972 to 2006. However, this
time range does not cover the majority of the elections from the other data sources (i.e., elections in 1962 to 1997). Therefore, this study exercises caution when comparing federal and provincial measures. In general, this provincial data corresponds with trends during the period. That is, most provinces ran increasing deficits in the 1990s with the notable exception of Alberta (Figure 10).

Figure 10: Provincial Net Financial Debt by Year
Source: Adapted from the Statistics Canada (2010a) CANSIM Table 385-0014

The eighth data set includes initial and renewal applications for the federal Employment Insurance (EI) program (i.e., CANSIM table 276-0004). This monthly non-seasonally adjusted data set includes federal and provincial data from 1949 to 2010. However, this study uses data preceding elections in 1962 to 1997 to match the other Statistics Canada data sets. In addition, this study uses a calculated average of the past twelve months before a federal election to avoid seasonal variation (Figure 11).
The selection of specific data points for the study depends on the dates of federal elections covered by the Comparative Manifesto Project described in the next subsection.

2.2.2 Comparative Manifesto Project

National level data for content analysis of policymakers’ ideas, shown through party manifestos, is available through the Comparative Manifesto (CMP) Project for fifty-four countries holding free elections from 1945. This study uses data collected through the CMP relevant to Canada (Budge et al., 2001; Klingemann et al., 2006; Volkens et al., 2010). The CMP includes fifty-six policy categories measuring the percentage of text in national-level seat-winning party platforms referring to each policy category in elections from 1945 to the mid-2000s (ibid.)
CMP researchers organized a subset of the policy categories to represent a right-left liberalism scale using Laver and Budge’s (1992) scale for right-left position of a party. The CMP right-left scale (i.e., the \textit{rile} variable) represents the net percentage of party manifesto text that fits within thirteen discrete counterbalancing right and left policy categories per national political party (Table 1). That is, the scale is the result of the subtraction of the percentage of text coded under the “left” categories from the percentage of text in manifesto documents under the “right” categories.

**Table 1: Comparative Manifesto Project Right-Left Scale**

<table>
<thead>
<tr>
<th>Orientation: Variable Name</th>
<th>Text Classification: Variable Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right: per104</td>
<td>Positive: Military</td>
</tr>
<tr>
<td>Right: per201</td>
<td>Positive: Freedom and Human Rights</td>
</tr>
<tr>
<td>Right: per203</td>
<td>Positive: Constitutionalism</td>
</tr>
<tr>
<td>Right: per305</td>
<td>Positive: Political Authority</td>
</tr>
<tr>
<td>Right: per401</td>
<td>Positive: Free Enterprise</td>
</tr>
<tr>
<td>Right: per402</td>
<td>Positive: Enterprise Incentives</td>
</tr>
<tr>
<td>Right: per407</td>
<td>Negative: Protectionism</td>
</tr>
<tr>
<td>Right: per414</td>
<td>Positive: Government Economic Orthodoxy</td>
</tr>
<tr>
<td>Right: per505</td>
<td>Positive: Welfare State Limitation</td>
</tr>
<tr>
<td>Right: per601</td>
<td>Positive: Patriotism</td>
</tr>
<tr>
<td>Right: per603</td>
<td>Positive: Traditional Morality</td>
</tr>
<tr>
<td>Right: per605</td>
<td>Positive: Law and Order</td>
</tr>
<tr>
<td>Right: per606</td>
<td>Positive: National Harmony</td>
</tr>
<tr>
<td>Left: per103</td>
<td>Positive: Anti-Imperialism</td>
</tr>
<tr>
<td>Left: per105</td>
<td>Negative: Military</td>
</tr>
<tr>
<td>Left: per106</td>
<td>Positive: Peace</td>
</tr>
<tr>
<td>Left: per107</td>
<td>Positive: International Cooperation</td>
</tr>
<tr>
<td>Left: per202</td>
<td>Positive: Democracy</td>
</tr>
<tr>
<td>Left: per403</td>
<td>Positive: Market Regulation</td>
</tr>
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<td>Left: per404</td>
<td>Positive: Consultative Economic Planning</td>
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<td>Left: per406</td>
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<td>Positive: Education Expansion</td>
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<tr>
<td>Left: per701</td>
<td>Positive: Labour Groups</td>
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</tbody>
</table>
For Canada, the right-left scale provides an intuitive placement and description of policymakers’ ideas represented in manifestos from the federal Conservatives, Liberals, New Democratic Party, Social Credit, Reform, Canadian Alliance, and Bloc Québécois (Figure 12). For example, the two main parties to form government (i.e., Conservatives and Liberals) generally straddle the central vote in line with the median voter theorem.

Interestingly, the Liberal Party has moved from being a centre-right party to a centre-left party according to the CMP right-left liberalness scale. In addition, Canada has several periods with more than three political parties that show cycles of merger and fragmentation. Again, this aligns with the median voter theorem and is a natural outcome of a majoritarian electoral system.

**Figure 12: Comparative Manifesto Project – Right/Left Ideology**
Placement of Canadian federal party positions by text weighting of party manifestos on the Laver and Budge (1992) right-left liberalness scale calculated by the Comparative Manifesto Project (Klingemann et al., 2006).
In recent history, 1993 was a key election year. This election involved two new regional parties winning seats in the federal parliament – the Bloc Québécois and Reform Party. This fracture came at the end of a process starting in 1980 where all parties began to move away from the political centre. The 1997 shift to the political right is still in place as evidenced by a minority government led by the centre-right Conservatives since 2006. In addition, Canada’s traditional party of the left, the NDP, was close to its most centrist position in the 2004 and 2006 elections.

The relevant CMP variable for this study is the right-left liberalness scale. The Comparative Manifesto Project includes the number of national votes received by each federal party. That is, researchers can calculate a Canadian right-left score from data included within the CMP using the Kim-Fording (1998) method (i.e., calculating the position of the median voter in terms of the national right-left score derived from federal party positions). However, there is no vote weighting data in the CMP for Canadian provinces. Therefore, this study adds Canadian Parliamentary Guide data (described below) summarizing votes per province by federal party to the CMP data. This study uses CMP data for elections held in 1962 to 1997 to fit available economic data.

2.2.3 Canadian Parliamentary Guide

The Canadian Parliamentary Guide provides a measure of how public opinion responds to party affiliation through elections at the national and provincial level. This public opinion varies significantly from province to province. For example, Alberta voters tend to vote for the federal Conservative Party while Quebec voters tend to vote Liberal Party or Bloc Québécois. Therefore, it is reasonable to imagine that these provincial differences may reflect variation in policy mood by province.
The Comparative Manifesto Project provides a quantitative measure of federal policymakers’ ideas in Canada through text weighting of party manifestos before federal elections. Adding the vote weighting data by province from the Canadian Parliamentary Guide provides a measure of how public opinion responds to policymakers’ ideas by province even though the elections are federal. This study uses election data based on the Canadian Parliamentary Guide and weighted by federal party and province. The election range for the study is 1963 to 1997.

2.2.4 Summary

This study uses data from Statistics Canada, the Comparative Manifesto Project, and the Canadian Parliamentary Guide to collect information before and after Canadian federal elections. These components provide the building blocks to explore relationships between government funding of higher education institutions and the economic environment, policy feedback, public opinion and elections, policymakers’ ideas, and political institutions. The next sections describe how this study assembles the data to measure the main concepts covered in the literature review.

2.3 Higher Education Expenditures

An important government policy choice regarding the funding of higher education is the nature and level of expenditures supporting universities, community colleges, and vocational institutes. This study continues the work of previous literature by using the provinces as the unit of analysis and by seeking empirical evidence of a role for political economy in Canadian governmental policy choices. The data from Statistics Canada allows this study to build a comparative measure of government expenditures per person
by province. These three measures track direct federal, provincial, and combined government expenditures for universities, community colleges, and vocational institutes.

The first measure provides comparative statistics on direct federal funding of higher education institutions by province adjusted to 1997 dollars (Figure 13). This federal support went primarily to vocational institutes, secondarily to universities, and thirdly to community colleges. In general, federal support for institutions averages less than $250 per person. However, federal support per person is highest in the Maritime Provinces and exceeded $250 per person after the 1993 and 1997 federal elections.

**Figure 13: Direct Federal Expenditures for Higher Education Institutions**

Source: Adapted from the Statistics Canada (2003, 2010b, 2010d) CANSIM database, Tables 478-0001, 091-0005, and 360-0020

The second measure provides comparative statistics on direct provincial funding of institutions including federal EPF transfers to provincial governments (Figure 14).
Provincial support went primarily to universities and secondarily to community colleges or vocational institutes at varying levels by province during the year following federal elections between 1963 and 1997. This variation in support may be due to different approaches regarding the role of community colleges and vocational institutes. For example, community colleges may reflect vocational priorities in some provinces.

Figure 14: Direct Provincial Expenditures for Higher Education Institutions
Source: Adapted from the Statistics Canada (2003, 2010b, 2010d) CANSIM database, Tables 478-0001, 051-0005, and 360-0020

The third measure provides comparative statistics on combined federal and provincial funding of higher education institutions by province (Figure 15). The total governmental support for institutions favours universities in most provinces. After the 1993 and 1997 elections, the exception became Newfoundland/Labrador and Prince Edward Island where combined support for vocational institutes surpassed university
support. In general, total government support for institutions averages less than $500 per person except for Newfoundland/Labrador after the 1993 and 1997 federal elections.

**Figure 15: Direct Government Expenditures for Higher Education Institutions**

Source: Adapted from the Statistics Canada (2003, 2010b, 2010d) CANSIM database, Tables 478-0001, 051-0005, and 360-0020

### 2.4 Economic Environment

The economy is an environmental factor that may influence government decisions on funding levels for higher education institutions and influence voters’ attitudes. This study proposes to segment the influence of the state of the economy into two components – economic position and economic discomfort. That is, the level of economic indicators and voters’ perception of an accelerating pace of change.
This study continues the practice of previous literature to include aspects of the economic environment in the analysis of policy choice. Generally, these aspects included proxies for the level of the economy. For economic revenue, Elliott (1995) included provincial GDP, Hossler et al. (1997) included state tax revenue, Rizzo (2003) included household income, Weerts and Ronca (2006) included per capita income, and Tandberg (2007) used Gross State Product per capita. For government debt, Elliott (1995) included net government borrowing and debt charges. For job prospects, Elliott (1995), Rizzo (2003), Weerts and Ronca (2006), Tandberg (2007), and McLendon et al. (2009) included unemployment or employment rates. These studies measured economic status directly through the position of the economic data and indirectly through the rate of change in the data. That is, regression analysis can tap into both aspects but the effects are bundled in each economic variable unless the regression model includes an independent variable for the rate of change. Therefore, this study includes proxies for economic revenue, government debt, and job prospects to measure the concept of economic position and includes a separate independent variable constructed with economic rates of change in key indicators. To segment the different levels of calculation, this study refers to rate when discussing a single period of time and pace when discussing acceleration between periods rather than use “the rate of the rates”.

This study includes voters’ reaction to the economy by measuring the concept of economic discomfort through an increase in pace of inflation, debt load, and/or unemployment. Tracking data on pace provides an opportunity to measure economic discomfort through ordinal or continuous variables (e.g., by case and index).
2.4.1 Economic Position

This study uses Statistics Canada data for GDP, debt, and EI applications as proxies for the state of the economy measured by the position of these statistics. This subsection addresses each of these proxies in turn.

A common proxy for economic revenue is GDP. To increase its usefulness, this study adjusts the data into 1997 dollars and represents GDP per person (Figure 16).

**Figure 16: Gross Domestic Product**

Source: Adapted from the Statistics Canada (2010b, 2010c, 2000, 2010d) CANSIM database, Tables 051-0005, 380-0002, 384-0014 and 360-0020

This format allows comparative analysis between years, provinces, and federal and provincial averages. During the periods before the 1963 to 1997 federal elections, most provinces increased GDP per person except during the 1990 recession. In addition, Alberta and Ontario generally had the highest GDP per person and these two provinces
were the only ones to consistently produce GDP above the national federal average. In particular, Alberta generated $30,000 to $40,000 in annual GDP per person that was a level of revenue significantly higher than the rest of Canada.

This study uses two different proxies for government debt due to limitations on data availability. For federal government debt, the annual debt data from Statistics Canada converts directly into a comparative format in 1997 dollars per person. For provincial debt, the closest proxy available is net financial debt. Although this data converts into 1997 dollars per person, the range of the data is 1972 to 1997.

After 15 years of relative stability, the annual federal debt increased steadily from the mid-1970s average of $8,000 per person to $22,000 per person in 1997 (Figure 17).

**Figure 17: Federal Government Debt**

Source: Adapted from the Statistics Canada (2009, 2010b, 2010d) CANSIM database, Tables 385-0010, 051-0005, and 360-0020
Provincial net financial debt shows a different pattern. Namely, it tracks the creation of debt when provincial income is lower than provincial expenditures. Alberta, British Columbia, and Saskatchewan were the only provinces to have provincial income exceeding expenditures at any point during 1972 to 1997 (Figure 18). In general, all the provinces moved towards higher levels of borrowing during the period.

**Figure 18: Provincial Net Financial Debt**

Source: Adapted from the Statistics Canada (2010a, 2010b, 2010d) CANSIM database, Tables 385-0014, 051-0005, and 360-0020

Alberta and British Columbia had the smallest annual budget shortfalls of approximately $1,000 per person. Most of the remaining provinces increased their annual borrowing rates to approximately $9,000 of new debt per person per year. Newfoundland gradually increased its borrowing rate to $15,000 of new debt per person.
The proxy for job prospects is the number of initial and renewing applications for claims submitted each month for Employment Insurance (EI) benefits as a percentage of the total population. Using the twelve-month average before the date of a federal election provides a seasonally adjusted result timed to the election (Figure 19).

**Figure 19: Employment Insurance Applications**  
Source: Adapted from the Statistics Canada (2010c) CANSIM database, Table 276-0004

The EI levels reflect employment challenges in the fisheries industries of the Maritime Provinces. In addition, other resource economies such as British Columbia show cyclical trends related to commodity prices. Alberta, Manitoba, Saskatchewan, and Ontario were the only provinces to maintain EI application levels below the national average. This proxy indicates that these provincial economies generated more jobs or more emigration to sustain higher job prospects. Given the state of the other provincial
economies at the time and the steady growth in population (Figure 20), it is reasonable to rely on this proxy as an indicator of job prospects.

**Figure 20: Canadian Population**

Source: Adapted from the Statistics Canada (2010b) database, Table CANSIM 051-005

This study uses the variables of GDP, government debt, and EI applications as proxies for the level of the economy. That is, economic conditions are generally better when GDP is growing, government debt is decreasing, and EI applications are decreasing. However, even with this data in a comparable format by time, region, and national average, it does not include a proxy for public attitudes related to the impact from the rate of economic change. This study considers the acceleration of rates (i.e., pace) between periods as an indicator of economic discomfort.

The following sections show the calculations for the pace of CPI, government debt, and EI applications in order to construct a measure of economic discomfort.
2.4.2 Consumer Price Index Pace

Calculating the net percentage change in CPI per month involves two steps. First, this study uses the twelve-month average CPI before a federal election as the monthly CPI rate for each applicable election date. Second, for each election date, the formula divides the current election’s monthly rate by the preceding election’s monthly rate (Equations 1 & 2). This generates the gross percentage change in CPI after subtracting one from the result (e.g., 1.10 – 1 = 10%). Dividing the gross percentage change in the variable by the number of months between elections generates the average net percentage change per month for all months since the last election. This provides the net percentage change in the variable per month for the current election. Subtracting the previous election’s net rate, per month, value from the current election’s net rate, per month, generates a positive or negative number representing pace since the last election.

\[
\text{Months} = \text{month\_count}[n] - \text{month\_count}[n - 1]
\]

Where:
- \( \text{Months} \) = the number of months between elections
- \( \text{month\_count} \) = the number of months after 1960
- \( [n] \) = the current election
- \( [n - 1] \) = the previous election

\[
\text{CPI\_pace} = \frac{((\text{CPI\_average}[n]/\text{CPI\_average}[n - 1]) - 1) / \text{Months}[n]) - ((\text{CPI\_average}[n - 1]/\text{CPI\_average}[n - 2]) - 1) / \text{Months}[n - 1])}{\text{Months}[n] - \text{Months}[n - 1]}
\]

Where:
- \( \text{CPI\_pace} \) = a positive or negative number representing acceleration
- \( \text{CPI\_average} \) = the average CPI monthly rate over the last 12 months
- \( [n] \) = the current election
- \( [n - 1] \) = the previous election
- \( [n - 2] \) = the election before the previous election
- \( \text{Months}[n] \) = current period difference between elections in months
- \( \text{Months}[n - 1] \) = previous period difference between elections
Each of the measures of economic position has a corresponding risk that can increase economic discomfort. The negative side of growing GDP is the risk of inflation and CPI is a standard measure of inflation. Therefore, if the net percentage change in CPI per month is positive, then inflation is growing faster. If negative, then inflation is growing slower. Measuring the differences between the average net percentage change per month of consecutive elections shows the pace of change (Figure 21).

**Figure 21: Consumer Price Index Pace**

Source: Adapted from the Statistics Canada (2010d) database, CANSIM Table 326-0020

That is, if the value is positive, then inflation is growing faster in the current election period than the previous election period. If negative, then inflation is growing slower currently than the previous election period. The period between the 1972 and 1974 federal elections had the highest increase in inflation per month when compared with the
previous election period. Federal data is available for all elections and provincial data is limited to four elections.

2.4.3 Government Debt Pace

Calculating pace for government debt involves defining an appropriate measure of burden and then using the same methodology as above (Equations 1 & 2). One negative aspect of growing government debt depends on the relative ability of the economy to carry the debt. One measure of this burden is the portion of debt to GDP (Figure 22).

**Figure 22: Federal Government Debt Load Position**

Source: Adapted from the Statistics Canada (2010e, 2009) CANSIM database, Tables 380-0002 and 385-0010

This perspective shows a possible explanation for federal government debt not being a political issue until the early 1990s. That is, at some point in the early 1990s the portion
of debt to GDP, or debt load, increased beyond the highest levels of the early 1960s (i.e., 58%).

For comparison, the provincial net financial debt as a portion of GDP shows the rate of annual debt increase/decrease as a portion of provincial GDP (Figure 23). Besides Alberta, British Columbia, and Ontario, most provinces increased annual debt at a rate equivalent to 25% of annual GDP from the 1980s onwards.

Figure 23: Provincial Government Debt Load Position
Source: Adapted from the Statistics Canada (2010a, 2010f, 2000) CANSIM database, Tables 385-0014, 384-0001, and 384-0014

This study uses separate pace of debt measures for provincial and federal governments because the source data reflects two different perspectives of government debt. The debt pace measure uses the same equation as CPI pace except there is no need to use seasonal data, i.e., twelve month average, because both debt statistics are already
in an annual format. While the debt load measures reflect the positional level of debt in Canada, the debt pace measure reflects the stress points relative to federal elections where the rate of government debt load increased or decreased.

For the federal debt, the debt load increased the fastest in 1968, 1979, 1984, and 1988 (Figure 24). This measure separates pace from the level of debt. For example, the portion of debt to GDP was high from 1984 to 1997 even though the pace of debt increase began to slow in the periods before the 1993 and 1997 federal elections.

**Figure 24: Federal Government Debt Pace**

Source: Adapted from the Statistics Canada (2010e, 2009) CANSIM database, Tables 380-0002 and 385-0010

For provincial debt, the net financial debt load is more volatile than the federal measure due to the variance in year-to-year budgets and the limited range of data available from Statistics Canada. Between two and eight provinces increased debt in each
year from 1979 to 1997 (Figure 25). The years with the highest number of provinces adding debt at an increasing rate were 1979, 1980, 1984, and 1988.

**Figure 25: Provincial Government Debt Pace**

Source: Adapted from the Statistics Canada (2010a, 2010f, 2000) CANSIM database, Tables 385-0014, 384-0001, and 384-0014

### 2.4.4 Employment Insurance Applications Pace

Calculating a corresponding measure of pace for unemployment involves defining an appropriate measure of burden and then using the same methodology as above (Equations 1 & 2).

The negative side of low job prospects is unemployment. This study uses data providing the twelve-month average number of Employment Insurance (EI) applications for initial claims and claim renewals per month, as a percentage of the population, as a
proxy for unemployment. The pace of EI total applications was highest in 1965, 1968, 1972, 1979, 1984, and 1993 (Figure 26).

**Figure 26: Employment Insurance Applications Pace**

Source: Adapted from the Statistics Canada (2010c) CANSIM database, Table 276-0004

![EI Applications Pace (%) change per month]

2.4.5 Economic Discomfort

This study uses the net percentage change per month as a comparative tool for the Consumer Price Index (CPI), the portion of government debt to GDP, and EI applications to build measures of economic pace. Combining these three measures into an ordinal variable allows this study to use a proxy for the concept of public attitudes on economic discomfort as decreasing, increasing at a low rate, increasing at a medium rate, and
increasing at a high rate. This measure of economic discomfort is an element of public opinion based on the dynamics of the economy that is separate from governments’ capacity to raise revenue.

All three pace variables measure the relative percentage change per month for the time between federal elections. Therefore, there are two options to combine the variables into a single measure. The first method combines the three variables into a single federal or provincial index of the pace of change for CPI, debt, and EI applications. The second method identifies the cases, i.e., years, and frequency, i.e., number, of instances of increasing pace to create an economic discomfort variable.

Similar to the famous Okun index and Barro misery index, combining measures related to GDP, inflation, and unemployment can act as a proxy for economic status through the levels of key indicators. However, Di Tella, MacCulloch, and Oswald (2001) provide evidence that inflation and joblessness are not equally weighted in surveys of public happiness. In other words, a one percent increase in the unemployment rate may have a bigger impact on public opinion than a one percent increase in inflation. Therefore, any un-weighted index implicitly assumes either that the index elements have equal weighting or that the unequal weighting remains consistent over time. Even with these caveats, the indexes have value as a reference point. However, this study uses an alternative case based method to reduce the chances of one element of the index over weighing the others.

---

3 The magnitude of change in economic discomfort and/or the weighting of the CPI, debt, and EI elements are beyond the scope of this paper. Therefore, the variable is ordinal not interval because it is unknown if the spacing between the increments is even.
This study translates economic pace into a proxy for voters’ economic discomfort by identifying the number of pace elements (i.e., CPI, debt, or EI applications) that are increasing (Figure 27). A result of zero increasing pace elements represents decreasing economic discomfort. That is, the economy is improving and voter discomfort is decreasing. A result of one represents a proxy for increasing discomfort at a low rate. That is, at least one of the CPI, debt, or EI measures is increasing at a faster rate. A result of two represents increasing voter economic discomfort at a medium rate. A result of three represents increasing voter economic discomfort at a high rate. That is, the monthly rates of CPI, debt, and EI applications are all increasing at the same time. Therefore, this study uses a case based proxy of public perception of economic discomfort built on pace.

**Figure 27: Voters’ Economic Discomfort**

2.5 Policy Feedback

An important factor influencing government policy choices is the policy feedback from prior decisions (Pierson, 1993). This study represents previous government policy choices regarding the funding of higher education by using the level of expenditures supporting universities, community colleges, and vocational institutes from prior periods.

This study uses a one-election lag of the measures of higher education expenditures defined in section 2.3 as the proxy for policy feedback. As such, the descriptive nature of the policy feedback variable is the same as the higher education expenditure measures except shifted by one election. However, this does mean the study will drop one election year from the panel data because the first election needs a previous election for the lagged dependent variable. That is, although the maximum range for the key Statistics Canada variables run from elections in 1962 to 1997 (i.e., eleven elections), this study will focus on elections in 1963 to 1997 because the added value from the lagged dependent model outweighs the loss of the 1962 panel data. However, the 1962 election data is still available for descriptive analysis where applicable.

2.6 Policy Mood

This study uses voter’s response to policymaker’s ideas (i.e., party platform manifestos) as a proxy for policy mood. Merging the CMP variable for a right-left scale with Canadian federal election data by province as described below builds a measure for the policy mood of the federal median voter by province.
2.6.1 Policymakers’ Ideas

Recently available Comparative Manifesto Project (CMP) data for national level party positions allows new options to improve previous analyses in the literature by empirically adding political preference data by country. The CMP right-left liberalness scale provides an intuitive placement and description of ideas for the federal Conservative Party, Liberal Party, New Democratic Party, Social Credit, Reform, Canadian Alliance, and Bloc Québécois. Therefore, this study uses the CMP data on the right-left scale as a proxy for the location of policymakers’ ideas in Canada.

2.6.2 Public Opinion and Elections

The raw CMP data is only available at the federal level for national parties. Therefore, this study uses electoral data by province from the Canadian Parliamentary Guide to convert the national data into regional weighting of federal voters. That is, the electoral data is a proxy for the concept of public opinion and elections. Therefore, this study uses the Kim-Fording (1998, 2003) vote weighting principles for CMP data to build a measure of the median voter’s policy mood, by province, to compare with higher education expenditures. That is, this study uses pre-election party positions and voter electoral responses to locate the policy mood of the median voter.

According to Ferejohn’s (1990) median voter theorem, this position would influence vote-seeking parties in government and opposition to adjust, where necessary, policy implementation. In other words, the interaction of party positions and voting is a better indicator of policy implementation, in theory, than the pre-election party positions by themselves. However, it is challenging and costly to locate the median voter on policy details and equally difficult to track party positions over time.
In Canada, there is the additional challenge of untangling the effects of federalism. This is especially the case with post-secondary funding categories given that education is the responsibility of the provinces but the economy, and rising influence of knowledge work, falls arguably under the jurisdiction of the federal government.

Therefore, this study builds a proxy for the combination of policymakers’ ideas and policy mood by province in lieu of the absence of manifesto data for provincial parties. Combining data from the Comparative Manifesto Project and the Canadian Parliamentary Guide produces a proxy for the policy mood of the median voter, in a federal election, identified by the province of that voter (Figure 28).

**Figure 28: Policymakers’ Ideas and Policy Mood**
Placement of Canadian federal party positions by text weighting of party manifestos on the Laver and Budge (1992) right-left scale calculated by the Comparative Manifesto Project (Klingemann et al., 2006) and placement of median voter’s response to those ideas by province (Adapted from Canadian Parliamentary Guide data).
As expected, the vote weighting of the median voter by province falls between the ranges of party positions presented in the manifestos before elections when viewed by federal election. Although the median voter’s policy mood varies by province, the perspective by election provides an intuitive sense of comparison between elections and between parties. For example, a wider spread between party positions and provincial responses to those positions is a proxy for a fragmented policy mood across the country.

Organizing the policy mood of the federal median voter by province shows general differences between the provinces regarding voting patterns (Figure 29).

**Figure 29: Policy Mood**

Placement of Canadian federal party positions by text weighting of party manifestos on the Laver and Budge (1992) right-left scale calculated by the Comparative Manifesto Project (Klingemann et al., 2006) and placement of median voter’s response to those ideas by province (Adapted from Canadian Parliamentary Guide data).

Source: Author calculations from Comparative Manifesto Project and Canadian Parliamentary Guide data
For example, the median federal voter in Alberta generally had a policy mood that was further to the right than Quebec. In addition, federal voters in British Columbia had the largest swings in policy mood from left to right and back again. Furthermore, federal voters in Newfoundland had the most consistent policy mood with the smallest swing from right to left. However, this variation in responses could result from non-policy aspects of parties as well as attributes of mood in a province.

Voter policy mood at federal elections appears to vary significantly from province to province during the period. Therefore, this study uses the policy mood of the federal median voter by province as a proxy for public opinion expressed through elections.

2.7 Political Institutions

Previous researchers focused on the role of political institutions as a key factor that may influence government decisions on funding levels for higher education institutions. The role of political institutions is not the focus of this study primarily due to the intent of incorporating the role of ideas into solving the puzzle of the link between government intentions and actual funding levels. Secondarily, the role of political institutions in Canada influencing higher education expenditures is fertile ground for future research given that most of the literature specifically responds to unique elements of American political institutions. In other words, future studies would first need to replicate data models and convert policy choice models appropriately to the Canadian context. In short, this study aims to prototype a “Canadianization” of relevant approaches on a smaller scale.

To ensure there is a simple control variable for political institutions, this study converts the Archibald and Feldman (2006) approach regarding Tax and Expenditure
Limitation laws (TELs) and supermajority requirements (SMRs) to track the influence a change in federal legislation. That is, this study uses a binary dummy variable to check the influence before and after the April 1, 1977, implementation of the Federal – Provincial Fiscal Arrangements and Established Programs Financing Act (EPF) as a proxy for the concept of a role for political institutions in Canadian policy choices on higher education funding.

2.8 Summary

This study builds proxy variables to measure four key concepts from a meta-framework of tools for analysing policy choices. The focus of the study is higher education expenditures in Canada using data capturing information before and after Canadian federal elections. Therefore, the study firstly measures the economic environment through variables for economic position and pace thereby tracking the level of the economy and enabling a proxy representing economic discomfort of Canadians during the study period. Secondly, the study measures the concept of policy feedback through a proxy using a lagged dependent variable for higher education expenditures. Thirdly, the study includes public opinion expressed through federal elections through a proxy that measures the concept of policy mood. Fourthly, the study measures the concept of the influence of political institutions by a proxy for the change in the EPF federal funding transfer mechanism.

The next chapter describes how this study organizes the proxy variables and applies the policy choice framework in a model for data analysis of Canadian government expenditures on higher education institutions.
3 Methods

3.1 Introduction

The literature review and methodology outlined in the first two chapters presents the rationale for choosing five proxy variables to measure the concepts of an economic environment, policy feedback, policy mood, and political institutions. This chapter outlines the methods used by the study to organize the relationship between the proxy variables, the implications of using different multivariate data analysis methods, and the technical attributes of the variables.

The following sections build a general model for applying the policy choice meta-framework, develop methods for using time-series panel regressions appropriate for Canadian government expenditures on higher education institutions, and provide data analysis of the measurement variables.

3.2 General Model

This study uses a policy choice meta-framework to outline the relationship between political factors and government expenditure decisions. That is, government expenditures, for policy area $X$, reflect changes at time $t$ in the economic and demographic environment, policy feedback related to the policy area, public opinion and elections, the organization of interests in the jurisdiction(s), policymakers’ ideas, and relevant political institutions (Equation 3).

$$expenditure_X = \beta_0 + \beta_{\text{environment}} + \beta_{\text{feedback}_X} + \beta_{\text{opinion}} + \beta_{\text{interests}} + \beta_{\text{ideas}} + \beta_{\text{institutions}} + u$$  (3)
This study focuses on the economic aspect of the environment and excludes demographic factors. Therefore, the concepts of economic position and voter discomfort reflect the role of the environment. This study does not use an independent variable for policymakers’ ideas because they are indirectly included in the creation of the policy mood variable. In addition, evaluating the organization of interests in Canada is beyond the scope of this study. This leaves a general model with government expenditures reflecting economic position, voter discomfort, policy feedback, policy mood, and political institutions while demographics and the organization of interests is in the category of unobservables (Equation 4).

\[
\text{expenditure}_X = \beta_0 + [\beta_{\text{position}} + \beta_{\text{discomfort}}] + \beta_{\text{feedback}}X + \beta_{\text{mood}} \]
\[
+ \beta_{\text{institutions}} + u
\]

Applying the general model in Canada involves including the relationship between the federal and provincial governments. That is, the general model segments expenditures as government expenditures (i.e., combined federal and provincial governments), federal expenditures, or provincial expenditures (i.e., noted by a g, f, or p prefix). In addition, the general model adds federal and provincial categories for economic position, voter discomfort, policy feedback, and policy mood (i.e., also noted by a g, f, or p prefix). However, this study leaves political institutions as a shared category because political institutions are not the central topic of this study.

With the above modifications, the general model can investigate combined government expenditures on a policy area (i.e., X), federal government expenditures on the policy area, or provincial government expenditures on the policy area. To investigate
the outcome of expenditures by province, the general model tracks the relevant categories by geographical location (i.e., subscript $p$). For example, the study considers both the portion of federal expenditures allocated to universities in Alberta and the portion of the Alberta provincial government’s expenditures on universities in that province. In addition, the categories track the independent variables by geography where feasible.

Therefore, a general model for determining government expenditures on a policy area located by province would include the following equations (5, 6, and 7) where $t$ represents time and $p$ represents the proportion allocated by province. For example, government expenditures for a policy area, $X$, by province, $p$, at time, $t$, reflects the relationship between policy choice categories by province and time and unobservables.

\[
g_{expX_p} = \beta_0 + \beta_{f\_position} + \beta_{f\_discomfort} + \beta_{f\_feedbackX} + \beta_{f\_mood} + \beta_{p\_position} + \beta_{p\_discomfort} + \beta_{p\_feedback} + \beta_{p\_mood} + \beta_{institutions} + u \tag{5}
\]

\[
f_{expX_p} = \beta_0 + \beta_{f\_position} + \beta_{f\_discomfort} + \beta_{f\_feedbackX} + \beta_{f\_mood} + \beta_{institutions} + u \tag{6}
\]

\[
p_{expX_p} = \beta_0 + \beta_{p\_position} + \beta_{p\_discomfort} + \beta_{p\_feedbackX} + \beta_{p\_mood} + \beta_{institutions} + u \tag{7}
\]

The next section considers different regression models and adds specific proxy variables to the general model to build the methods for the study.
3.3 Frameworks

Guided by Wilson and Butler’s (2007) review and analysis of 195 political science journal articles using time-series data analysis, this study uses three statistical models to build sets of equations to evaluate the proposed general model. The first framework uses the static model common to the higher education finance literature to date. Although the main inferential studies used fixed effects by state/province, this study uses both random and fixed effects within a static model for sensitivity analysis. The second framework uses a dynamic model broadly employed in comparative political science literature recommended by Beck and Katz (1995) and Beck (2001). That is, the Beck and Katz (1995) method includes pooling the data for ordinary least squares (OLS) analysis, using a lagged dependent variable, and then calculating panel-corrected standard errors. The third framework uses a dynamic model of first differences. That is, the difference in the dependent variable from one period to the next relates to the difference between the periods of the independent variables.

This study uses multiple approaches for testing, comparison, and robustness. Wilson and Butler (2007) empirically note that untested model specifications can arbitrarily influence results. Therefore, this study tests unit heterogeneity and dynamics (where appropriate) across the three frameworks in the sensitivity analysis in the Results chapter.

For comparison, this study generates results using FEM to provide consistency with previous higher education literature and then demonstrates two alternative frameworks using dynamics. As Wilson and Butler (2007) emphasize, there is no single
correct model and each regression analysis framework provides a way to test theoretical approaches.

For robustness, this study uses Mill’s (1875) method of difference to qualitatively assess the quantitative results from the small panel data sets available for Canadian expenditures on higher education institutions. For example, the difference between static and dynamic models provides insight into the role of policy feedback because static models and their corresponding frameworks, by definition, do not include the lagged dependent variables useful for analysing influence from prior periods.

In short, this study aims to address Wilson and Butler’s (2007) concerns and recommendations for increasing the appropriateness of model specification and robustness in published research.

3.3.1 Static Frameworks

Dropping the policy feedback category from the proposed general model allows this study to measure the remaining concepts in a static model for comparison to previous higher education literature. To complete the static framework, this study adds GDP, debt, and EI applications as proxy variables for economic position, this study’s constructed economic discomfort variable, and uses the federal policy mood variable as a proxy for provincial policy mood given the absence of alternatives. In addition, the study adds the EPF variable as a proxy for the role of political institutions in higher education expenditures (Equation 8, 9, and 10). Note that in these equations, the policy area, X, refers to expenditures specific to universities, community colleges, or vocational institutes (e.g., \( g_{expU} \) would refer to combined government expenditures for universities by province).
\( g_{\text{expX}} = \beta_0 + [\beta_f \text{GDP}_\nu + \beta_f \text{debt}_\nu + \beta_f \text{EI}_\nu] + \beta_f \text{discomfort}_\nu + [\beta_f \text{mood}_\nu] + (8) \)

\[
[\beta_p \text{GDP}_\nu + \beta_p \text{debt}_\nu + \beta_p \text{EI}_\nu] + \beta_p \text{discomfort}_\nu + \beta_p \text{EPF}_\nu + u
\]

\( f_{\text{expX}} = \beta_0 + \beta_f \text{GDP}_\nu + \beta_f \text{debt}_\nu + \beta_f \text{EI}_\nu + \beta_f \text{discomfort}_\nu + \beta_f \text{mood}_\nu + \beta \text{EPF}_\nu + u \\
4 \qquad (9) \)

\( p_{\text{expX}} = \beta_0 + \beta_p \text{GDP}_\nu + \beta_p \text{debt}_\nu + \beta_p \text{EI}_\nu + \beta_p \text{discomfort}_\nu + \beta_p \text{mood}_\nu + \beta \text{EPF}_\nu + u \\
4 \qquad (10) \)

Therefore, the static frameworks for the general model include nine variables for combined government expenditures, six variables for federal expenditures, and six variables for provincial expenditures.

**3.3.2 Dynamic Frameworks**

This study applies two dynamic models to the proposed general theoretical model to generate regression equations. The first dynamic model uses the lagged dependent variable (LDV) model. This is similar to the static model but adds a lagged dependent variable as a proxy for policy feedback (Equations 11, 12, and 13). For this study, the lagged dependent variable represents the applicable expenditures for higher education institutions (i.e., universities, community colleges, or vocational institutes) from the prior period (e.g., \( g_{\text{feedbackX}} = g_{\text{expX}} \)).

\( g_{\text{expX}} = \beta_0 + \beta_f \text{GDP}_\nu + \beta_f \text{debt}_\nu + \beta_f \text{EI}_\nu + \beta_f \text{discomfort}_\nu + [\beta_g \text{feedbackX}_\nu] + (11) \)

\[
+ \beta_f \text{mood}_\nu + \beta_p \text{GDP}_\nu + \beta_p \text{debt}_\nu + \beta_p \text{EI}_\nu + \beta_p \text{discomfort}_\nu + \beta \text{EPF}_\nu + u
\]
\[ f_{\text{exp}X_p} = \beta_0 + \beta f_{\text{GDP}_p} + \beta f_{\text{debt}_p} + \beta f_{\text{EI}_p} + \beta f_{\text{discomfort}_p} + \beta f_{\text{feedback}X_p} + \beta f_{\text{mood}_p} + \beta \text{EPF}_p + u \] (12)

\[ p_{\text{exp}X_p} = \beta_0 + \beta p_{\text{GDP}_p} + \beta p_{\text{debt}_p} + \beta p_{\text{EI}_p} + \beta p_{\text{discomfort}_p} + \beta p_{\text{feedback}X_p} + \beta f_{\text{mood}_p} + \beta \text{EPF}_p + u \] (13)

The second dynamic model uses the first difference (FD) model. This is similar to the LDV model except all dependent and independent variables reflect the difference in periods (Equations 14, 15, and 16).

\[ g_{\text{exp}X_p} - g_{\text{exp}X_{p-1}} = \beta_0 + \beta (f_{\text{GDP}_p} - f_{\text{GDP}_{p-1}}) + \beta (f_{\text{debt}_p} - f_{\text{debt}_{p-1}}) + \beta (f_{\text{EI}_p} - f_{\text{EI}_{p-1}}) + \beta (f_{\text{discomfort}_p} - f_{\text{discomfort}_{p-1}}) + \beta (g_{\text{feedback}X_p} - g_{\text{feedback}X_{p-1}}) + \beta (f_{\text{mood}_p} - f_{\text{mood}_{p-1}}) + \beta (\text{EPF}_p - \text{EPF}_{p-1}) + u \] (14)

\[ f_{\text{exp}X_p} - f_{\text{exp}X_{p-1}} = \beta_0 + \beta (f_{\text{GDP}_p} - f_{\text{GDP}_{p-1}}) + \beta (f_{\text{debt}_p} - f_{\text{debt}_{p-1}}) + \beta (f_{\text{EI}_p} - f_{\text{EI}_{p-1}}) + \beta (f_{\text{discomfort}_p} - f_{\text{discomfort}_{p-1}}) + \beta (f_{\text{feedback}X_p} - f_{\text{feedback}X_{p-1}}) + \beta (f_{\text{mood}_p} - f_{\text{mood}_{p-1}}) + \beta (\text{EPF}_p - \text{EPF}_{p-1}) + u \] (15)

\[ p_{\text{exp}X_p} - p_{\text{exp}X_{p-1}} = \beta_0 + \beta (p_{\text{GDP}_p} - p_{\text{GDP}_{p-1}}) + \beta (p_{\text{debt}_p} - p_{\text{debt}_{p-1}}) + \beta (p_{\text{EI}_p} - p_{\text{EI}_{p-1}}) + \beta (p_{\text{discomfort}_p} - p_{\text{discomfort}_{p-1}}) + \beta (p_{\text{feedback}X_p} - p_{\text{feedback}X_{p-1}}) + \beta (f_{\text{mood}_p} - f_{\text{mood}_{p-1}}) + \beta (\text{EPF}_p - \text{EPF}_{p-1}) + u \] (16)
3.4 Data Analysis

The analysis of the data specified in the equations includes structure, statistics, and testing. These subsections cover the structure of the data through descriptions, detailed summary statistics by category, and testing of estimator assumptions.

3.4.1 Data Structure

The data used by the equations falls into six categories. That is, the dependent variables and independent variables related to the policy choice categories specified by the general model. This subsection addresses each of these categories in turn.

The equations generated from the static and dynamic frameworks share nine dependent variables for the source of government expenditure and type of higher education institution (Table 2). The first difference equations are the only equations that use the variables based on the difference between elections and those variables end with “_d”.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>g_expU:</td>
<td>Government (federal &amp; provincial) expenditures for universities.</td>
</tr>
<tr>
<td>g_expCC:</td>
<td>Government (federal &amp; provincial) expenditures for community colleges</td>
</tr>
<tr>
<td>g_expV:</td>
<td>Government (federal &amp; provincial) expenditures for vocational institutes</td>
</tr>
<tr>
<td>f_expU:</td>
<td>Federal government expenditures for universities</td>
</tr>
<tr>
<td>f_expCC:</td>
<td>Federal government expenditures for community colleges</td>
</tr>
<tr>
<td>f_expV:</td>
<td>Federal government expenditures for vocational institutes</td>
</tr>
<tr>
<td>p_expU:</td>
<td>Provincial government expenditures for universities</td>
</tr>
<tr>
<td>p_expCC:</td>
<td>Provincial government expenditures for community colleges</td>
</tr>
<tr>
<td>p_expV:</td>
<td>Provincial government expenditures for vocational institutes</td>
</tr>
<tr>
<td>g_expU_d:</td>
<td>Difference between current and prior period g_expU</td>
</tr>
<tr>
<td>g_expCC_d:</td>
<td>Difference between current and prior period g_expCC</td>
</tr>
<tr>
<td>g_expV_d:</td>
<td>Difference between current and prior period g_expV</td>
</tr>
<tr>
<td>f_expU_d:</td>
<td>Difference between current and prior period f_expU</td>
</tr>
<tr>
<td>f_expCC_d:</td>
<td>Difference between current and prior period f_expCC</td>
</tr>
<tr>
<td>f_expV_d:</td>
<td>Difference between current and prior period f_expV</td>
</tr>
</tbody>
</table>

Table 2: Dependent Variable Descriptions

All values are annual expenditures in 1997 dollars per person
Table 2: (concluded)
All values are annual expenditures in 1997 dollars per person

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>p(_{expU})_d:</td>
<td>Difference between current and prior period (p\ _{expU})</td>
</tr>
<tr>
<td>p(_{expCC})_d:</td>
<td>Difference between current and prior period (p\ _{expCC})</td>
</tr>
<tr>
<td>p(_{expV})_d:</td>
<td>Difference between current and prior period (p\ _{expV})</td>
</tr>
</tbody>
</table>

The static and dynamic equations use GDP, debt, and applications for EI as proxies to measure the concept of economic position (Table 3).

Table 3: Independent Variable Descriptions for Economic Position
All values are annual in 1997 dollars per person except EI applications.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(f\ _{GDP}):</td>
<td>Federal government GDP (includes provinces and territories)</td>
</tr>
<tr>
<td>(f\ _{debt}):</td>
<td>Federal government debt</td>
</tr>
<tr>
<td>(f\ _{EI}):</td>
<td>National 12-month average for EI applications (% of population)</td>
</tr>
<tr>
<td>(p\ _{GDP}):</td>
<td>Pro vincial government GDP</td>
</tr>
<tr>
<td>(p\ _{debt}):</td>
<td>Provincial government Net Financial Debt</td>
</tr>
<tr>
<td>(p\ _{EI}):</td>
<td>Provincial 12-month average for EI applications (% of population)</td>
</tr>
<tr>
<td>(f\ _{GDP})_d:</td>
<td>Difference between current and prior period (f\ _{GDP})</td>
</tr>
<tr>
<td>(f\ _{debt})_d:</td>
<td>Difference between current and prior period (f\ _{debt})</td>
</tr>
<tr>
<td>(f\ _{EI})_d:</td>
<td>Difference between current and prior period (f\ _{EI})</td>
</tr>
<tr>
<td>(p\ _{GDP})_d:</td>
<td>Difference between current and prior period (p\ _{GDP})</td>
</tr>
<tr>
<td>(p\ _{debt})_d:</td>
<td>Difference between current and prior period (p\ _{debt})</td>
</tr>
<tr>
<td>(p\ _{EI})_d:</td>
<td>Difference between current and prior period (p\ _{EI})</td>
</tr>
</tbody>
</table>

The static and dynamic equations use a constructed variable of voters’ economic discomfort (Table 4). That is, economic discomfort tracks the number of instances with an increasing pace of CPI, debt, and/or EI applications prior to a federal election. The study also measures provincial voters’ economic discomfort in relation to the timing of a federal election rather than provincial government elections.

Table 4: Independent Variable Descriptions for Voters’ Economic Discomfort
Ordinal variables with 0, 1, 2, 3 cases when CPI, debt, and/or EI pace increasing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(f\ _{discomfort}):</td>
<td>Federal discomfort decreasing, increasing at low, medium, or high rate</td>
</tr>
<tr>
<td>(p\ _{discomfort}):</td>
<td>Provincial discomfort decreasing, increasing at low, med., or high rate</td>
</tr>
<tr>
<td>(f\ _{discomfort})_d:</td>
<td>Difference between current and prior period (f\ _{discomfort})</td>
</tr>
<tr>
<td>(p\ _{discomfort})_d:</td>
<td>Difference between current and prior period (p\ _{discomfort})</td>
</tr>
</tbody>
</table>
The equations based on dynamic models use a lagged dependent variable (i.e., expenditures) to measure the concept of policy feedback (Table 5). The purpose of this variable is to check the influence of the previous level of expenditures on the current level of expenditures.

### Table 5: Independent Variable Descriptions for Policy Feedback

All values are annual expenditures in 1997 dollars per person

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$g_{feedbackU}$</td>
<td>Government expenditures for universities from last period</td>
</tr>
<tr>
<td>$g_{feedbackCC}$</td>
<td>Government expenditures for community colleges from last period</td>
</tr>
<tr>
<td>$g_{feedbackV}$</td>
<td>Government expenditures for vocational institutes from last period</td>
</tr>
<tr>
<td>$f_{feedbackU}$</td>
<td>Federal expenditures for universities from last period</td>
</tr>
<tr>
<td>$f_{feedbackCC}$</td>
<td>Federal expenditures for community colleges from last period</td>
</tr>
<tr>
<td>$f_{feedbackV}$</td>
<td>Federal expenditures for vocational institutes from last period</td>
</tr>
<tr>
<td>$p_{feedbackU}$</td>
<td>Provincial expenditures for universities from last period</td>
</tr>
<tr>
<td>$p_{feedbackCC}$</td>
<td>Provincial expenditures for community colleges from last period</td>
</tr>
<tr>
<td>$p_{feedbackV}$</td>
<td>Provincial expenditures for vocational institutes from last period</td>
</tr>
<tr>
<td>$g_{feedbackU_d}$</td>
<td>Difference between current and prior period $g_{feedbackU}$</td>
</tr>
<tr>
<td>$g_{feedbackCC_d}$</td>
<td>Difference between current and prior period $g_{feedbackCC}$</td>
</tr>
<tr>
<td>$g_{feedbackV_d}$</td>
<td>Difference between current and prior period $g_{feedbackV}$</td>
</tr>
<tr>
<td>$f_{feedbackU_d}$</td>
<td>Difference between current and prior period $f_{feedbackU}$</td>
</tr>
<tr>
<td>$f_{feedbackCC_d}$</td>
<td>Difference between current and prior period $f_{feedbackCC}$</td>
</tr>
<tr>
<td>$f_{feedbackV_d}$</td>
<td>Difference between current and prior period $f_{feedbackV}$</td>
</tr>
<tr>
<td>$p_{feedbackU_d}$</td>
<td>Difference between current and prior period $p_{feedbackU}$</td>
</tr>
<tr>
<td>$p_{feedbackCC_d}$</td>
<td>Difference between current and prior period $p_{feedbackCC}$</td>
</tr>
<tr>
<td>$p_{feedbackV_d}$</td>
<td>Difference between current and prior period $p_{feedbackV}$</td>
</tr>
</tbody>
</table>

The static and dynamic equations use the federal policy mood measure as a proxy for public opinion (Table 6).

### Table 6: Independent Variable Descriptions for Policy Mood

Comparative Manifesto Project right-left scale vote-weighted by province

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$f_{mood}$</td>
<td>Federal policymakers’ ideas (net % text in party manifestos) * public opinion in federal elections (% federal party vote by province)</td>
</tr>
<tr>
<td>$p_{mood}$</td>
<td>Not available</td>
</tr>
<tr>
<td>$f_{mood_d}$</td>
<td>Difference between current and prior period $f_{mood}$</td>
</tr>
<tr>
<td>$p_{mood_d}$</td>
<td>Not available</td>
</tr>
</tbody>
</table>
The static and dynamic equations use the presence of EPF transfer funding as a proxy for the role of political institutions in policy choices for expenditures on higher education institutions (Table 7).

**Table 7: Independent Variable Descriptions for Political Institutions**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPF:</td>
<td>True 1977 to 1997 (i.e., equals 1, else 0)</td>
</tr>
<tr>
<td>EPF_d:</td>
<td>Difference between current and prior period EPF</td>
</tr>
</tbody>
</table>

### 3.4.2 Summary Statistics

The variable summary below includes the number of observations, mean, standard deviation, minimum value, and maximum value. The number of observations shows the data sources with limited information. For some equations, this drops down to only three elections (i.e., three elections with ten provinces means thirty observations). Limited panel data for provincial debt may affect the performance and fit of the statistical models.

The federal data sources provide the full range of the twelve elections covered by the study. This subsection provides summary statistics for each of the categories in turn beginning with the dependent variables.

The summary statistics for all the dependent variables highlight the split in focus between the federal government’s primary support for vocations and the provincial governments’ primary support for universities (Table 8).

**Table 8: Dependent Variable Summary Statistics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>g_expU:</td>
<td>120</td>
<td>$258.69</td>
<td>$105.95</td>
<td>$23.51</td>
<td>$407.46</td>
</tr>
<tr>
<td>g_expCC:</td>
<td>120</td>
<td>$71.82</td>
<td>$59.53</td>
<td>$11.54</td>
<td>$300.52</td>
</tr>
<tr>
<td>g_expV:</td>
<td>120</td>
<td>$148.16</td>
<td>$107.58</td>
<td>$11.16</td>
<td>$867.16</td>
</tr>
<tr>
<td>f_expU:</td>
<td>120</td>
<td>$43.85</td>
<td>$22.39</td>
<td>$3.48</td>
<td>$189.62</td>
</tr>
<tr>
<td>f_expCC:</td>
<td>120</td>
<td>$8.21</td>
<td>$5.62</td>
<td>$0.53</td>
<td>$35.21</td>
</tr>
<tr>
<td>f_expV:</td>
<td>120</td>
<td>$103.72</td>
<td>$97.70</td>
<td>$5.88</td>
<td>$854.19</td>
</tr>
</tbody>
</table>
Table 8: (concluded)

All values are annual expenditures in 1997 dollars per person

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>( p_{expU} ):</td>
<td>120</td>
<td>$215.12</td>
<td>$95.60</td>
<td>$11.00</td>
<td>$367.31</td>
</tr>
<tr>
<td>( p_{expCC} ):</td>
<td>120</td>
<td>$63.60</td>
<td>$60.73</td>
<td>$4.84</td>
<td>$297.94</td>
</tr>
<tr>
<td>( p_{expV} ):</td>
<td>120</td>
<td>$44.43</td>
<td>$32.62</td>
<td>$5.27</td>
<td>$153.79</td>
</tr>
<tr>
<td>( g_{expU} d ):</td>
<td>112</td>
<td>$20.82</td>
<td>$55.69</td>
<td>-100.24</td>
<td>193.32</td>
</tr>
<tr>
<td>( g_{expCC} d ):</td>
<td>112</td>
<td>$7.02</td>
<td>$22.06</td>
<td>-75.29</td>
<td>78.41</td>
</tr>
<tr>
<td>( g_{expV} d ):</td>
<td>112</td>
<td>$19.65</td>
<td>$67.29</td>
<td>-296.30</td>
<td>545.77</td>
</tr>
<tr>
<td>( f_{expU} d ):</td>
<td>112</td>
<td>$2.94</td>
<td>$26.24</td>
<td>-156.22</td>
<td>181.93</td>
</tr>
<tr>
<td>( f_{expCC} d ):</td>
<td>112</td>
<td>$0.28</td>
<td>$5.86</td>
<td>-15.90</td>
<td>16.90</td>
</tr>
<tr>
<td>( f_{expV} d ):</td>
<td>112</td>
<td>$14.97</td>
<td>$74.22</td>
<td>-373.49</td>
<td>617.98</td>
</tr>
<tr>
<td>( p_{expU} d ):</td>
<td>112</td>
<td>$17.88</td>
<td>$53.35</td>
<td>-97.75</td>
<td>171.91</td>
</tr>
<tr>
<td>( p_{expCC} d ):</td>
<td>112</td>
<td>$6.74</td>
<td>$21.96</td>
<td>-70.79</td>
<td>83.41</td>
</tr>
<tr>
<td>( p_{expV} d ):</td>
<td>112</td>
<td>$4.68</td>
<td>$24.47</td>
<td>-72.22</td>
<td>77.19</td>
</tr>
</tbody>
</table>

The summary statistics for the independent variables for economic position highlight the size of federal debt and volatility of provincial employment (Table 9).

Table 9: Independent Variable Summary Statistics for Economic Position

All values are annual in 1997 dollars per person except EI applications per population

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f_{GDP} ):</td>
<td>120</td>
<td>$22,228.48</td>
<td>$5,753.82</td>
<td>$12,850.10</td>
<td>$29,798.34</td>
</tr>
<tr>
<td>( f_{debt} ):</td>
<td>120</td>
<td>$11,046.83</td>
<td>$4,924.35</td>
<td>$6,964.18</td>
<td>$21,772.39</td>
</tr>
<tr>
<td>( f_{EI} ):</td>
<td>120</td>
<td>0.91%</td>
<td>0.11%</td>
<td>0.71%</td>
<td>1.12%</td>
</tr>
<tr>
<td>( p_{GDP} ):</td>
<td>120</td>
<td>$19,121.17</td>
<td>$7,428.58</td>
<td>$6,429.65</td>
<td>$40,663.02</td>
</tr>
<tr>
<td>( p_{debt} ):</td>
<td>120</td>
<td>$3,533.01</td>
<td>$4,112.37</td>
<td>-7,707.01</td>
<td>$14,341.57</td>
</tr>
<tr>
<td>( p_{EI} ):</td>
<td>120</td>
<td>1.01%</td>
<td>0.35%</td>
<td>0.38%</td>
<td>2.05%</td>
</tr>
<tr>
<td>( f_{GDP} d ):</td>
<td>110</td>
<td>$1,432.37</td>
<td>$1,819.47</td>
<td>-2,518.46</td>
<td>$4,257.77</td>
</tr>
<tr>
<td>( f_{debt} d ):</td>
<td>120</td>
<td>$1,284.56</td>
<td>$1,419.54</td>
<td>-566.91</td>
<td>$4,148.72</td>
</tr>
<tr>
<td>( f_{EI} d ):</td>
<td>120</td>
<td>-0.04%</td>
<td>0.14%</td>
<td>-0.24%</td>
<td>0.21%</td>
</tr>
<tr>
<td>( p_{GDP} d ):</td>
<td>110</td>
<td>$1,378.95</td>
<td>$2,054.05</td>
<td>$2,518.46</td>
<td>$9,234.61</td>
</tr>
<tr>
<td>( p_{debt} d ):</td>
<td>70</td>
<td>$991.84</td>
<td>$1,739.12</td>
<td>-6,773.37</td>
<td>$4,993.93</td>
</tr>
<tr>
<td>( p_{EI} d ):</td>
<td>120</td>
<td>-0.01%</td>
<td>0.18%</td>
<td>-0.31%</td>
<td>0.60%</td>
</tr>
</tbody>
</table>

The summary statistics for the voters’ economic discomfort show higher levels of discomfort at the national level in the sample (Table 10).

Table 10: Independent Variable Summary Statistics for Economic Discomfort

Ordinal variables with 0, 1, 2, 3 cases when CPI, debt, and/or EI pace increasing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f_{discomfort} ):</td>
<td>100</td>
<td>1.50</td>
<td>1.12</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>( p_{discomfort} ):</td>
<td>40</td>
<td>1.23</td>
<td>1.14</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 10: (concluded)

Ordinal variables with 0, 1, 2, 3 cases when CPI, debt, and/or EI pace increasing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>f_conf_d</td>
<td>90</td>
<td>-.11</td>
<td>1.92</td>
<td>-3</td>
<td>3</td>
</tr>
<tr>
<td>p_conf_d</td>
<td>30</td>
<td>-.87</td>
<td>1.55</td>
<td>-3</td>
<td>2</td>
</tr>
</tbody>
</table>

The summary statistics for the independent variables for policy feedback are the lagged dependent values in Table 7 less the first year’s value in the series. Therefore, the values are similar.

The summary statistics for the independent variables for policy mood shows the political location of federal voters as left of centre and moving to the left (Table 11).

Table 11: Independent Variable Summary Statistics for Policy Mood

Comparative Manifesto Project right-left scale vote-weighted by province

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>f_mood</td>
<td>120</td>
<td>-3.18</td>
<td>8.70</td>
<td>-26.03</td>
<td>24.82</td>
</tr>
<tr>
<td>f_mood_d</td>
<td>120</td>
<td>1.10</td>
<td>9.12</td>
<td>-17.97</td>
<td>28.63</td>
</tr>
</tbody>
</table>

The summary statistics for the independent variables for political institutions show that the implementation of the EPF was approximately mid-way through the sample of elections in the study (Table 12).

Table 12: Independent Variable Summary Statistics for Political Institutions

Binary variable for presence of EPF federal transfer program

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPF</td>
<td>120</td>
<td>0.5</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>EPF_d</td>
<td>120</td>
<td>0.08</td>
<td>0.28</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

3.4.3 Testing

This study uses two tests to check for violations of the estimator assumptions and uses sensitivity analysis guided by the concerns and recommendations outlined by Keele and Kelly (2006) for dynamic models. The Augmented Dickey-Fuller (ADF) unit-root test confirms that seventy-six dependent variables out of 180 meet the stationarity
condition.\textsuperscript{4} The Breusch-Godfrey test for higher-order serial correlation confirms that the model residuals are not highly correlated for fifty-nine cases out of the seventy-six that passed the stationarity condition.\textsuperscript{5} These two tests confirm that the panel data for federal expenditures on higher education institutions is suitable for analysis using OLS with a lagged dependent variable.

However, sampled data for provincial expenditures and combined government expenditures is not suitable for dynamic analysis without further modification.\textsuperscript{6} Altering the standard equations by removing the provincial debt and economic discomfort variables and retesting the data confirms the absence of serial correlation for forty-two cases using provincial government expenditures on higher education institutions. Therefore, the study uses these cases to represent provincial funding. Interestingly, removing the provincial debt and discomfort variables from the combined government equations does not improve the serial correlation of the combined equations. Therefore, this study analyses federal and provincial expenditures separately where feasible.

This study tests dynamic models through equations with and without policy feedback for comparison. This sensitivity analysis also includes the use of fixed and/or random effects where applicable. The standard Breusch-Pagan Lagrange multiplier test rules out using simple OLS for analysis. The widely used Hausman test confirms that either fixed or random effects are generally suitable for the panel data for federal or

\textsuperscript{4} In Stata, the command is “dfuller” to calculate the MacKinnon approximate p-value for Z(t) for the dependent variables.
\textsuperscript{5} In Stata, the command “estat bgodfrey” will perform the Breusch-Godfrey Lagrange Multiplier test for autocorrelation.
\textsuperscript{6} Advanced data smoothing and cointegrated data techniques are beyond the scope of this paper. The study’s intent is to identify political factors with reliable data and then seek additional data and alternative techniques in future research.
provincial expenditures on higher education institutions. The lone exception is provincial expenditures on universities where only fixed effects by province are suitable for a static model. Therefore, this study only uses data that passes appropriate testing methods.

3.5 General Expectations

The key measures of the study include economic position, economic discomfort, policy feedback, and policy mood. The general expectations of the study include the following:

(A) As governments’ ability to pay improves through economic position, then expenditures for higher education institutions will increase.

(B) As the public experiences increased economic discomfort, expenditures for higher education institutions will decrease.

(C) As policy feedback increases, then government expenditures for higher education institutions will increase.

(D) As policy mood moves to the right, then funding for universities will decrease and funding for vocational institutes will increase.

3.6 Summary

This study builds a general model for applying the policy choice meta-framework for any policy area related to government expenditures subject to the availability of data. This chapter applies the general model to Canadian expenditures on higher education institutions by using static and dynamic models of time series multivariate analysis suited to panel data. The analysis of the data highlights the fluctuation of the variables related to
the twelve federal elections held in 1962 to 1997. However, limited data availability restricts some analysis to the federal elections in 1988, 1993, and 1997.

As per the data testing, this study uses the data from first differences in equations with and without policy feedback for federal and provincial expenditures on universities, community colleges, and vocational institutes. That is, this study uses sensitivity analysis between equations with and without a lagged dependent variable.
4 Results

4.1 Introduction

This chapter provides a general description of the findings, testing of hypotheses, and discussion of implications. In general, federal funding for universities tends to decrease when prior period expenditures increased, community college funding increases with economic discomfort, and vocational funding decreases as federal GDP increases. At the same time, provincial funding for universities tends to increase with provincial GDP and community college funding increases with provincial GDP and EI applications. The following sections cover the details of the results.

4.2 Direction and Significance

The first difference (FD) model provides the majority of findings for this study. However, the direction of results from non-first difference models also supports the general findings described below for federal and provincial expenditures on higher education institutions.

4.2.1 Federal Expenditures

Federal expenditures on higher education institutions generally follow the same pattern nationally and by region other than three exceptions (Table 13). All the exceptions occur with federal funding to the Maritimes for community colleges and vocational institutes. That is, federal funding tends to increase for Maritime colleges when federal GDP increases or policy mood of federal voters in the Maritimes moves to
the right. In addition, federal expenditures on Maritime vocational institutes tends to decrease as voters experience more economic discomfort.

**Table 13: Direction and Significance – Federal Expenditures**

Federal expenditures for Universities, Community Colleges, and Vocational Institutes, by province aggregated by region, based on the budget following elections in 1963 to 1997

<table>
<thead>
<tr>
<th>Variables</th>
<th>Universities (U)</th>
<th>Community Colleges (CC)</th>
<th>Vocational Institutes (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ca</td>
<td>W.</td>
<td>C.</td>
</tr>
<tr>
<td>$f_{GDP_d}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$f_{deb_d}$</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>$f_{EI_d}$</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>$f_{discom_d}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$f_{feeb_U_d}$</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$f_{feeb_CC_d}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$f_{feeb_V_d}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$f_{mood_d}$</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>$EPF_d$</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Notes:**

By region, Canada (Ca), Western Canada (W.), Central Canada (C.), & Maritimes (M.)

Model 1, first differences without lagged dependent variable.

Model 2, first differences with lagged dependent variable to represent policy feedback.

+ + + positive direction & p<0.01, + + pos. direction & p<0.05, + pos. direction & p<0.1
- - - negative direction & p<0.01, - - neg. direction & p<0.05, - neg. direction & p<0.1
Other than the exceptions in the Maritimes, the most frequently significant findings show that federal funding for universities and vocational institutes tend to increase as EI applications increase and decrease with economic discomfort. At the same time, federal expenditures for community colleges shows the opposite pattern with funding decreasing with EI applications and increasing with economic discomfort. This divergence in the pattern highlights three observations.

The first observation is that funding varies by institutional type and by Canadian region. This may partly explain why Elliott (1995) did not find regional consistency of effects in post secondary funding in Canada. It is plausible that inferential equations looking at total funding for higher education hide the counter balancing aspects of the funding sub-elements. In Elliott’s (1995) model, the first difference equations investigated total federal post secondary funding (i.e., instruction, investment, research, and student funding) by province. Therefore, it is useful to consider separate funding categories and regions in future comparative research.

The second observation is that the federal government’s ability to pay is not the only influence on the allocation of resources to higher education institutions. Given the same economic environment, funding may be re-allocated from one institutional type to another. For example, if EI applications are high, then the federal government is likely to shift funding from community colleges to universities and vocational institutes.

The third observation is that future research on the sensitivity of the sub-elements of the economic discomfort variable would help explain the different direction of results from EI applications and economic discomfort. For example, does the pace of CPI,
government debt, and EI applications share similar directions and significance? If not, then are there patterns where they align and other cases where they do not?

Regarding GDP, outside the Maritimes federal funding tends to decrease for community colleges as GDP rises. Across Canada and in the Maritimes, federal funding also tends to decrease for vocational institutes as GDP rises. There are not enough significant findings to generalize from this pattern. However, the mixture of findings implies some interaction between the regions. For example, federal funding for vocational institutes across Canada and within the Maritimes show significant results while there are no significant results for Western or Central Canada.

Regarding federal debt, the framework only found debt to be significant for federal funding in Western Canada. As debt increases, federal funding tends to increase for universities and decrease for community colleges. Further research is necessary to uncover a clear role for debt in federal funding for higher education institutions.

The addition of a lagged dependent variable as a proxy for policy feedback was generally neutral or improved the models for universities and community colleges. However, the number of significant variables tends to decrease for vocational institutes. Further research is necessary to understand the variation between institutional types. In all applicable significant findings, federal funding tends to decrease as policy feedback increases. In a first difference model, this means that federal funding tends to balance out over time. That is, a decreasing trend tends to follow an increasing trend or vice versa.

For policy mood, a right leaning electorate in Central Canada tends to lead to an increase in federal funding for universities and vocational institutes. Outside of the
Maritimes, a right leaning electorate tends to lead to decreases in federal funding for community colleges.

For the EPF, the implementation of the adapted funding formula tends to lead to a decrease in federal funding for community colleges and vocational institutes across Canada. This measure is more effective in non-first difference models and the study retains its use for consistency and to control for pre and post-EPF funding as per the precedent set by Elliott (1995).

4.2.2 Provincial Expenditures

Provincial expenditures appear similar by institutional type within a limited data sample required by dropping the provincial debt measures (Table 14). However, there may be an offsetting pattern with federal expenditures. For example, federal expenditures on community colleges tend to decrease with EI applications while provincial expenditures increase with EI applications. In addition, results show a potential counterbalancing with GDP and community college funding and EI applications for university funding.

More research is necessary to expand the data available for specific analysis of provincial expenditures on higher education institutions. For the most part, the currently available data passes the stationarity requirement. The current challenge with the data is autocorrelation within the small samples per province (i.e., twelve elections). A larger sample size or considering non-election years may address the challenge. However, the future challenge will be finding sufficient non-economic data to fulfill sufficient coverage of proxy variables to measure political concepts. The alternative is to extrapolate available political data (e.g., policy mood) for years in between elections.
### Table 14: Direction and Significance – Provincial Expenditures

Provincial expenditures for Universities, Community Colleges, and Vocational Institutes, by province aggregated by region, based on the budget following elections in 1963 to 1997

<table>
<thead>
<tr>
<th>Variables</th>
<th>Universities (U)</th>
<th>Community Colleges (CC)</th>
<th>Vocational Institutes (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ca N. M. 1 2 1 2</td>
<td>Ca N. M. 1 2 1 2 1 2 1 2</td>
<td>Ca N. M. 1 2 1 2 1 2 1 2</td>
</tr>
<tr>
<td>( p_{\text{GDP}_d} )</td>
<td>+ +</td>
<td>+ + + + + + + +</td>
<td>+ + + + + + + +</td>
</tr>
<tr>
<td>( p_{\text{EI}_d} )</td>
<td>-</td>
<td>+ + + + + + + +</td>
<td>+ + + + + + + +</td>
</tr>
<tr>
<td>( p_{\text{feedbackU}_d} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( p_{\text{feedbackCC}_d} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( p_{\text{feedbackV}_d} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( f_{\text{mood}_d} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( EPF_d )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
By region, Canada (Ca), Not Maritimes (N.) & Maritimes (M.)
Model 1, first differences without lagged dependent variable.
Model 2, first differences with lagged dependent variable to represent policy feedback.
+ + + positive direction & \( p<0.01 \), + + pos. direction & \( p<0.05 \), + pos. direction & \( p<0.1 \)
- - - negative direction & \( p<0.01 \), - - neg. direction & \( p<0.05 \), - neg. direction & \( p<0.1 \)

#### 4.2.3 Non-First Difference Models

Comparing non-first difference models replicates the pattern for federal funding of community colleges (Table 15). That is, federal funding tends to decrease with EI applications and increase with economic discomfort in Western Canada. Although the non-first difference models only include Alberta, Saskatchewan, and Manitoba, this consistency across five different models implies robustness of results from EI applications and economic discomfort.
Table 15: Direction and Significance – Non First Difference Models

Federal & Provincial expenditures for Universities, Community Colleges, and Vocational Institutes, by province aggregated by region, based on the budget following elections in 1963 to 1997

<table>
<thead>
<tr>
<th>Variables</th>
<th>Universities (U)</th>
<th>Community Colleges (CC)</th>
<th>Vocational Institutes (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PE (f_expU)</td>
<td>AB, SK, &amp; MB (f_expCC)</td>
<td>AB (f_expV)</td>
</tr>
<tr>
<td></td>
<td>FE RE</td>
<td>FE RE PC LD</td>
<td>FE RE</td>
</tr>
<tr>
<td>F_GDP</td>
<td>i</td>
<td></td>
<td>+ i</td>
</tr>
<tr>
<td>P_GDP</td>
<td></td>
<td></td>
<td>i</td>
</tr>
<tr>
<td>F_debt</td>
<td>i</td>
<td></td>
<td>i</td>
</tr>
<tr>
<td>F_EI</td>
<td>i</td>
<td>- - - -</td>
<td>+ i</td>
</tr>
<tr>
<td>P_EI</td>
<td></td>
<td></td>
<td>i</td>
</tr>
<tr>
<td>F_discomfort</td>
<td>i</td>
<td>+ + + +</td>
<td>i</td>
</tr>
<tr>
<td>F_feedbackCC</td>
<td>n/a</td>
<td>n/a n/a n/a</td>
<td>n/a n/a n/a</td>
</tr>
<tr>
<td>F_mood</td>
<td>i</td>
<td></td>
<td>i</td>
</tr>
<tr>
<td>EPF</td>
<td>i</td>
<td></td>
<td>- i i</td>
</tr>
</tbody>
</table>

Notes:
By province or group of provinces
Model FE, Fixed Effects (without policy feedback)
Model RE, Random Effects (without policy feedback)
Model PC, Panel Corrected Standard Errors (without policy feedback)
Model LD, Lagged Dependent Variable using PC (with policy feedback)

+ + + positive direction & p<0.01, + + pos. direction & p<0.05, + pos. direction & p<0.1
- - - negative direction & p<0.01, - - neg. direction & p<0.05, - neg. direction & p<0.1
i Insufficient observations

Federal expenditures for vocational institutes in Alberta mirror the national pattern of results for EI applications and the presence of the EPF system. However, the role of GDP varies from the national pattern in the opposite direction. That is, federal
funding for vocational institutes in Alberta tends to increase when federal GDP increases. This result may be an exception given that it is only significant at the ten percent level and that Elliott’s (1995) findings for Alberta show a general decreasing trend for funding of all higher education institutions as GDP increases. Regarding unemployment, Elliott’s (1995) results generally support the premise that funding increases for higher education institutions in Alberta unemployment increases.

Overall, the non-first difference models face two fundamental data challenges. First, limited data availability increases the cases of insufficient observations to generate results. The statistical software automatically drops variables due to collinearity and smaller sample sizes of this panel data by province tend to be collinear. That is, variables tend to behave similarly. Second, non-stationarity within the data is a root challenge. This is particularly difficult to overcome when sampling by irregularly timed election dates because elections further apart are more likely to demonstrate patterns of growth leading to non-stationarity. In addition, implementing data smoothing techniques to address challenges with elections further apart may “smooth out” the political effects within the data for elections closer together. Therefore, future research is necessary to minimize these data challenges.

4.3 Magnitude and Significance

This section outlines the magnitude of the findings for Canada nationally and regionally primarily through the first difference models. The benefit of calculating magnitude on tested data is the ability to provide a reasonable ranking of the various influences in the models on funding for higher education institutions.
4.3.1 Canada

The largest indicators for federal expenditures on universities, community colleges, and vocational institutes across Canada are policy feedback, economic discomfort, and federal GDP (Table 16).

Table 16: Interpretation of Results – Canada

Direction, magnitude, and significance of estimated change in the dependent variable (federal expenditures on Universities, Community Colleges, and Vocational Institutes), by province aggregated by region, assuming a one standard deviation increase in the independent variables.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Std. Dev.</th>
<th>U (1)</th>
<th>CC (1)</th>
<th>V (1)</th>
<th>U (2)</th>
<th>CC (2)</th>
<th>V (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>f_GDP_d</td>
<td>$1,819</td>
<td>---</td>
<td>---</td>
<td>-$47.31 ($19.47) **</td>
<td>---</td>
<td>---</td>
<td>-$44.03 ($21.11) **</td>
</tr>
<tr>
<td>f_debt_d</td>
<td>$1,420</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>f_EI_d</td>
<td>0.14%</td>
<td>$9.77 ($5.02) *</td>
<td>-$2.70 ($1.26) **</td>
<td>$44.74 ($6.31) ***</td>
<td>---</td>
<td>-$2.81 ($0.86) ***</td>
<td>---</td>
</tr>
<tr>
<td>f_discomfort_d</td>
<td>1.92</td>
<td>---</td>
<td>$3.60 ($1.18) ***</td>
<td>-$21.12 ($7.27) ***</td>
<td>---</td>
<td>$3.90 ($0.82) ***</td>
<td>---</td>
</tr>
<tr>
<td>f_feedbackU_d</td>
<td>$26.83</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>-$11.81 ($6.14) *</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>f_feedbackCC_d</td>
<td>$5.19</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>---</td>
<td>-$1.82 ($0.96) *</td>
<td>---</td>
</tr>
<tr>
<td>f_feedbackV_d</td>
<td>$66.42</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>---</td>
<td>---</td>
<td>-$32.28 ($19.00) *</td>
</tr>
<tr>
<td>f_mood_d</td>
<td>9.12</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>EPF_d</td>
<td>0.28</td>
<td>---</td>
<td>-$1.38 ($0.64) **</td>
<td>-$10.48 ($3.79) ***</td>
<td>---</td>
<td>-$1.28 ($0.45) ***</td>
<td>-$12.61 ($6.79) *</td>
</tr>
</tbody>
</table>

Estimated change in annual federal expenditures shown per person in 1997 dollars with plus/minus in brackets. (*** p<0.01, ** p<0.05, * p<0.1)
Model 1, first differences of federal funding without lagged dependent variable.
Model 2, first differences of federal funding with lagged dependent variable to represent policy feedback.
For federal expenditures on universities, a first differences model with a lagged dependent variable estimates that an increase in policy feedback by one standard deviation would decrease spending per person by approximately $12, on average, plus or minus $6 with a less than ten percent probability of getting this result by chance in a sample this size. Using the same model without a lagged dependent variable estimates that an increase in EI applications by one standard deviation would increase spending per person by approximately $10, on average, plus or minus $5 with a less than ten percent probability of getting this result by chance. The implication between the two models is that policy feedback is a larger influence on federal funding for universities than employment levels. However, given that the results for both models are limited to one variable and significant at the ten percent level, further sensitivity analysis is required. Therefore, this study includes regional analysis of federal funding on universities.

For the largest influence on federal expenditures for community colleges, both first difference models (i.e., with and without a lagged dependent variable) estimate that an increase in economic discomfort by one standard deviation would increase spending per person by approximately $4, on average, plus or minus $1 with a less than one percent probability of getting this result by chance. The second largest influence is employment with both models estimating that an increase in EI applications by one standard deviation would decrease spending per person by approximately $3, on average, plus or minus $1. In addition, there is a less than five percent probability of getting this result by chance without policy feedback in the model and a less than one percent chance of getting this result by chance with policy feedback in the model. In other words, adding the policy feedback variable to the model increases the robustness of results for federal
funding of community colleges. When included, the model estimates that an increase in policy feedback by one standard deviation would decrease spending per person by approximately $2, on average, plus or minus $1 with a less than ten percent probability of getting this result by chance in a sample this size. For both models, the EPF variable has the least influence on federal funding for community colleges.

For the largest influence on federal expenditures for vocational institutes, the first differences model estimates that an increase in GDP by one standard deviation would decrease spending per person by approximately $47, on average, plus or minus $19 with a less than five percent probability of getting this result by chance in a sample this size. Adding policy feedback to the model reduces the influence of federal GDP to a decrease in spending per person of approximately $44, on average, plus or minus $21 with the same probability of significance. This confirms the robustness of GDP as the largest influence on federal funding for vocational institutes. However, the addition of the policy feedback variable eliminates the significant findings for EI applications and economic discomfort in the base model. This is unusual in that both EI applications and economic discomfort are significant at the one percent level when policy feedback is not included. The nature of the interaction between EI applications, economic discomfort, and policy feedback is unclear at the national level of analysis and requires regional analysis for further exploration. In both models, the EPF variable has the lowest magnitude influence on federal funding per person.

For Canada, the model shows significant results for economic position, economic discomfort, policy feedback, and the introduction of the EPF. In general, the addition of
policy feedback reduces the influence of the economy. Interestingly, the model does not find a significant role for federal debt or policy mood with panel data pooled nationally.

**4.3.2 Western Canada**

For Western Canada, the largest indicators for federal expenditures on universities and community colleges are EI applications and economic discomfort (Table 17).

For federal expenditures on universities, the addition of policy feedback does not significantly alter results. Both models estimate that an increase in EI applications by one standard deviation would increase spending per person by approximately $12, on average, plus or minus $3 with a less than one percent probability of getting this result by chance in a sample this size. The next largest impact is economic discomfort. Both models estimate that an increase in economic discomfort by one standard deviation would decrease federal spending per person by approximately $10, on average, plus or minus $3 with a less than one percent probability of getting this result by chance. The third largest impact is a significant role for federal debt. The models estimate that an increase in federal debt by one standard deviation would increase federal funding per person by approximately $4, on average, plus or minus $2 with a less than five percent probability of getting this result by chance.

For federal expenditures on community colleges, the model using policy feedback is the stronger case. All five variables are significant at the one percent level. In addition, EI applications, economic discomfort, and policy mood increased significance from the five percent level to the one percent level with the addition of policy feedback. The downside is the loss of the GDP and debt variables that were significant at the ten percent level. The stronger model estimates that an increase in economic discomfort by one
standard deviation would increase spending per person by approximately $5, on average, plus or minus $1 with a less than one percent probability of getting this result by chance.

In addition, the stronger model estimates that a policy mood that moves to the political right by one standard deviation would decrease spending per person by approximately $5, on average, plus or minus $2 with significance at the one percent level in the sample.

**Table 17: Interpretation of Results – Western Canada**

Direction, magnitude, & significance of estimated change in the dependent variable, by province aggregated by region, with a one std. dev. increase in the independent variables.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Std. Dev.</th>
<th>U (1)</th>
<th>CC (1)</th>
<th>V (1)</th>
<th>U (2)</th>
<th>CC (2)</th>
<th>V (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$f_{GDP_d}$</td>
<td>$1,819$</td>
<td>---</td>
<td>-$5.33</td>
<td>---</td>
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<td></td>
<td></td>
<td></td>
<td>($3.22)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$f_{debt_d}$</td>
<td>$1,420$</td>
<td>$3.62$</td>
<td>-$2.17</td>
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<td></td>
<td>($1.69)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$f_{EI_d}$</td>
<td>0.14%</td>
<td>$11.92$</td>
<td>-$4.36</td>
<td>---</td>
<td>$11.96$</td>
<td>-$4.88</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($2.85)</td>
<td>($1.77)</td>
<td></td>
<td>($3.10)</td>
<td>($0.73)</td>
<td></td>
</tr>
<tr>
<td>$f_{discomfort_d}$</td>
<td>1.92</td>
<td>-$9.68</td>
<td>$3.42</td>
<td>---</td>
<td>-$9.73</td>
<td>$5.32</td>
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<td></td>
<td></td>
<td>($2.87)</td>
<td>($1.77)</td>
<td></td>
<td>($3.17)</td>
<td>($0.94)</td>
<td></td>
</tr>
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<td>$f_{feedbackU_d}$</td>
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<td>n/a</td>
<td>n/a</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>$f_{feedbackCC_d}$</td>
<td>$5.19$</td>
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<td>n/a</td>
<td>n/a</td>
<td>---</td>
<td>-$3.01</td>
<td>---</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td>n/a</td>
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</tr>
<tr>
<td>$f_{mood_d}$</td>
<td>9.12</td>
<td>---</td>
<td>-$6.93</td>
<td>---</td>
<td>---</td>
<td>-$5.26</td>
<td>---</td>
</tr>
<tr>
<td></td>
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<td>($2.71)</td>
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<td></td>
<td>($1.81)</td>
<td></td>
</tr>
<tr>
<td>EPF_d</td>
<td>0.28</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>-$1.81</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>($0.53)</td>
<td></td>
</tr>
</tbody>
</table>

Estimated change in annual federal expenditures shown per person in 1997 dollars with plus/minus in brackets. (*** p<0.01, ** p<0.05, * p<0.1)

Model 1, first differences of federal funding without lagged dependent variable.

Model 2, first differences of federal funding with lagged dependent variable to represent policy feedback.
Furthermore, the first differences model with a lagged dependent variable estimates that an increase in EI applications or policy feedback by one standard deviation would decrease spending per person by approximately $5 or $3 respectively, on average, plus or minus $1 with a less than one percent probability of getting this result by chance. As with the other models so far, the EPF variable has the lowest influence on federal spending.

For Western Canada, the results are limited to universities and community colleges. The models show significant results for economic position, economic discomfort, policy feedback, policy mood, and the introduction of the EPF. In general, the addition of policy feedback absorbs some of the influence of the economy. In addition, the roles of federal debt and policy mood are significant in Western Canada even though they are not significant variables when evaluated nationally. These results confirm a useful role for analysis considering regions and higher institutional type.

4.3.3 Central Canada

The largest indicators for federal expenditures on universities, community colleges, and vocational institutes across Central Canada are EI applications and policy mood (Table 18).

For federal expenditures on universities, the addition of policy feedback does not significantly alter results. Both models estimate that an increase in EI applications by one standard deviation would increase spending per person by approximately $6, on average, plus or minus $2 with a less than one percent probability of getting this result by chance in a sample this size. The models also estimate that an increase in economic discomfort by one standard deviation would increase federal spending per person by approximately $5.50, on average, plus or minus $2 with a less than one percent probability of getting
this result by chance. In addition, both models estimate that a policy mood that moves to the right by one standard deviation would increase university funding per person by approximately $4.50, on average, plus or minus $2.50 with a less than ten percent probability of getting this result by chance.

Table 18: Interpretation of Results – Central Canada
Direction, magnitude, and significance of estimated change in the dependent variable (first difference of federal expenditures on Universities, Community Colleges, and Vocational Institutes), by province aggregated by region, assuming a one standard deviation increase in the independent variables.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Std. Dev.</th>
<th>U (1)</th>
<th>CC (1)</th>
<th>V (1)</th>
<th>U (2)</th>
<th>CC (2)</th>
<th>V (2)</th>
</tr>
</thead>
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<tr>
<td>$f_{GDP_d}$</td>
<td>$1,819$</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>$-1.84$</td>
<td>---</td>
</tr>
<tr>
<td>$f_{debt_d}$</td>
<td>$1,420$</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>$f_{EI_d}$</td>
<td>0.14%</td>
<td>$6.08$ ($2.01)</td>
<td>---</td>
<td>$-2.47$ ($0.64)</td>
<td>---</td>
<td>$6.08$ ($2.02)</td>
<td>$-2.27$ ($0.42)</td>
</tr>
<tr>
<td>$f_{discomfort_d}$</td>
<td>1.92</td>
<td>$-5.49$ ($1.84)</td>
<td>$1.74$ ($0.58)</td>
<td>---</td>
<td>$-5.60$ ($2.10)</td>
<td>$1.79$ ($0.39)</td>
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</tr>
<tr>
<td>$f_{feedbackU_d}$</td>
<td>$26.83$</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>$f_{feedbackCC_d}$</td>
<td>$5.19$</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>---</td>
<td>$-2.16$ ($0.93)</td>
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</tr>
<tr>
<td>$f_{feedbackV_d}$</td>
<td>$66.42$</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>$f_{mood_d}$</td>
<td>9.12</td>
<td>$4.46$ ($2.54)</td>
<td>$-3.24$ ($1.21)</td>
<td>$8.52$ ($4.93)</td>
<td>$4.50$ ($2.56)</td>
<td>$-4.14$ ($1.05)</td>
<td>---</td>
</tr>
<tr>
<td>EPF_d</td>
<td>0.28</td>
<td>---</td>
<td>$-0.94$ ($0.33)</td>
<td>---</td>
<td>$-5.31$ ($2.75)</td>
<td>---</td>
<td>$-1.02$ ($0.21)</td>
</tr>
</tbody>
</table>

Estimated change in annual federal expenditures shown per person in 1997 dollars with plus/minus in brackets. (*** p<0.01, ** p<0.05, * p<0.1)
Model 1, first differences of federal funding without lagged dependent variable.
Model 2, first differences of federal funding with lagged dependent variable to represent policy feedback.
For federal expenditures on community colleges, the model including policy feedback is the stronger model. In this case, the addition of policy feedback adds the role of federal GDP as a significant variable. The stronger model estimates that a move to the political right by one standard deviation would decrease spending per person by approximately $4, on average, plus or minus $1 with a less than one percent probability of getting this result by chance in a sample this size. The second largest influence on federal funding for community colleges is EI applications. The stronger model estimates that an increase in EI applications by one standard deviation would decrease spending per person by approximately $2, on average, plus or minus less than a dollar with a less than one percent probability of getting this result by chance. In addition, this model estimates that an increase in policy feedback or GDP would decrease spending per person by approximately $2, on average, plus or minus $1 with a less than five percent probability of getting this result by chance. Economic discomfort plays a smaller role for community colleges in Central Canada. The model estimates that an increase in economic discomfort by one standard deviation would increase funding by approximately $2, on average, plus or minus less than $0.50 with a less than one percent probability of getting this result by chance. As with the other models, the EPF variable has the lowest magnitude influence.

For federal expenditures on vocational institutes, both models have only two variables that are significant at the ten percent level. The addition of policy feedback drops policy mood as a significant variable and adds EI applications as a significant variable. Given the greater consistency of EI applications as an indicator of funding across all the models reviewed so far and theoretical support from Keele and Kelly (2006), it is reasonable to rely on model with a lagged dependent variable as a more
reliable case. That model estimates that an increase in EI applications by one standard deviation would decrease spending per person by approximately $10, on average, plus or minus $6 with a less than ten percent probability of getting this result by chance. In addition, the lagged depend variable model estimates that the introduction of the EPF decreased federal funding for vocational institutes in Central Canada.

For Central Canada, the models show significant results for economic position, economic discomfort, policy feedback, policy mood, and the introduction of the EPF. For university expenditures, the lack of change in results implies robust findings. For community colleges, the addition of policy feedback adjusts the influence of the economy and strengthens the overall significance of the model. For vocational expenditures, the addition of policy feedback adjusts the role of EI applications as more significant than policy mood.

4.3.4 Maritimes

The largest indicators for federal expenditures on universities, community colleges, and vocational institutes across the Maritimes are policy feedback, policy mood, and economic factors (Table 19).

For federal expenditures on universities, the only model with significant results is a first difference model with a lagged dependent variable. This model estimates that an increase in policy feedback by one standard deviation would decrease spending per person by approximately $12, on average, plus or minus $6 with a less than five percent probability of getting this result by chance in a sample this size. This confirms a role for previous political funding decisions regarding universities. At the same time, it implies that policy feedback may have a general role in the Maritimes.
Table 19: Interpretation of Results – Canadian Maritime Provinces

Direction, magnitude, and significance of estimated change in the dependent variable (first difference of federal expenditures on Universities, Community Colleges, and Vocational Institutes), by province aggregated by region, assuming a one standard deviation increase in the independent variables.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Std. Dev.</th>
<th>U (1)</th>
<th>CC (1)</th>
<th>V (1)</th>
<th>U (2)</th>
<th>CC (2)</th>
<th>V (2)</th>
</tr>
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<td>$6.97</td>
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<td>$7.10</td>
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<td></td>
<td></td>
<td>($2.15)</td>
<td>($32.02)</td>
<td></td>
<td>($2.04)</td>
<td>($35.66)</td>
</tr>
<tr>
<td>f_debt_d</td>
<td>$1,420</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>f_EI_d</td>
<td>0.14%</td>
<td>---</td>
<td>-$2.06</td>
<td>$90.90</td>
<td>---</td>
<td>-$2.12</td>
<td>$52.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>($1.24)</td>
<td>($9.66)</td>
<td></td>
<td>($1.15)</td>
<td>($27.38)</td>
</tr>
<tr>
<td>f_discomfort_d</td>
<td>1.92</td>
<td>---</td>
<td>$5.21</td>
<td>-$45.56</td>
<td>---</td>
<td>$5.17</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>($1.20)</td>
<td>($11.20)</td>
<td></td>
<td>($1.11)</td>
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<td>n/a</td>
<td>n/a</td>
<td>-$12.42</td>
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<td>---</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>($6.01)</td>
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</tr>
<tr>
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<td>n/a</td>
<td>n/a</td>
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<td>---</td>
</tr>
<tr>
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<td>n/a</td>
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<td>$7.74</td>
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<td></td>
<td></td>
<td>($1.84)</td>
<td></td>
<td></td>
<td>($1.84)</td>
<td></td>
</tr>
<tr>
<td>EPF_d</td>
<td>0.28</td>
<td>---</td>
<td>-$1.32</td>
<td>-$22.52</td>
<td>---</td>
<td>---</td>
<td>-$26.18</td>
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<td></td>
<td></td>
<td>($0.62)</td>
<td>($6.19)</td>
<td></td>
<td></td>
<td>($10.92)</td>
</tr>
</tbody>
</table>

Estimated change in annual federal expenditures shown per person in 1997 dollars with plus/minus in brackets. (*** p<0.01, ** p<0.05, * p<0.1)
Model 1, first differences of federal funding without lagged dependent variable.
Model 2, first differences of federal funding with lagged dependent variable to represent policy feedback.

For federal expenditures on community colleges, the models with and without policy feedback show that policy mood has the largest influence. Both models estimate that a policy mood movement to the political right by one standard deviation would increase spending per person by approximately $8, on average, plus or minus $2 with a
less than one percent probability of getting this result by chance. Both models also estimate that federal GDP is the second largest influence on federal funding for community colleges. That is, the models estimate that an increase in GDP by one standard deviation would increase spending by approximately $7, on average, plus or minus $2 with a less than one percent probability of getting this result by chance.

Economic discomfort and EI applications are the third and forth largest influencers for federal expenditures on community colleges in the Maritimes. The models estimate that an increase in economic discomfort by one standard deviation would increase spending per person by approximately $5, on average, plus or minus $1 with a less than one percent probability of getting this result by chance. Furthermore, the models estimate that an increase in EI applications by one standard deviation would decrease spending per person by approximately $2, on average, plus or minus $1 with a less than ten percent probability of getting this result by chance. Although the model with the lagged dependent variable does not show a significant role for policy feedback, it does drop the EPF variable. This implies there may be some interaction between past funding decisions and the structure of the funding mechanism for community colleges in the Maritimes.

For federal expenditures on vocational institutes, the economic variables have the largest magnitude. Although the base model using first differences without a lagged dependent model has the higher level of significance for four variables, it may be overstating the role of the economy and understating the role of politics in federal funding for the Maritimes. The addition of the policy feedback variable to the base model retains the significance of the variables for GDP, EI applications, and the presence of the EPF and drops the economic discomfort variable from the model. The model with policy
feedback estimates that an increase in GDP by one standard deviation would decrease spending per person by approximately $85, on average, plus or minus $36 with a less than five percent probability of getting this result by chance. This model also estimates that an increase in EI applications by one standard deviation would increase spending per person by approximately $52, on average, plus or minus $27 with a less than ten percent probability of getting this result by chance. In addition, this model estimates that an increase in policy feedback by one standard deviation would decrease spending per person by approximately $34, on average, plus or minus $19 with a less than ten percent probability of getting this result by chance. As with all the other models, the EPF variable has the least influence on federal spending. However, federal funding for vocational institutes is the most volatile with the largest movements in magnitude for all significant variables including the EPF variable. These results confirm a large role for federal funding in vocational institutes to mitigate economic downturns. That is, when GDP increases vocational funding decreases dramatically and when EI applications increase then vocational funding increases considerably.

For the Maritimes, the model shows significant results for economic position, economic discomfort, policy feedback, policy mood, and the introduction of the EPF. However, none of the models found a significant role for federal debt.

### 4.3.5 Non-First Difference Models

The results from four other types of models using tested data for Alberta, Saskatchewan, and Manitoba reflect similar magnitudes of influence for federal funding on community colleges for western provinces (Table 20). However, there is insufficient
data to compare models of federal expenditures on vocational institutes in western Canada.

Table 20: Interpretation of Results – Non First Difference Models
Direction, magnitude, and significance of estimated change in the dependent variable (federal expenditures on Community Colleges and Vocational Institutes), by province aggregated by region or by province as noted below, assuming a one standard deviation increase in the independent variables.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Std. Dev.</th>
<th>CC (1)</th>
<th>CC (2)</th>
<th>CC (3)</th>
<th>CC (4)</th>
<th>V (5)</th>
</tr>
</thead>
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<td>$f_{GDP}$</td>
<td>$5,754</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>$11.91) ($4.10) *</td>
</tr>
<tr>
<td>$f_{debt}$</td>
<td>$4,924</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>$f_{EI}$</td>
<td>0.11%</td>
<td>-$5.19 ($2.38) **</td>
<td>-$5.03 ($2.39) **</td>
<td>-$5.03 ($2.26) **</td>
<td>-$4.81 ($1.98) **</td>
<td>$8.04 ($1.76) **</td>
</tr>
<tr>
<td>$f_{discomfort}$</td>
<td>1.12</td>
<td>---</td>
<td>$2.85 ($1.71) *</td>
<td>$2.85 ($1.61) *</td>
<td>$3.18 ($1.44) **</td>
<td>---</td>
</tr>
<tr>
<td>$f_{feedbackCC}$</td>
<td>$5.48</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>---</td>
<td>n/a</td>
</tr>
<tr>
<td>$f_{mood_d}$</td>
<td>8.70</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>$6.90 ($0.95) ***</td>
</tr>
<tr>
<td>$EPF_d$</td>
<td>0.50</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-$4.78 ($1.71) *</td>
</tr>
</tbody>
</table>

Estimated change in annual federal expenditures shown per person in 1997 dollars with plus/minus in brackets. (** p<0.01, * p<0.05, * p<0.1)
(1) Fixed effects without policy feedback for Alberta, Saskatchewan, & Manitoba
(2) Random effects without policy feedback for AB, SK, & MB
(3) Panel Corrected Standard Errors (PCSE) without policy feedback for AB, SK, & MB
(4) Lagged Dependent Variable (using PCSE) with policy feedback for AB, SK, & MB
(5) Fixed effects without policy feedback for Alberta

For federal expenditures on community colleges, the four models estimate that an increase in EI applications by one standard deviation would decrease spending per person by approximately $5, on average, plus or minus $2 with a less than five percent probability of getting this result by chance in a sample this size. The influence of
economic discomfort is secondary to EI applications. The three of the four models found EI applications significant. Those three models estimate that an increase in economic discomfort by one standard deviation would increase spending per person by approximately $3, on average, plus or minus less than $2 with a less than ten percent probability of getting this result by chance. These results confirm a role for EI applications and economic discomfort as factors to consider in federal expenditures on community colleges.

### 4.4 Comparison

This section completes sensitivity analysis for federal funding of different categories of higher education institutions because there is insufficient data to reliably compare findings for provincial expenditures.

#### 4.4.1 Universities

The findings imply that the federal government views universities as an aid to employment particularly in Central Canada. In general, the largest indicator for university funding is the number of EI applications. An increase in funding related to EI applications is greater than the decrease in funding associated with increasing economic discomfort. In addition, a movement of policy mood to the right in Central Canada relates to increased federal funds for universities in the region.

#### 4.4.2 Community Colleges

In general, federal expenditures on community colleges increase with economic discomfort and decrease with debt, EI applications, policy feedback, and the implementation of the EPF. In Central Canada, community college funding decreases
with GDP while in the Maritimes funding increases with federal GDP. In Western and Central Canada, funding for community colleges decrease as policy mood moves to the right. In contrast, federal funding for community colleges in the Maritimes increases as federal voters by Maritime province move to the right. In both exceptions, this contrast may be a result of targeted federal investment in the Maritime Provinces that traditionally face greater economic development challenges. In addition, the contrast by region explains the absence of significant findings for GDP and policy mood when viewed nationally.

4.4.3 Vocational Institutes

Federal expenditures for vocational institutes reflect a direct interest in employment. Vocational funding increases when EI applications increase in Central Canada and the Maritimes. In addition, funding decreases as the economy improves as measured by GDP. Interestingly, there is a shortage of significant results for Western and Central Canada regarding federal expenditures on vocational institutes in the sample.

4.5 Hypotheses

The testing of the following hypotheses shows mixed results for government expenditures on higher education institutions.

(1) Government expenditures on universities will increase as the economy grows.
(2) University funding will decrease as voter’s policy mood moves to the right.
(3) Vocational institute funding will increase as the economy shrinks.
(4) Vocational funding will increase as voter’s policy mood moves to the right.
4.5.1 University Expenditures and Economic Growth

Provincial expenditures on universities do tend to increase as the economy grows as shown by significant results for an increase in provincial GDP and a decrease in EI applications outside of the Maritimes.

Federal expenditures on universities generally increase as economic discomfort declines. However, federal funding does not increase as federal debt and EI applications decrease. Therefore, the findings show mixed results in support of hypothesis one.

4.5.2 University Expenditures and Policy Mood

Federal expenditures on universities do not decrease as voter’s policy mood moves to the right based on the only applicable significant results from Central Canada. Therefore, hypothesis two is false in this sample.

4.5.3 Vocational Expenditures and Economic Decline

Federal expenditures on vocational institutes do tend to increase across Canada as the economy shrinks as shown by significant results for funding increases related to decreased federal GDP, increased federal EI applications, and increased economic discomfort. The only exceptions in the sample are for economic discomfort in the Maritimes and provincial GDP in Alberta. Therefore, the majority of applicable findings support the validity of hypothesis three.

4.5.4 Vocational Expenditures and Policy Mood

Federal vocational funding does increase as voter’s policy mood moves to the right in Central Canada and Alberta. These two results are the only significant ones in the
sample and would need further research to confirm this finding as part of a larger trend. Therefore, the findings support the validity of hypothesis four in the sample.

4.6 Discussion

The concepts in this study that are similar to previous literature are GDP, borrowing, and unemployment. This study adds contextual categories, policy feedback, and policy mood to existing frameworks in the literature for analysis of government expenditures on higher education institutions in Canada. All three areas of additions provide new perspectives on the data and options for further research. At the same time, the findings regarding the role of the economy reinforce and potentially clarify prior research. This section discusses the findings in light of the literature where applicable.

4.6.1 Gross Domestic Product

The most applicable study in the previous literature is Elliott’s (1995) model that included provincial GDP. In general, Elliott’s (1995) model showed that overall funding for post-secondary education increased as provincial GDP increased. The single exception in his results was the province of Alberta where funding decreased when GDP increased during 1977 to 1991. The limited results for provincial GDP described above (Section 4.2.2) seem to confirm this general trend. However, the substantial variation in direction of influence of federal GDP by institutional type implies that influence of provincial GDP may vary by spending category (e.g., institutions, students) and within spending categories (e.g., institutional type).
4.6.2 Government Debt

Elliott’s (1995) study was the only one in the literature using inferential statistics to consider government debt. In general, Elliott’s (1995) model found 50/50 split in significant results for the influence of provincial borrowing on provincial post-secondary expenditures. Without provincial data to compare, this study found limited examples of significant results for the role of federal debt in Western Canada (Section 4.3.2). However, these results did vary in direction by institutional type. That is, as federal debt increases, federal spending on universities tends to increase and spending on community colleges tends to decrease in Western Canada.

The lack of significant results for the role of federal debt is particularly surprising given the attention the topic received in the 1990s. For example, four out the five political parties in the 1997 election included specific concerns related to government debt in their party manifestos. The NDP did not mention government debt and the remaining parties from left to right emphasized the following (Pennings & Keman, 2011):

“Let’s remember that between 1995 and 1998, more than half of the federal spending cuts will have come from cuts to provincial transfers. It will be those on welfare, students and the sick who will suffer the most.” *Bloc Québécois 1997 manifesto*

“A new Liberal government will continue to bring down the deficit and the debt-to-GDP ratio while directing substantial new resources to investments in jobs, health care, our children's future, and education and knowledge.” *Liberal Party 1997 manifesto*

“…the federal government is paying about $46 billion a year in interest payments—that’s more than $5 million an hour. Every year that the government runs a deficit, those numbers get worse.” *Progressive Conservative Party 1997 manifesto*
“…interest payments of $50 billion a year are eating the heart out of our health and social programs. A Reform Government will put our fiscal house in order, so we will have the resources required to fund our vital social programs.” Reform Party 1997 manifesto

In general, the quotes seem to acknowledge a connection between the limiting effects of government debt on the government’s ability to pay for social programs including education. However, the data has not yet supported an inferential relationship.

4.6.3 Unemployment

Elliott (1995) and McLendon et al. (2009) both used measures of unemployment in their models investigating higher education expenditures. In general, Elliott (1995) found that an increase in the unemployment rate tended to lead to an increase in provincial post-secondary founding in five out of six provinces. The lone exception in his study was New Brunswick. In general, McLendon et al. (2009) found that an increase in unemployment tended to lead to a decrease in state higher education expenditures in the following year. As described above in this chapter, this study finds a consistent and significant role for EI applications that tends to influence funding by institutional type. The lack of institutional type and region analysis in previous literature may partly explain the difference in results. For example, federal funding of community colleges matches the direction of findings in the McLendon et al. (2009) study.

4.6.4 Canadian Categories

This study segments the role of the economy into position and voters’ discomfort, added institutional type, and analyses data nationally and regionally. In each situation, adding a subset of categories helped refine the analysis.
Results vary in a consistent pattern between positional measures of the economy and a measure of the public’s perception of the pace of the economy. In addition, EI applications and economic discomfort were the most consistently significant independent variables of government expenditures for higher education institutions.

Separating expenditures into institutional type confirms that the influences on funding levels vary in a generally consistent pattern. For example, the federal government tends to invest in universities and vocational institutes to increase employment.

Considering results nationally and regionally provides a useful insight into the Canadian environment. Offsetting expenditure trends between the Maritimes and the rest of Canada hides relationships when viewed only from a national perspective.

In short, these additional categories offer a starting point to further refine analysis of funding patterns in Canada.

4.6.5 Policy Feedback

This study builds on previous literature on higher education funding that acknowledges the influence of prior periods. Using policy feedback analysis, through lagged dependent variables where data testing allows, applies one of the standard tools from political science. In the data sample, seven of the twelve applicable equations found a significant role for policy feedback. Therefore, considering the past is a useful addition to funding models.

4.6.6 Policy Mood

The key focus of this study is the addition of policy mood to higher education funding analysis. The federal policy mood variable constructed from the Laver and
Budge (1992) right-left scale in the Comparative Manifesto Project is significant in five out of the twelve main models used on the sample. However, there are two challenges that may have altered its influence in the results.

The first challenge is applying the right-left scale in Canada. The CMP policy category for positive text mentions of the expansion of education (per506) is, by CMP definition, a measure of the left side of the right-left scale. That is, the primary goal of education expansion is presumably to increase access for students. In Canada, education is not a federal jurisdiction and, not surprisingly, mentioned infrequently by federal parties until 1980 thereby underweighting the left side of the scale. After 1980, five out of the six high outlying data points are from centre-right parties (Figure 30).

Kershaw (2005) identifies the role of work and particularly generating earnings as a key tenet of neoliberalism. Therefore, it is reasonable to attribute this increase in focus from centre-right parties to their association of expanding higher education with the potential to increase jobs. The following two quotes provide applicable examples from the Progressive Conservative (PC) party manifestos (Pennings & Keman, 2011):

“The most spectacular federal contribution to education in recent years was the passing of the Technical and Vocational Training Assistance Act in December 1960, under which the Conservative Government agreed to contribute to each province 75% of the capital cost of schools and training programs.” *Progressive Conservative 1965 Manifesto*

“Today’s jobs demand more skills and knowledge than ever before and that trend will only grow in the future. If Canadians and their children are to share in tomorrow’s opportunities, we must start preparing today. The most important jobs advantage we can give the next generation is the opportunity for advanced education and training.” *Progressive Conservative 1997 Manifesto*
Therefore, the text measured by the CMP includes an increase in mentions of the expansion of higher education intended for job creation – a neoliberal goal. However, this increase overweighs the left side of the scale and under weights the right side. In the Canadian context, the net result is a right-left scale shifted to the left at the federal level due to the neoliberal tone of the central government’s responsibility for national economic development.

**Figure 30: Canadian Federal Manifesto Content on Education Expansion**
Federal party positions for Comparative Manifesto Project category *per506* vote-weighted by province (1945 – 2000)

The second challenge is the relationship and timing between the influences of the economy and changes in policy mood. Stevenson (2001) empirically demonstrates that policy mood moves to the left when the economy expands and moves to the right when the economy contracts as measured by changes in GDP, unemployment, and inflation.
This study confirms this finding in the Canadian sample by testing and measuring policy mood as a dependent variable with GDP, EI applications, debt, and economic discomfort as independent variables. In Central Canada, this model estimates that an increase in economic growth by one standard deviation would move voters’ policy mood to the left by approximately 72% of one standard deviation, on average, plus or minus 21% of one standard deviation with a less than five percent probability of getting this result by chance in a sample this size.

In addition, Stevenson’s (2001) results show that it may take up to four years for policy mood changes to fully reflect influence from economic changes. Therefore, elections that are closer together (e.g., 1963/1965 and 1979/1980) may underweight the influence of policy mood. Therefore, future research should consider appropriate methods to manage these challenges.

4.7 Summary

The findings of the study include a statistically significant role for attributes of the economy and elements of politics on government expenditures, by province, for universities, community colleges, and vocational institutes from observations of twelve federal elections between 1962 and 1997.

This study finds that government expenditures on universities tend to increase as the economy grows and funding for vocational institutes tend to increase as the economy grows.

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7 Test results include 80% of the dependent variables passing the stationarity condition and all these cases demonstrating the absence of autocorrelation.
8 Central Canada was the only region that had significant results for all four indicators of economic growth: GDP increasing, debt decreasing, EI applications decreasing, and economic discomfort decreasing. Presented results are the net of the four variables and assuming the lowest level of significance out of the four variables.
shrinks. The addition of voters’ perception of the economy through a measure of
discomfort provides a useful addition to the established role of the government’s ability
to pay as a factor in higher education expenditures.

This study adds policy feedback and policy mood to explore the role of politics in
government decisions for funding levels. A one-election lag of the dependent variable
proved significant in over half of the models at both the national and regional level. The
role of policy mood is significant at the regional level but not nationally in part to
offsetting trends between Canadian regions. The study finds that federal funding for
vocational institutes will increase as voter’s policy mood moves to the right in Central
Canada and Alberta. Current challenges with implementing a measure of policy mood in
Canada may limit its effectiveness to separate political from economic influences on
government expenditures on higher education institutions.
5 Conclusion

5.1 Summary

This study uses theoretical frameworks from political science to guide the design and selection of measures to interpret economic and political variables associated with federal and provincial government expenditures on higher education institutions in Canada between 1963 and 1997.

Framing the context of the study through the lens of political theories on policy choice organizes the literature and determines the variables for the study. The general model builds on current econometric variables used in the higher education finance literature by adding measures of voters’ economic discomfort, policy feedback, and constructing a measure of policy mood of federal voters as a proxy for public opinion.

The limitations of the study reflect the challenges in the higher education finance field highlighted by Rizzo (2003): lack of consensus on methods, data accessibility, and isolating relationships between the measures. These challenges influence the selection of methods, data sources, and analytical tools. Therefore, this study develops a new methodology to address these challenges. However, the implementation of a new methodology is also a limitation.

The findings of the study provide evidence that confirms a significant role of the economy towards influencing government expenditures on higher education that varies by institutional type and Canadian region. In addition, results demonstrate a significant role for policy feedback and voters’ policy mood as influences on government funding decisions.
5.1.1 Context

One way to analyse decisions by governments is with political theories regarding policy choice. Jacobs (2010f) outlines a methodology to compare variation in six analytical categories across jurisdictional cases. The categories for theoretical frameworks, or meta-framework, include the environment (e.g., economic and demographic), political institutions, policy feedback, public opinion and elections, the organization of interests, and policymakers’ ideas. In addition, the methodology locates the categories sequentially leading up to a policy choice and reflects the change in the environment from the government decision. These six categories provide a lens to organize the limited amount of literature using inferential analysis relevant to government expenditures on higher education.

Using the Jacobs (2010f) framework of political theories highlights the opportunities for new investigation into political factors. In general, the current higher education finance literature puts about half its focus on the environment through consideration of primarily economic and demographic variables (Table 21).

Table 21: Weighting of Analysis by Political Category

<table>
<thead>
<tr>
<th>Political Categories</th>
<th>Literature</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Significant Variables</td>
<td>Tested Variables</td>
</tr>
<tr>
<td>Environment</td>
<td>291</td>
<td>574</td>
</tr>
<tr>
<td>Feedback</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Opinion</td>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>Interests</td>
<td>33</td>
<td>79</td>
</tr>
<tr>
<td>Ideas</td>
<td>71</td>
<td>134</td>
</tr>
<tr>
<td>Institutions</td>
<td>74</td>
<td>141</td>
</tr>
<tr>
<td>Totals</td>
<td>492</td>
<td>987</td>
</tr>
</tbody>
</table>
The literature splits the remainder of its focus approximately one third on political institutions, one third on policymakers’ ideas, and one third for the other three categories. The current literature puts the least amount of focus on the role of policy feedback, public opinion and elections, and the organization of interests. The majority of higher education finance literature uses American data. Therefore, this study includes variables for the environment and political institutions for consistency and adds new variables for policy feedback and public opinion given the absence of comparable Canadian measures of the organization of interests. In addition, this study includes policymakers’ ideas indirectly through the policy mood variable. Adding a separate measure for policymakers’ ideas is more suitable for future research once current data challenges are improved.

Overall, approximately half of the tested variables in the higher education finance literature demonstrated significance. Approximately one third of the tested variables in this study demonstrated significance due to methodological differences. The main difference between this study and the literature is the tight testing requirements for data in order to support the use of a lagged dependent variable. In general, the methods in the current literature focus on the use of fixed effects statistical models without a lagged dependent variable and using applicable fixed effects testing (Table 22). However, the literature continues to use fixed effects testing methods when using lagged dependent variable and first difference methods.

As Keele and Kelly (2006) demonstrate, models considering political factors need to use the appropriate data testing techniques for appropriate specification. This raises two challenges. First, models with political factors may be misspecified if there is no lagged dependent variable to account for past influences if, theoretically, it is reasonable
to believe there is some form of policy feedback. Therefore, there is an opportunity to improve the analysis of the work completed by Elliott (1995), Hossler et al. (1999), Weerts and Ronca (2006), Archibald and Feldman (2006), and McLendon et al. (2009) by adding a lagged dependent variable and using appropriate data testing methods.

Second, if models using a lagged dependent variable do not test for non-stationarity and autocorrelation, then the results will be unreliable. Therefore, there is an opportunity to improve the analysis of the work completed by Rizzo (2003) and Tandberg (2007) by testing the data for non-stationarity and autocorrelation. This study updates the work of Elliott (1995) that used a first differences model by adding lagged dependent variables with applicable testing.

**Table 22: Comparison of Analytical Methods**

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Literature</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical Models</td>
<td><strong>Fixed Effects, Lagged Dependent Variable, &amp; First Differences</strong></td>
<td>Fixed Effects, Random Effects, Lagged Dependent Variable, &amp; First Differences</td>
</tr>
<tr>
<td>Data Testing</td>
<td><strong>Hausman, Breusch-Pagan Lagrange Multiplier, Leading Values, Variation Inflation Factor, Akaike’s Information Criterion, &amp; Weak Instruments</strong></td>
<td>Hausman, Breusch-Pagan Lagrange Multiplier, Non-stationarity, &amp; Autocorrelation</td>
</tr>
<tr>
<td>Reporting</td>
<td><strong>Significance, Direction, &amp; Magnitude</strong></td>
<td><strong>Significance, Direction, &amp; Magnitude</strong></td>
</tr>
</tbody>
</table>

Note: Bold reflects primary focus

Data that did not pass the testing requirements in this study showed higher levels of significance in regression equations. However, those results are not reliable and not included in reporting. The benefit of using the stricter testing requirements outlined by
Keele and Kelly (2006) is that this study can report a more reliable picture of the
influence from the past through policy feedback. In this study, the lagged dependent
variable is the applicable government expenditures on higher education. This study uses
the lagged dependent variable as a proxy for the theoretical concept of policy feedback.
In addition, this study uses three economic measures and constructs two proxy variables
to represent public perception (Table 23).

**Table 23: Comparison of Concepts and Proxies**

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Influence</td>
<td>GDP, Debt, EI Applications, &amp; Economic Discomfort*</td>
</tr>
<tr>
<td>Policy Feedback</td>
<td>Lagged Dependent Variable</td>
</tr>
<tr>
<td>Public Opinion</td>
<td>Policy Mood*</td>
</tr>
<tr>
<td>Organization of Interests</td>
<td>n/a</td>
</tr>
<tr>
<td>Policymakers’ Ideas</td>
<td>n/a</td>
</tr>
<tr>
<td>Political Institutions</td>
<td>Presence of EPF</td>
</tr>
</tbody>
</table>

* Note: Constructed proxies to represent public perception

The constructed variables act as a proxy for public opinion relating to the
economy and to policymakers’ ideas. First, this study builds an ordinal “economic
discomfort” variable from the number of cases per period showing that the economy is
going worse at a faster pace. The three indicators are the increasing pace of inflation
through the Consumer Price Index, the increasing pace of government debt through a
measure of debt as a percentage of GDP, and the increasing pace of unemployment
through the number of Employment Insurance (EI) applications per month. Second, this
study builds a continuous “policy mood” variable based on data from the Comparative
Manifesto Project for the position of party platforms on Laver and Budge’s (1992) right-
left scale. This study calculates the policy mood of voters by province by weighting
national Comparative Manifesto Project data by votes per federal party by province.
5.1.2 Limitations

Rizzo (2003) highlights three challenges in the field of higher education finance. First, there is a lack of consensus on appropriate analytical methods. Second, there is a lack of accessible data. Third, there is difficulty in isolating the relationships between political and economic influences on government decision makers. In addition, McLendon et al. (2009) points out that even with recent attention in the field, from about a half dozen papers, the inferential understanding of the area is “underdeveloped both conceptually and empirically” (p. 688).

In light of this context, this study attempts to prototype a new approach by applying three tools from political science to address the corresponding three challenges. First, the study uses political science categories of theoretical concepts outlined by Jacobs (2010f) to build a framework of frameworks, or meta-framework, to guide selection of variables and methods. Second, the study introduces the use of data from the Comparative Manifesto Project for sub-national jurisdictions and Stimson’s (1991, 1999) policy mood concept to provide new opportunities to access political data. Third, the study adapts analytical tools from Beck and Katz (1995), Keele and Kelly (2006), and Wilson and Butler (2007) to higher education finance for reliably isolating relationships with lagged dependent variables and regression equations using panel corrected standard errors. With any prototype, there is a risk of misspecifying the application of tools in a new field. To minimize that risk and reduce complexity, this study does not include variables for all political categories. Therefore, in minimizing one risk the study creates another with the absence of robust measures for the organization of interests,
policymakers’ ideas, and political institutions. The intent of the study is to offer a new approach available for iterative improvement.

Limited data availability and challenges from irregular timing of Canadian federal elections reduce the sample size of provincial expenditures on higher education institutions to a handful of observations. Therefore, the study’s results primarily focus on the influence of the variables on federal expenditures.

This study uses regions instead of Canada due to offsetting regional trends that limit the effectiveness of national results. Federal expenditures on higher education institutions in the Maritime Provinces exhibit a different pattern from the rest of the country. For example, federal expenditures on community colleges tend to rise by approximately $7 per person in the Maritimes as GDP increases by $1,819 per person. However, federal expenditures fall by approximately $4 elsewhere with a similar increase in GDP (Table 24). In addition, federal expenditures on community colleges tend to rise in the Maritimes as voter’s policy mood moves to the right and decrease elsewhere.

Table 24: Summary of Magnitude
Federal expenditures per person on higher education institutions (Universities, Community Colleges, & Vocational Institutes) by province aggregated by region

<table>
<thead>
<tr>
<th>Variables</th>
<th>Std. Dev.</th>
<th>BC-QC (U, CC, V)</th>
<th>NB-NL (U, CC, V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>$1,819</td>
<td>-$4</td>
<td>$7</td>
</tr>
<tr>
<td>debt</td>
<td>$1,420</td>
<td>$4</td>
<td>-$2</td>
</tr>
<tr>
<td>EI</td>
<td>0.14%</td>
<td>$9</td>
<td>-$4</td>
</tr>
<tr>
<td>discomfort</td>
<td>1.92</td>
<td>-$8</td>
<td>$3</td>
</tr>
<tr>
<td>feedback</td>
<td>$27/$5/$66</td>
<td>-$3</td>
<td>-$12</td>
</tr>
<tr>
<td>mood</td>
<td>9.12</td>
<td>$4</td>
<td>-$5</td>
</tr>
<tr>
<td>EPF</td>
<td>0.28</td>
<td>-$1</td>
<td>-$5</td>
</tr>
</tbody>
</table>

In addition, this study uses regions instead of provinces due to data challenges.

That is, there is insufficient data meeting stationarity and absence of autocorrelation.
criteria to compare individual provinces. Currently, the study relies on the strength of panel corrected standard errors to derive results from pooled data of multiple provinces.

The study primarily focuses on university and vocational institute funding because the community college category is not stable across Canada and over time. The current community college category includes non-degree granting institutions. However, institutions may apply to become degree granting institutions and subsequently fall into either the university or vocational institution category. Therefore, it is possible that a portion of the decreased funding going towards community colleges represents fewer institutions defined as community colleges.

5.1.3 Findings

This study tests four hypotheses regarding government expenditures on universities and vocational institutes. First, the study finds mixed support for the hypothesis that government expenditures on universities will increase as the economy grows. That is, provincial funding for universities tends to increase in some regions but federal funding does not increase in a consistent pattern. Second, the study finds no support in the sample for the hypothesis that university funding will decrease as voter’s policy mood moves to the right. However, the constrained availability of valid data limits this finding to Central Canada. Therefore, there is insufficient evidence in this sample to alter the general trend in the literature supporting the connection between lower funding levels and ideological movement to the right. Third, the study finds support for the hypothesis that vocational institute funding will increase as the economy shrinks. This finding supports the connection between the importance of jobs and the role of funding to support job creation through vocational institutes. Fourth, the study finds support for the
hypothesis that government expenditures on vocational institutes will increase as voter’s policy mood moves to the right. This finding supports Kershaw’s (2005) analysis that neoliberal ideology supports the central role of work as a policy goal.

5.2 Conclusions

There are three implications from the study that may influence the field of higher education finance. The study offers an original contribution to the literature, opportunities for application, and topics for future research.

5.2.1 Contribution

This study continues the work of Elliott (1995) to investigate government expenditures on higher education in Canada. The research is incremental in that similar concepts appear in other studies in political science. However, it is demonstrative rather than definitive due to data challenges and the absence of robust measures for the organization of interests, policymakers’ ideas, and political institutions.

Based on Phillips’ (1992) criteria, there are six ways that this study makes an original contribution to the literature. First, this study completes new empirical research specific to inferential statistical analysis of government expenditures on higher education institutions in Canada by province aggregated by region. Elliott (1995) looked at total government expenditures by province for the entire higher education sector and did not find regional trends. This study identifies offsetting trends by institutional type and geographic region that mask results when combined.

Second, this study proposes and uses a new synthesis of Stimson’s (1991, 1999) policy mood theory, typically relating to public opinion surveys, and Laver and Budge’s
(1992) right-left scale, typically used at the national level, to apply Comparative Manifesto Project federal data at the provincial level. This study applies this synthesis to higher education finance. However, researchers can apply this technique in other federal countries and other fields (e.g., state/provincial welfare expenditures).

Third, this study uses lagged dependent variable techniques developed and revised by Beck and Katz (1995), Keele and Kelly (2006), and Wilson and Butler (2007), typically used in comparative political analysis, and applies these techniques in a new area. This study demonstrates the use of this technical literature for application in higher education finance and highlights the opportunities for their use to improve the robustness of future research.

Fourth, this study brings new evidence to a longstanding debate on the role of politics and higher education funding. This study is the first to estimate and forecast the magnitude of effects from inferential analysis of Canadian political factors influencing government expenditures on higher education institutions. After robust data testing, this study finds significant relationships for new variables reflecting policy feedback and public opinion.

Fifth, this cross-disciplinary study adds political science theory and methods to the mainstream econometric approaches used in the higher education finance literature. This study demonstrates the use of Jacobs’ (2010f) approach to theoretical frameworks as a guide for theory and method selection to complement econometric methodology.

Sixth, this study investigates public opinion in relation to the economy, through economic discomfort, and related to politics, through policy mood, that inferential analysis of higher education finance has not considered to date. Rizzo (2003) and
Tandberg (2007) were the only researchers to consider a variable that fits within the public opinion and elections category. However, both studies used the same variable that relates to elections (i.e., voter turnout) and not considered proxies for public opinion.

In summary, the study contributes two examples of the use of public opinion for researchers to consider. First, the study highlights that the cumulative effect of changes in economic pace may influence public opinion and thereby act as a variable influencing government decisions. Second, the study provides a methodology to use Comparative Manifesto Project and Canadian Parliamentary Guide data to build a measure of federal policy mood by province. This proxy for policy mood is useful for analysis of combined, federal, and/or provincial government spending. In addition, researchers could use a similar approach in other federal countries and for other areas of expenditures.

5.2.2 Application

This study brings three approaches from political science to complement the economic focus in the higher education finance literature and match the challenges outlined by Rizzo (2003).

First, researchers can apply the Jacobs’ (2010f) meta-framework for policy choice to help build consensus on the methods for considering political variables in higher education finance models. Broadly speaking, the theoretical framework provides options for researchers outside of political science to include the role of politics in studies.

Second, researchers can use Comparative Manifesto Project data at the country and provincial/state level of analysis as demonstrated to increase options for data accessibility. At a minimum, the Comparative Manifesto Project provides new data to use in quantitative and qualitative models. At the maximum, researchers can integrate the
Comparative Manifesto Project data into new uses, such as policy mood, that opens up new data opportunities for analytical models.

Third, the study highlights technical literature from Beck and Katz (1995), Keele and Kelly (2006), and Wilson and Butler (2007) that researchers can apply in models for more robust isolation of relationships between the variables. Specifically, this technical literature provides testable methods for using lagged dependent variables with time series cross section and panel data.

This study provides all three elements to support applications for forecasting, advocacy, and evidence based decisions. The empirical results provide significance, direction, and magnitude of the roles of economic and political factors regarding higher education expenditures. The practical application of the magnitude of findings by non-researchers could improve forecasting of funding levels at institutions by region. In addition, the magnitude of results provides information for framing advocacy for increased funding. For example, higher education institutions may benefit by emphasizing their job creation potential during economic downturns. Furthermore, policymakers and policy analysts could use measures of economic discomfort and policy mood to help predict public preferences for resource allocation.

5.2.3 Future Research

The goals for immediate future research involve building the foundation for analysis by province and then expanding into further comparative analysis. Building the methodological foundation includes implementing data smoothing techniques, exploring the effects from multiple period lags, confirming an election effect, and expanding the use of political variables. Once the foundation is in place, options for comparative
analysis include recasting American research, researching the differences between federal and unitary states, considering alternative right-left scales, and investigating the influence of spatial dynamics.

Building a methodological foundation starts with addressing non-stationarity in the data. This study used basic moving averages, conversion to Canadian dollars relative to 1997 to address inflation, and conversion of raw expenditures to funding per person to smooth population growth. However, gaps between elections may still mimic growth trends. Implementing advanced data smoothing techniques is the first step to enable a wider range of research with Canadian data.

Furthermore, future research needs an exploration of the effects from multiple period lags. As Stevenson’s (2001) results demonstrate with the economy and policy mood, the effects between the variables may occur over a four-year period. In the current higher education finance literature, if a researcher used lags in time between independent variables or a lagged dependent variable, then it was a one-year lag. Future research can reliably compare equations with various multi-year lag combinations once the data smoothing techniques produce data that meets the stationarity criteria.

Another option for strengthening the methodological foundation is confirming the presence of an “election effect”. This involves comparing inferential results between non-election and election year data. The base case would use the same theoretical framework without the policy mood variable because actual data is only available during election years. The base case equations would test a dummy variable for election years to see if there is a significant change in higher education expenditures related to elections. The test case would combine data smoothing and cointegrated data techniques, where applicable,
to forecast a policy mood value in between elections derived from economic variables. If simulations demonstrate that the forecasted policy mood values are reasonable and reliable, then research can use the base and test versions of the data for sensitivity analysis.

In addition, future research could expand the use of political variables by including proxies for the role of demographics, interest groups, and policymakers’ ideas as independent variables to assess and compare Canadian results more closely with American studies. Completing research in the first four areas in sequence provides a stable way to incremental improve the methodology and complete the foundation for broader application of the model because it is very likely that other jurisdictions will face similar data challenges.

Future research directions that draw on the work from this thesis include new options for comparative analysis. For example, this study supports the ability to recast previous American research on higher education expenditures by adding economic discomfort, policy feedback, and policy mood. One way to do this would be the comparison of policy mood based on the Comparative Manifesto Project weighted by state with the Grapevine citizen ideology measure. Alternatively, this study highlights the work of Keele and Kelly (2006) for other researchers to consider the use of the lagged dependent variable where appropriate for analysis of political dynamics.

Using this study’s theoretical framework and methodology would allow for comparative analysis between unitary and federal countries as well as states/provinces within federal countries. The economic discomfort methodology would be the most
reliable tool until finding methods to handle the data challenges restricting the use of policy mood.

The presented methodology in this study can also adapt to other right-left tools for sensitivity analysis. For example, the Klingemann et al. (2006) scale is an alternative tool to the Laver and Budge (1992) framework provided by the Comparative Manifesto Project. In the Canadian context, this could include different weighting of the Comparative Manifesto Project policy categories to better reflect provincial and federal divisions of responsibilities. In addition, it would be technically feasible to move from a single left-right axis to a two-axis scale to represent placement within a four-quadrant map of political ideologies.

Furthermore, analysis of spatial dynamics provides additional comparative options for considering provincial and national data. For example, do geographically nearer provinces provide a greater influence over farther provinces economically and politically? Similarly, spatial dynamics is also relevant for national comparative analysis. For example, Kayser (2009) investigates the relationship between business cycles and electoral decisions in countries based on their spatial relationship to each other. The field of spatial econometrics holds interesting opportunities to add to comparative analysis.

In conclusion, this study highlights the opportunity to add public opinion measures to higher education finance research by using a policy choice meta-framework. Furthermore, this study demonstrates the usefulness of public opinion related to the economic environment and national party positions described in manifestos. The limitations of the study provide new options for research areas. In addition, the implications from the methodology and findings highlight opportunities to use recent
developments in regression analysis techniques for time series data and improve research in the area of higher education finance by adding political factors.
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